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Review Article

Emotional Intelligence and Digital Competence in Enhancing Teacher Performance: A Two-Stage Higher-Order PLS-SEM with Learning Effectiveness as Mediator

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ABSTRACT

Purpose of the study: This study examines how emotional intelligence and digital competence jointly influence teacher performance through the mediating role of learning effectiveness in private elementary schools in Cilegon, Indonesia. It addresses a key gap in prior research by adopting a process-oriented perspective to explain how teacher competencies are translated into professional performance.

Methodology: A cross-sectional survey was conducted involving 243 teachers selected using proportional stratified random sampling. Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with a two-stage higher-order approach to capture the multidimensional nature of the constructs and their structural relationships.

Main Findings: The results indicate that emotional intelligence and digital competence both have significant positive effects on teacher performance. Emotional intelligence strongly predicts digital competence and contributes to learning effectiveness, while digital competence enhances instructional quality. Learning effectiveness partially mediates the relationships between competencies and performance, demonstrating that teacher capabilities influence outcomes both directly and through teaching–learning processes.

Novelty/Originality of this study: This study contributes by proposing an integrative competency framework that positions emotional intelligence as a foundational resource for digital competence and identifies learning effectiveness as a key mediating mechanism. It extends existing models by offering a process-based explanation of how competencies translate into teacher performance, providing both theoretical advancement and practical insights for teacher development in the digital era.

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1. INTRODUCTION

Teacher performance has increasingly been recognized as a critical determinant of educational quality, as it reflects the extent to which teachers effectively enact instructional, pedagogical, and professional responsibilities in classroom practice. Across global and national contexts, disparities in learning outcomes, instructional quality, and resource allocation continue to highlight the importance of strengthening teacher capacity as a central lever for improving education systems [1]. In Indonesia, national education reports further emphasize persistent challenges in instructional processes and school quality, positioning teacher performance as a strategic priority for educational reform [2], [3]. These conditions underscore the urgency of identifying key determinants that can enhance teacher effectiveness in diverse educational settings.

From a theoretical perspective, performance is more appropriately conceptualized as a set of behaviors that contribute to organizational goals rather than merely outcomes [4]. This behavioral perspective is particularly relevant in teaching, where performance manifests through observable professional practices such as lesson planning, instructional delivery, assessment, and professional collaboration. Complementing this view, role theory suggests that teacher performance emerges from how individuals interpret and enact institutional expectations, requiring continuous adaptation to pedagogical, administrative, and socio-relational demands in school environments [5]. Thus, teacher performance is inherently multidimensional, shaped by both structural expectations and individual agency.

A growing body of research indicates that teacher performance is shaped by both contextual factors and individual-level resources. Organizational conditions such as workload, accountability systems, and institutional support have been shown to significantly influence teacher effectiveness [6], [7]. Excessive workload and administrative demands may lead to burnout, which in turn undermines work performance [8], while accountability pressures can increase stress levels and negatively affect instructional quality [9], [10]. However, recent scholarship has increasingly emphasized the role of internal capacities, suggesting that sustainable teacher performance depends not only on external conditions but also on psychological resources and personal competencies.

In this regard, psychological and socio-emotional characteristics have been identified as critical determinants of teacher effectiveness. Teachers' psychological attributes, including motivation, resilience, and emotional regulation, significantly influence their well-being, interpersonal relationships, and instructional practices [11]. Moreover, emotional experiences within professional contexts shape how teachers respond to classroom challenges and interact with students [12]. These findings suggest that internal psychological resources play a central role in enabling teachers to maintain instructional quality under complex and demanding conditions. Among these resources, emotional intelligence (EI) has received considerable scholarly attention. Emotional intelligence refers to the ability to perceive, understand, regulate, and utilize emotions in oneself and others. Empirical evidence demonstrates that emotional intelligence significantly contributes to teacher performance by enhancing classroom management, communication, and relational dynamics [13]. Furthermore, systematic reviews indicate that emotional intelligence training programs can effectively improve teachers' professional competencies and instructional effectiveness [14]. Given the emotionally intensive nature of teaching, EI can be considered a foundational capability that supports both pedagogical practices and professional resilience.

In parallel with the increasing digitalization of education, digital competence (DC) has emerged as another essential capability for teachers. Digital competence encompasses the knowledge, skills, and attitudes required to effectively use digital technologies for teaching, communication, content creation, and problem-solving [15]. Systematic reviews highlight that digital competence is a multidimensional construct that integrates technological, pedagogical, and cognitive dimensions [16]. Global evidence further indicates that digital competence has become a critical requirement for teachers across educational systems, particularly in response to rapid technological change [17]. Empirical studies also confirm that teachers' digital competence significantly influences online teaching effectiveness and students' learning outcomes [18], while recent frameworks emphasize the importance of motivation and self-regulated learning in the development of digital competence [19].

Although emotional intelligence and digital competence have been widely studied as independent predictors of teacher performance, the conceptual relationship between these two competencies remains underexplored. Emerging perspectives suggest that emotional intelligence may function as an underlying psychological resource that facilitates the development of digital competence. For instance, the concept of digital emotional intelligence highlights the integration of emotional and technological capabilities in navigating digital environments [20]. Similarly, studies in organizational contexts indicate that digital intelligence and emotional intelligence are complementary constructs that jointly influence performance and adaptability [21]. In educational settings, emotional intelligence has also been found to enhance teachers' self-efficacy and willingness to adopt technology, suggesting its role as an antecedent of digital competence [22]. However, empirical research examining this integrative relationship remains limited.

Furthermore, existing studies tend to examine the direct effects of emotional intelligence and digital competence on teacher performance, often overlooking the process through which these competencies translate into performance outcomes. From a pedagogical standpoint, teacher performance is not solely determined by competencies themselves, but by how these competencies are enacted within the teaching–learning process. In this context, learning effectiveness (LE) represents a critical mechanism that captures the quality of instructional processes, including student engagement, instructional strategies, learning environment, and feedback practices. Thus, learning effectiveness serves as a bridge between teacher competencies and observable performance outcomes.

Despite its theoretical relevance, learning effectiveness has rarely been positioned as a mediating variable that explains how competencies influence teacher performance. This represents a significant gap in the literature, as it limits the understanding of the underlying mechanism through which personal and professional competencies are transformed into observable performance outcomes. Integrating learning effectiveness as a mediating construct allows for a more process-oriented perspective, bridging the gap between teacher capacity and instructional practice while aligning with contemporary approaches to performance management and instructional quality [7], [10]. Based on the above considerations, this study addresses three key research gaps. First, prior research has not sufficiently examined the integrative relationship between emotional intelligence and digital competence within a unified model of teacher performance [20], [21]. Second, the potential role of emotional intelligence as an antecedent of digital competence remains theoretically suggested but empirically under-investigated [22]. Third, the mechanism through which these competencies influence teacher performance particularly through learning effectiveness as a mediating process has not been adequately explored, despite growing evidence on the importance of instructional processes in shaping educational outcomes [6], [18].

Accordingly, this study aims to develop and empirically test a process-oriented model of teacher performance by integrating emotional intelligence, digital competence, and learning effectiveness within a higher-order structural framework. Specifically, this study seeks to: (1) examine the direct effects of emotional intelligence and digital competence on teacher performance; (2) analyze the influence of emotional intelligence on digital competence and learning effectiveness; (3) investigate the effect of digital competence on learning effectiveness; and (4) test the mediating role of learning effectiveness in the relationships between competencies and teacher performance.

By addressing these objectives, this study contributes to the literature in several ways. Theoretically, it advances a more comprehensive understanding of teacher competence by positioning emotional intelligence as a foundational psychological resource that shapes digital competence and instructional processes. Conceptually, it introduces a process-based perspective by incorporating learning effectiveness as a mediating mechanism, thereby extending existing competency–performance models. Methodologically, it applies a higher-order PLS-SEM approach to capture the multidimensional nature of teacher competencies. Practically, the findings are expected to inform the design of integrated professional development programs that combine socio-emotional and digital competencies to enhance teacher performance in contemporary educational contexts.

2. RESEARCH METHOD

This study employed a quantitative approach using a cross-sectional survey design to examine the relationships among emotional intelligence (EI), digital competence (DC), learning effectiveness (LE), and teacher performance (TP). A correlational design was adopted to test both direct and mediated relationships among latent variables within a structural framework. To analyze the proposed model, this study applied Partial Least Squares Structural Equation Modeling (PLS-SEM) using SmartPLS 4.0. PLS-SEM was selected for several reasons: (i) its suitability for complex models involving hierarchical constructs and mediation paths, (ii) its robustness under non-normal data conditions, and (iii) its ability to handle relatively moderate sample sizes while maintaining predictive accuracy.

The model was specified as a higher-order reflective–reflective construct and estimated using a two-stage approach. In the first stage, latent variable scores for first-order constructs were obtained. In the second stage, these scores were used as indicators for the higher-order constructs, followed by standard evaluation of the measurement and structural models. The hypothesized relationships were formulated as a path analysis model comprising direct paths and mediated (indirect) paths through Learning Effectiveness (Y). Specifically, the model includes: $X_1 \rightarrow X_2$, $X_1 \rightarrow Y$, $X_2 \rightarrow Y$, $Y \rightarrow Z$, and the direct effects $X_1 \rightarrow Z$ and $X_2 \rightarrow Z$, enabling the indirect effects $X_1 \rightarrow Y \rightarrow Z$ and $X_2 \rightarrow Y \rightarrow Z$.

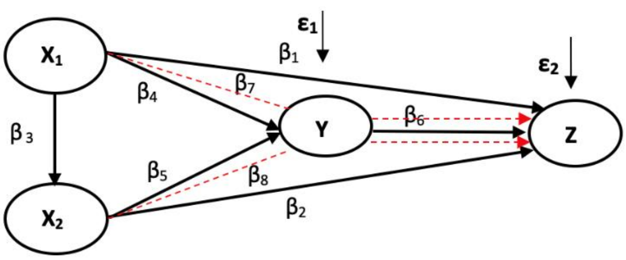

Figure 1. Structural/path model

The study was conducted in private elementary schools in Cilegon City, Banten Province, Indonesia. The target population comprised all active teachers in private elementary schools during the 2024/2025 academic year, totaling 663 teachers based on official educational records. The sample size was determined using the Isaac and Michael approach with a 5% margin of error, resulting in a minimum required sample of 243 respondents. To ensure representativeness across geographical units, the study employed proportional stratified random sampling, where teachers were selected proportionally from eight districts.

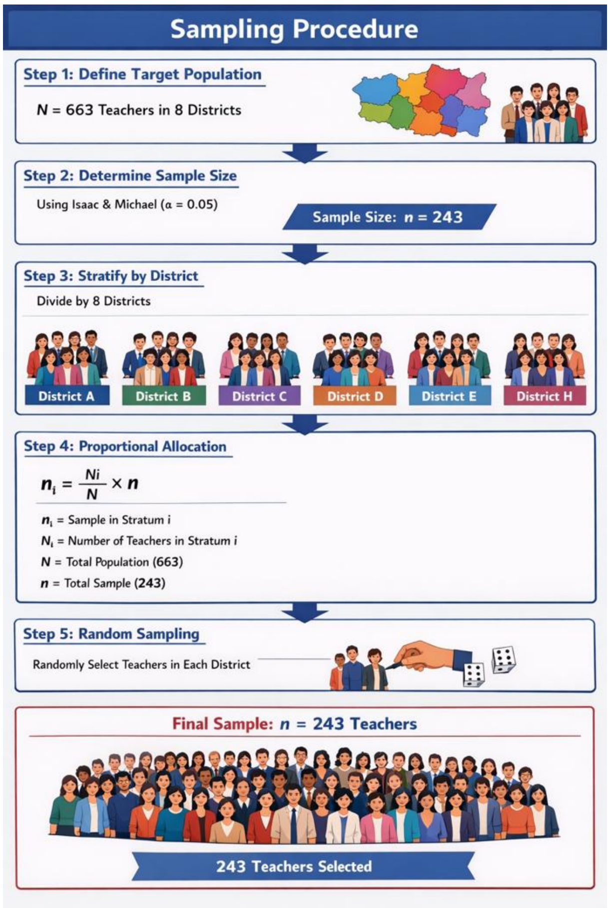

Figure 2. Sampling procedure (proportional stratified random sampling)

This sampling strategy enhances representativeness and reduces sampling bias by ensuring that each district contributes respondents according to its population proportion. The Measures and Instrumentation section outlines that data were collected using a structured questionnaire developed based on well-established theoretical constructs to ensure conceptual rigor and empirical validity. All variables were measured using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). This scaling approach enables the systematic quantification of respondents' perceptions while supporting robust statistical analysis.

Each construct was operationalized with clear conceptual boundaries to enhance measurement accuracy. Emotional Intelligence (EI) was conceptualized as a multidimensional construct encompassing self-awareness, self-regulation, self-motivation, empathy, and social skills. This operationalization reflects the integrative nature of emotional intelligence in shaping individuals' cognitive and social functioning. Furthermore, Digital Competence (DC) was defined as teachers' ability to effectively utilize digital technologies across several domains, including information processing, communication, content creation, digital safety, and problem-solving. This construct captures both technical and pedagogical dimensions of technology use in educational settings.

In addition, Learning Effectiveness (LE) was defined as the overall quality of the instructional process, incorporating student engagement, instructional strategies, learning environment, and feedback mechanisms. Meanwhile, Teacher Performance (TP) was reflected through observable professional behaviors, including work quality, discipline, initiative, competence, and communication skills. Through this systematic operationalization, the instrument is expected to produce reliable and valid data for examining the relationships among the study variables.

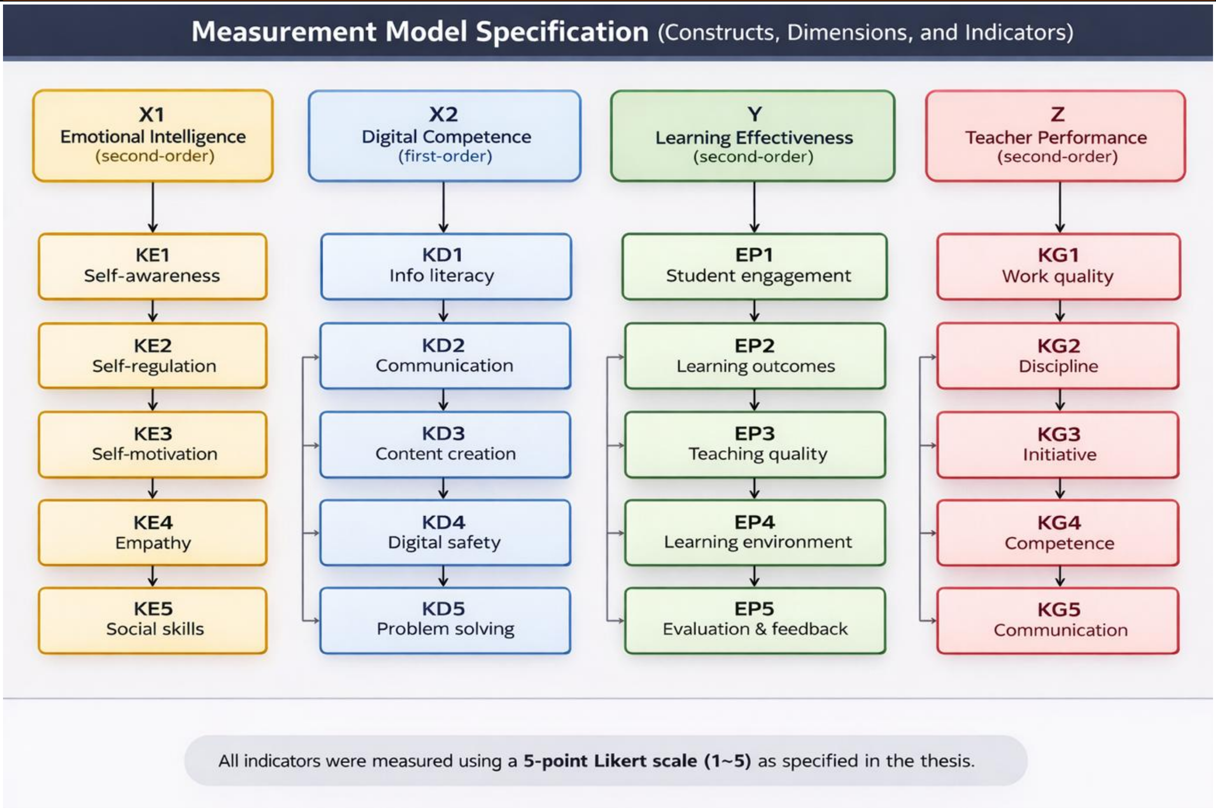

Figure 3. Measurement model specification

Prior to SEM analysis, initial validity testing was conducted using Pearson product–moment correlation to ensure that each item adequately represented its construct. Reliability was assessed using Cronbach's Alpha, with a threshold of $\alpha \geq 0.70$. Subsequently, within the PLS-SEM framework, measurement model evaluation included convergent validity, internal consistency reliability, and discriminant validity. The measurement criteria are presented in Table 1

Table 1. Measurement validation and reliability criteria

Stage	Analysis Technique	Purpose	Criteria / Threshold
Preliminary Analysis	Pearson Product–Moment Correlation	To assess item validity and ensure each indicator represents its construct adequately	r-value significant ($p < 0.05$)
Preliminary Analysis	Cronbach's Alpha	To evaluate internal consistency reliability of the instrument	$\alpha \geq 0.70$
Measurement Model (PLS-SEM)	Convergent Validity	To confirm that indicators converge to measure the same construct	Outer loading ≥ 0.70; AVE ≥ 0.50
Measurement Model (PLS-SEM)	Internal Consistency Reliability	To assess construct reliability within SEM framework	Composite Reliability ≥ 0.70
Measurement Model (PLS-SEM)	Discriminant Validity	To ensure constructs are distinct from one another	Fornell–Larcker criterion satisfied; HTMT < 0.90

Data analysis was conducted using a two-step approach within the Partial Least Squares Structural Equation Modeling (PLS-SEM) framework, following established methodological guidelines. The first stage involved the evaluation of the measurement model (outer model) to ensure the adequacy of construct validity and reliability prior to hypothesis testing. The second stage focused on the evaluation of the structural model (inner model) to test the hypothesized relationships among constructs. This stage included the assessment of collinearity, explanatory power, effect size, predictive relevance, and overall model fit using established thresholds.

The measurement model (outer model) was evaluated to ensure that all constructs met the required standards of validity and reliability prior to structural model assessment. This step is essential in PLS-SEM to confirm that the observed indicators adequately represent their respective latent variables and that the measurement properties are statistically sound. Indicator reliability was first examined through outer loadings.

Indicators with loadings of 0.70 or higher were considered acceptable, indicating that a substantial proportion of the variance in each indicator is explained by its corresponding construct. Indicators with loadings between 0.40 and 0.70 were subject to further consideration and retained only if they contributed to the overall construct validity. Convergent validity was assessed using the Average Variance Extracted (AVE), with a threshold of 0.50 or higher, indicating that each construct explains more than half of the variance of its indicators. Internal consistency reliability was evaluated using Composite Reliability (CR), with values above 0.70 considered satisfactory, reflecting the consistency of the indicators in measuring the same construct. Discriminant validity was examined using two complementary approaches. First, the Fornell–Larcker criterion was applied by comparing the square root of AVE for each construct with its correlations with other constructs, ensuring that each construct shares more variance with its indicators than with other constructs. Second, the Heterotrait–Monotrait ratio (HTMT) was used as a more stringent criterion, with values below 0.90 indicating adequate discriminant validity.

Following the establishment of a valid and reliable measurement model, the structural model (inner model) was evaluated to examine the hypothesized relationships among constructs. This stage focuses on assessing the predictive capability of the model as well as the strength and significance of the structural paths.Collinearity among predictor constructs was first assessed using the Variance Inflation Factor (VIF). VIF values below 5 indicate that multicollinearity is not a concern and that the estimated path coefficients are not biased due to high correlations among exogenous variables. The explanatory power of the model was evaluated using the coefficient of determination (R^2), which reflects the proportion of variance in the endogenous constructs explained by their predictors. R^2 values of 0.25, 0.50, and 0.75 are interpreted as weak, moderate, and substantial, respectively, providing a basis for assessing the model's explanatory strength. To further examine the contribution of each exogenous construct, effect size (f^2) was calculated. Values of 0.02, 0.15, and 0.35 indicate small, medium, and large effects, respectively, thereby offering insight into the practical significance of each structural relationship. Predictive relevance was assessed using the Stone–Geisser's Q^2 value obtained through blindfolding procedures. A Q^2 value greater than zero indicates that the model has predictive relevance for a given endogenous construct. The inner model was evaluated to test the hypothesized relationships among constructs. The criteria in Table 2 were applied.

Table 2. The criteria to test the hypothesized relationships among constructs

Indicator	Threshold	Purpose
VIF	< 5	Multicollinearity check
R^2	0.25 / 0.50 / 0.75	Explanatory power
f^2	0.02 / 0.15 / 0.35	Effect size
Q^2predict	> 0	Predictive relevance
SRMR	< 0.08	Model fit

Hypotheses were tested using a bootstrapping procedure with a 5% significance level. Path coefficients (β), t-statistics, and p-values were used to determine statistical significance, with the following criteria $t \geq 1.96$ and $p \leq 0.05$. Direct, indirect (mediation), and total effects were examined to understand both the magnitude and mechanism of relationships among variables. Mediation was interpreted as partial mediation when both direct and indirect effects are significant and also full mediation when only indirect effects are significant.

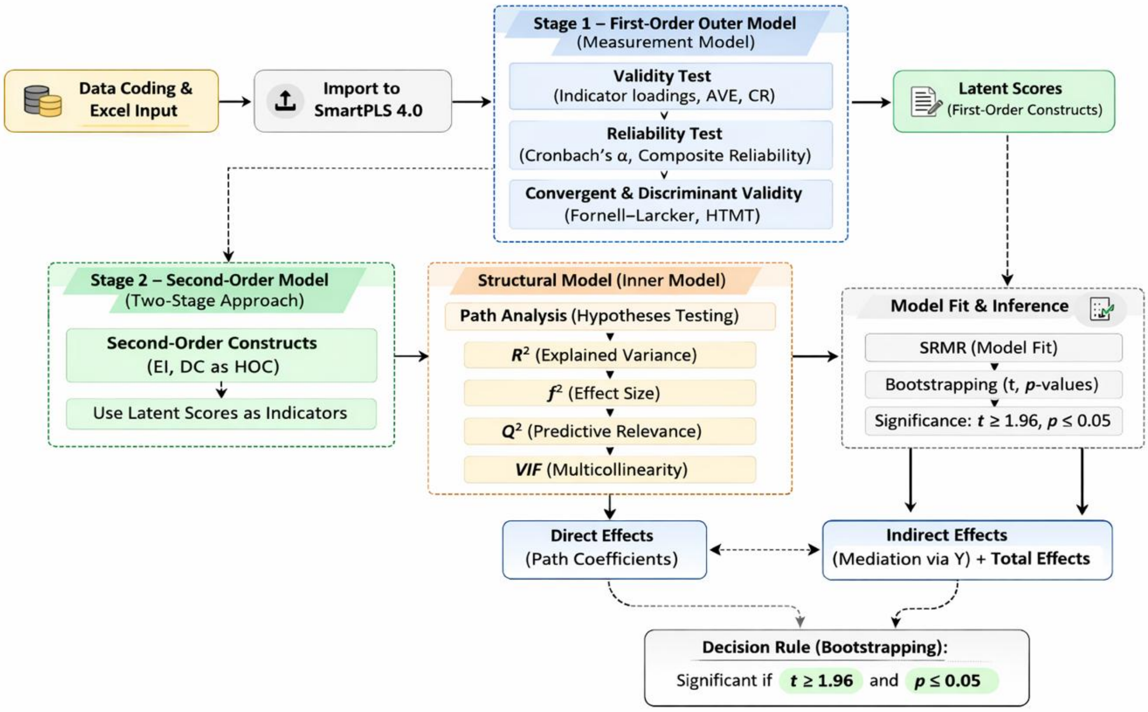

Figure 4. Bootstrapping inference and mediation assessment (SmartPLS output logic)

3. RESULTS AND DISCUSSION

3.1 Measurement Model Results Outer Model

The results of the outer model test are presented first to ensure the quality of the instrument (validity-reliability) before the interpretation of the structural relationship. Table 3 presents the external loadings of the indicator at the first-order level as early evidence of convergent validity.

Table 3. Outer loadings (first-order indicators)

Construct/Dimension	Indicator	Loading
EI (KE1)	KE1.1	0.903
	KE1.2	0.903
EI (KE2)	KE2.1	0.874
	KE2.2	0.889
EI (KE3)	KE3.1	0.879
	KE3.2	0.901
EI (KE4)	KE4.1	0.908
	KE4.2	0.909
EI (KE5)	KE5.1	0.891
	KE5.2	0.884
DC (KD)	KD1	0.856
	KD2	0.845
	KD3	0.774
	KD4	0.851
	KD5	0.739
LE (EP1)	EP1.1	0.905
	EP1.2	0.903
LE (EP2)	EP2.1	0.882
	EP2.2	0.887
LE (EP3)	EP3.1	0.908
	EP3.2	0.917
LE (EP4)	EP4.1	0.899
	EP4.2	0.922
LE (EP5)	EP5.1	0.898
	EP5.2	0.905

Construct/Dimension	Indicator	Loading
TP (KG1)	KG1.1	0.898
	KG1.2	0.888
TP (KG2)	KG2.1	0.893
	KG2.2	0.902
TP (KG3)	KG3.1	0.871
	KG3.2	0.898
TP (KG4)	KG4.1	0.898
	KG4.2	0.900
TP (KG5)	KG5.1	0.899
	KG5.2	0.902

The entire indicator has a load above 0.70, with a range of approximately 0.739–0.922. This shows that each indicator adequately reflects its construct and supports convergent validity at the indicator level. The following Table 4 presents the AVE value at the first-order level to strengthen the evidence of convergent validity.

Table 4. AVE (first-order)

Variable	Dimension	AVE
	Self-awareness	0.815
	Self-regulation	0.777
EI (X1)	Self-motivation	0.792
	Empathy	0.826
	Social skills	0.788
DC (X2)	Digital competence	0.663
	Student engagement	0.817
	Learning outcomes	0.783
LE (Y)	Teaching quality	0.833
	Learning environment support	0.829
	Evaluation & feedback	0.813
	Work quality	0.798
	Discipline	0.806
TP (Z)	Initiative	0.782
	Competence	0.808
	Communication	0.811

All AVEs are above 0.50, so the construct-dimension adequately explains the variance of the indicator. Table 5 presents the reliability (Cronbach's alpha and CR/rho_c) at the first-order level.

Table 5. Reliability (first-order)

Construct/Dimension	Cronbach’s alpha	CR (rho_c)
Self-awareness	0.773	0.898
Self-regulation	0.713	0.874
Self-motivation	0.739	0.884
Empathy	0.789	0.905
Social skills	0.731	0.881
Digital competence (X2)	0.872	0.907
Student engagement	0.776	0.899
Learning outcomes	0.723	0.878
Teaching quality	0.800	0.909
Learning environment support	0.794	0.906
Evaluation & feedback	0.770	0.897
Work quality	0.746	0.887
Discipline	0.759	0.892
Initiative	0.722	0.878
Competence	0.762	0.894
Communication	0.767	0.896

All alpha and CR values exceed the 0.70 threshold, indicating strong internal consistency in each dimension/construct. Because the model uses a second-order construct, the results of the outer model at the second-order level are shown as the main summary for the X1, Y, and Z constructs. The strong reliability and convergent validity observed across all dimensions also reinforce the conceptualization of the constructs as inherently multidimensional. Emotional intelligence, for instance, is not a single latent trait but a composite of interrelated capacities such as self-awareness, self-regulation, motivation, empathy, and social skills. Similarly, digital competence and learning effectiveness represent complex constructs that integrate cognitive, technical, and interactional dimensions. The high loading patterns across indicators therefore confirm that the measurement model adequately captures these theoretical complexities, reducing the risk of construct underrepresentation or oversimplification. This is consistent with contemporary perspectives that emphasize the multidimensional nature of teacher competencies and the need for robust measurement models to accurately reflect their structure [11], [16]. Table 6 shows the dimensional outer loadings of the second-order construct.

Table 6. Outer loadings (second-order dimensions → constructs)

Variable	Dimension	Loading	Decision
EI (X1)	KE1	0.904	Valid
	KE2	0.894	Valid
	KE3	0.886	Valid
	KE4	0.904	Valid
	KE5	0.905	Valid
DC (X2)	KD	1.000	Valid
LE (Y)	EP1	0.909	Valid
	EP2	0.877	Valid
	EP3	0.888	Valid
	EP4	0.904	Valid
	EP5	0.907	Valid
TP (Z)	KG1	0.925	Valid
	KG2	0.888	Valid
	KG3	0.860	Valid
	KG4	0.905	Valid
	KG5	0.917	Valid

All dimensions have a high load (≥0.860) to second-order constructs, indicating that they are strong representations of the main constructs in the hierarchical model. Tables 7–8 present AVE and reliability at the second-order level.

Table 7. AVE (second-order)

Construct	AVE	Decision
Emotional intelligence (X1)	0.808	Valid
Learning effectiveness (Y)	0.805	Valid
Teacher performance (Z)	0.809	Valid

AVE of all second-order constructs > 0.50 so that *convergent validity* at the construct level is also met.

Table 8. Reliability (second-order)

Construct	Cronbach's alpha	CR (rho_a)	CR (rho_c)
Emotional intelligence (X1)	0.940	0.941	0.955
Learning effectiveness (Y)	0.939	0.940	0.954
Teacher performance (Z)	0.941	0.942	0.955

Second-order reliability is very high (alpha ~0.94; CR ~0.95), confirming the internal consistency of the instrument for structural analysis. To ensure that constructs differ from each other, discriminant validity is checked through Fornell–Larcker and HTMT. Tables 9–10 show the results.

Table 9. Fornell–Larcker (second-order)

	EP (Y)	KE (X1)	KG (Z)	KD (X2)
EP (Y)	0.897			
KE (X1)	0.621	0.899		
KG (Z)	0.714	0.723	0.899	
KD (X2)	0.647	0.600	0.772	1.000

The root value of AVE (diagonal) is greater than the correlation between constructs, so that the

Table 10. HTMT (second-order)

	EP (Y)	KE (X1)	KG (Z)	KD (X2)
EP (Y)	—			
KE (X1)	0.660	—		
KG (Z)	0.758	0.767	—	
KD (X2)	0.668	0.618	0.796	—

All HTMTs < 0.90, so the validity of the discriminant is also confirmed through the HTMT criteria. The results of the outer model show that the research instrument is valid and reliable for measuring latent constructs, so that inference on the inner model can be made with a strong measurement base. Methodologically, the high loading pattern, AVE > 0.50, and reliability > 0.70 are consistent with the PLS-SEM evaluation practices also referenced in the thesis (e.g. Hair et al.'s reference to reliability/validity thresholds and two-stages on hierarchical constructs) [33], [34]. These findings are also relevant to the literature that emphasizes that digital competence and teachers' psychological capacity are multidimensional constructs that need to be carefully measured so as not to bias a single indicator [16], [11]. From a methodological standpoint, the use of a hierarchical component model with a second-order structure further strengthens the validity of the measurement approach. This modeling strategy allows for a more accurate representation of higher-order constructs by accounting for the relationships between dimensions and their underlying latent variables. Such an approach is particularly relevant in educational research, where constructs like emotional intelligence and learning effectiveness operate across multiple layers of abstraction. The application of PLS-SEM in this context is therefore appropriate, as it enables simultaneous evaluation of measurement and structural components while accommodating complex, multidimensional models [32], [33]. This reinforces confidence that subsequent structural interpretations are grounded in a rigorously validated measurement framework.

3.2 Structural Model Results Inner Model

Once the outer model is met, the inner model is evaluated to ensure that there are no multicollinearity problems, the model fit is adequate, and the model's explanatory and predictive power are strong enough. Table 11 presents the VIF value to check the multicollinearity between predictors in endogenous constructs.

Table 11. Inner VIF values

Relationship	VIF
EI → Teacher performance	1.828
DC → Teacher performance	1.562
EI → Digital competence	1.000
EI → Learning effectiveness	1.931
DC → Learning effectiveness	1.562
Learning effectiveness → Teacher performance	2.013

All VIF are in the range of 1,000–2,013, so no indication of multicollinearity interferes with the stability of the estimated path coefficient. Table 12 presents the SRMR for evaluating the global fit model.

Table 12. Model fit (SRMR)

Model	SRMR
Saturated model	0.036
Estimated model	0.036

An SRMR of 0.036 (<0.08) indicates a good model fit, so the approximate relationship structure is statistically acceptable. A well-fitting model further suggests that the proposed structural relationships are theoretically meaningful and empirically supported within the context of this study. The integration of emotional intelligence, digital competence, and learning effectiveness into a single structural framework reflects a holistic perspective on teacher performance, where psychological, technological, and pedagogical dimensions are interconnected. This aligns with emerging frameworks in educational research that emphasize the need to move beyond fragmented models toward integrative approaches capable of capturing the complexity of teaching in contemporary learning environments [37], [42]. The following Table 13 shows the effect size (f^2) to see the relative contribution of each predictor.

Table 13. Effect size (f^2)

Relationship	f^2	Category
EI → TP	0.171	Medium
EI → LE	0.204	Medium
EI → DC	0.562	Large
DC → LE	0.236	Medium
DC → TP	0.349	Medium
LE → TP	0.107	Small

The greatest effect appeared on the EI → DC pathway ($f^2 = 0.562$), suggesting the strong role of emotional capacity as a predictor of digital competence in this context. The LE → TP pathway had a relatively small effect ($f^2 = 0.107$), which means learning effectiveness contributes but is not the only explanation of performance. The large effect size of emotional intelligence on digital competence highlights the foundational role of psychological resources in shaping teachers' adaptability to technological demands. This finding suggests that the ability to manage emotions, sustain motivation, and maintain resilience is critical for engaging with digital tools and overcoming challenges associated with technology integration. In line with prior research, emotional intelligence and related psychological factors, such as self-efficacy, are key determinants of teachers' willingness and capacity to adopt and utilize digital technologies effectively [22]. Thus, emotional intelligence can be interpreted as an enabling condition that underpins the development of digital competence in educational settings. Table 14 presents the coefficient of determination (R^2) as an indicator of the model's ability to explain endogenous constructs.

Table 14. R^2 (Endogenous Constructs)

Endogenous construct	R^2	R^2 adjusted
Digital competence (X2)	0.360	0.357
Learning effectiveness (Y)	0.503	0.499
Teacher performance (Z)	0.730	0.727

The model explained 73.0% variation in teacher performance, 50.3% variation in learning effectiveness, and 36.0% variation in digital competence, showing strong explainability, especially in the main outcome (teacher performance). The high explanatory power of the model, particularly for teacher performance, indicates that the combination of emotional intelligence, digital competence, and learning effectiveness captures a substantial portion of the determinants of professional outcomes. This supports a multidimensional understanding of teacher performance, where effectiveness is not driven by a single factor but emerges from the interaction of personal, professional, and process-related competencies. Such a perspective is consistent with theoretical models that conceptualize teaching performance as a product of integrated competencies encompassing emotional, cognitive, and professional domains [37], as well as empirical findings highlighting the broad impact of teacher characteristics on both instructional quality and student development [42]. To visualize the magnitude of R^2 in each endogenous construct, Figure 5 is presented as follows.

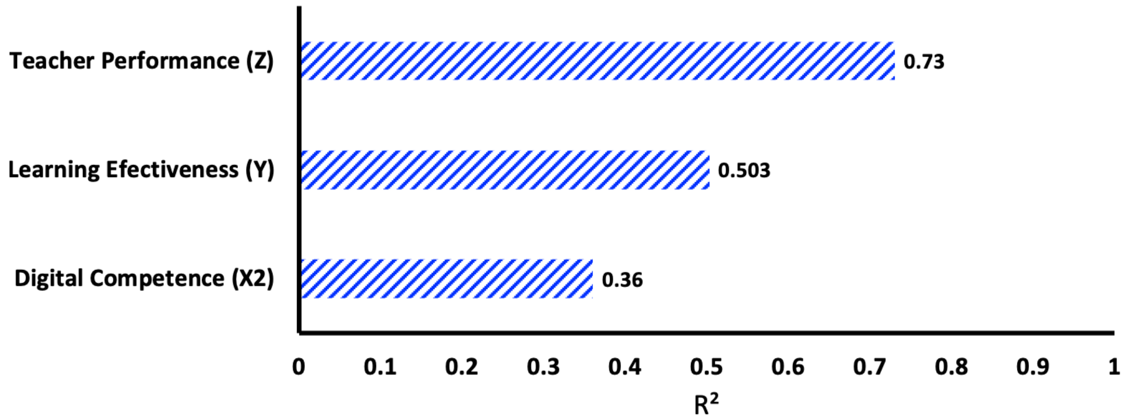

Figure 5. Explained Variance (R^2) of Endogenous Constructs

Figure 5 makes it clear that teacher performance has the highest proportion of explained variance, reinforcing that the combination of EI, digital competence, and learning effectiveness forms a strong predictive model for teacher performance. Table 15 presents Q²predict as an indicator of the model's predictive relevance.

Table 15. Q²predict (endogenous constructs)

Endogenous construct	Q²predict	Category
Digital competence (X2)	0.357	Medium
Learning effectiveness (Y)	0.380	Medium
Teacher performance (Z)	0.520	Large

All Q²predict values are positive, and Q²predict for teacher performance reaches 0.520 (large category), indicating that the model has good predictive ability to construct outcomes. The strong predictive relevance of the model further reinforces its practical significance, indicating that the identified relationships are not only explanatory but also capable of predicting future outcomes. In particular, the high predictive power for teacher performance suggests that improvements in emotional intelligence and digital competence, along with enhancements in learning effectiveness, can reliably translate into better professional performance. This predictive capability is especially important in the context of educational planning and teacher development, where evidence-based models are needed to guide interventions and policy decisions aimed at improving teaching quality. For easy reading of the Q²predict comparison, Figure 6 is shown below.

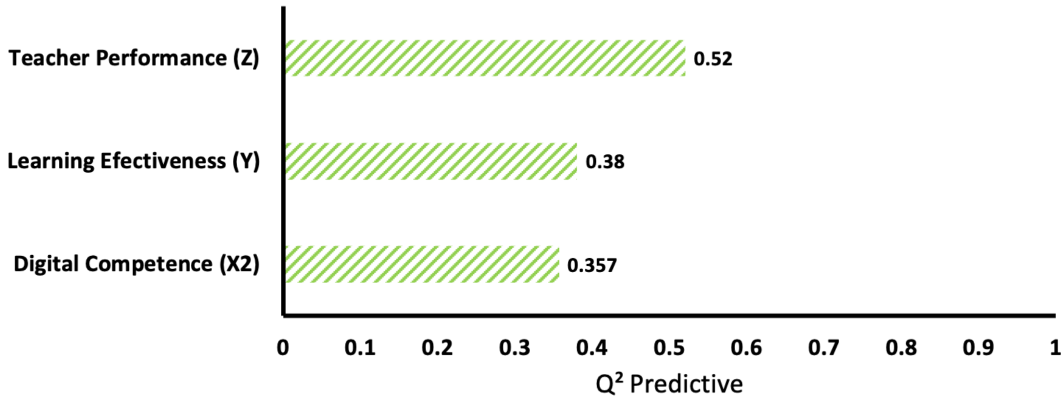

Figure 6. Predictive Relevance (Q²predict) of Endogenous Constructs

Figure 6 shows that the model's predictive ability is strongest in teacher performance, while learning effectiveness and digital competence are at the intermediate prediction level, consistent with the model structure that places the two as intermediate/supporting constructs. Substantively, the absence of multicollinearity and good fit suggests that relationships between variables can be interpreted without concerns of parameter distortion due to excessive predictor correlation. The high R^2 explainability for teacher performance indicates that this model captures a complementary combination of personal competence (EI), professional-technological competence (digital competence), and learning effectiveness mechanisms. This is in line with the literature argument that teachers' psychological characteristics contribute to effectiveness and professional relationships [11] and that teachers' digital competencies are multidimensional and relevant to pedagogic performance in technology-based learning ecosystems [16], [18].

Taken together, the structural model results provide empirical support for an integrative competency framework in which emotional intelligence functions as a psychological foundation, digital competence serves as a professional-technological capability, and learning effectiveness represents the process through which these competencies are enacted. This triadic interaction highlights that teacher performance is best understood as the outcome of dynamic relationships among internal capacities, professional skills, and instructional practices. Such an integrative perspective extends prior research that has often examined these variables in isolation, offering a more comprehensive explanation of how teacher competencies operate within complex educational systems.

3.3 Direct Effects result

Pengujian hipotesis dilakukan menggunakan bootstrapping SmartPLS sehingga hasil utama dilaporkan dalam bentuk koefisien jalur (β), t-statistic, dan p-value. Table 16 menyajikan hasil pengaruh langsung (*direct effects*) antar konstruk pada model struktural.

Table 16. Direct effects (path coefficients)

Path	β	t	p	Decision
EI → TP	0.318	6.614	0.000	Supported
DC → TP	0.426	6.746	0.000	Supported
EI → DC	0.600	12.952	0.000	Supported
EI → LE	0.364	7.135	0.000	Supported
DC → LE	0.428	10.116	0.000	Supported
LE → TP	0.241	4.185	0.000	Supported

All paths were positive and significant ($p \leq 0.05$). The significant positive effect of emotional intelligence on teacher performance confirms the role of emotional competence as a core psychological resource in professional practice. Teaching involves continuous emotional regulation, interpersonal interaction, and adaptive responses to diverse classroom situations. Teachers with higher emotional intelligence are better able to manage stress, maintain motivation, and foster constructive relationships with students, which ultimately enhances instructional quality and overall performance. This finding is strongly supported by previous studies demonstrating that emotional intelligence contributes to classroom management effectiveness, student engagement, and learning outcomes [36], [39]. Furthermore, emotional competence has been linked to reduced burnout and improved well-being, which are critical for sustaining long-term professional performance in teaching contexts [43]. Systematic reviews also emphasize that emotional intelligence plays a key role in inclusive teaching practices and professional sustainability, reinforcing its importance as a foundational component of teacher effectiveness [34], [35]. The effect of DC → TP (β = 0.426) is stronger than that of EI → TP (β = 0.318), and the strongest path is EI → DC (β = 0.600). The stronger effect of digital competence on teacher performance highlights the increasing importance of technological capability in contemporary education. Digital competence enables teachers to design interactive learning environments, integrate multimedia resources, and facilitate student-centered learning processes. From a theoretical standpoint, digital competence encompasses not only technical skills but also pedagogical integration, as emphasized in frameworks such as the Teacher Digital Competency (TDC) model [38]. Empirical studies further confirm that digital competence significantly enhances instructional effectiveness and pedagogical quality in technology-mediated learning environments [40], while also supporting the development of innovative teaching strategies through professional training and integrative learning experiences [41]. Moreover, the use of digital tools has been shown to strengthen pedagogical competence and improve instructional outcomes, particularly in collaborative and technology-enhanced learning settings [44]. This finding reinforces the argument that digital competence has become a central pillar of teacher professionalism in the digital era.

The strong relationship between emotional intelligence and digital competence suggests that psychological readiness plays a crucial role in technology adoption among teachers. Emotional intelligence supports adaptive learning behaviors, persistence in overcoming technological challenges, and openness to innovation. Teachers who are able to regulate their emotions and maintain intrinsic motivation are more likely to engage with digital tools and continuously develop their technological skills. This finding extends prior research indicating that emotional intelligence and self-efficacy are important predictors of teachers' engagement with digital technologies [22]. In addition, emotional competence remains relevant in digitally mediated environments, where communication, interaction, and collaboration increasingly occur through technological platforms [20]. Thus, emotional intelligence can be understood as an underlying driver that facilitates the development of digital competence. To provide a concise overview of the model structure, including the path coefficients and R^2, Figure 7 is shown below.

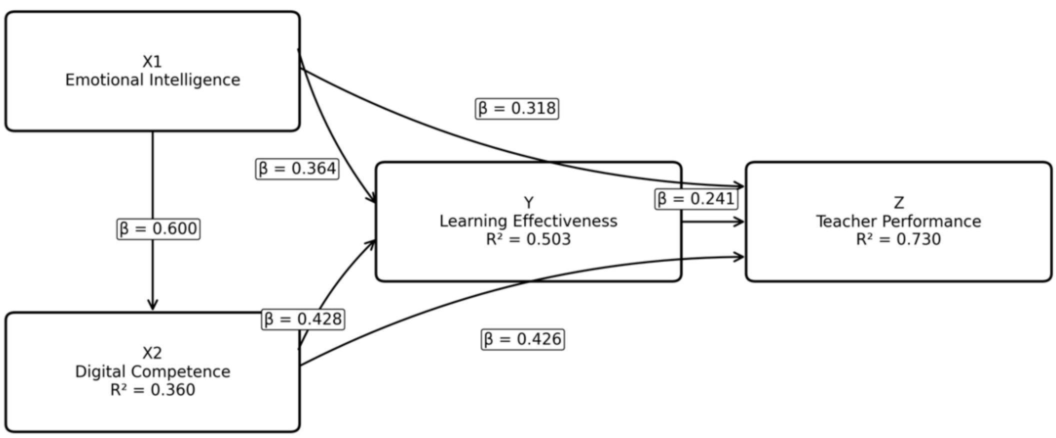

Figure 7. Model structure

Figure 7 illustrates that EI influences performance directly and also via the EI → DC and EI/DC → LE pathways, whilst the primary outcome (TP) has a high proportion of explained variance ($R^2 = 0.730$). The positive influence of emotional intelligence on learning effectiveness indicates that teachers' emotional capacities play a critical role in shaping the quality of instructional processes. Emotional intelligence enables teachers to create supportive learning environments, respond sensitively to students' needs, and maintain positive classroom dynamics. These capabilities contribute to increased student engagement, improved interaction quality, and more effective learning experiences. From a pedagogical perspective, effective teaching requires not only cognitive and technical skills but also relational competence, which is closely linked to emotional intelligence. This aligns with theoretical perspectives emphasizing that teaching effectiveness emerges from the integration of cognitive, pedagogical, and socio-emotional dimensions within instructional practice [23], [24]. The significant effect of digital competence on learning effectiveness highlights the role of technology in enhancing instructional quality. Digital tools enable teachers to facilitate interactive learning, provide timely feedback, and support diverse learning styles. In technology-enhanced learning environments, the ability to effectively use digital platforms is essential for promoting student engagement and collaboration. Research on online and blended learning emphasizes that digital technologies play a key role in strengthening teacher–student interaction and improving learning outcomes [25]. Additionally, digital environments support collaborative learning and communication, allowing teachers to create more dynamic and participatory instructional processes [26]. Therefore, digital competence functions as a key mechanism for improving the effectiveness of teaching and learning activities.

Theoretically, the finding that EI → TP supports the view that teaching is a profession characterised by social interaction and emotional regulation; emotional capacity acts as a psychological resource that helps teachers maintain the quality of their professional practice. This is consistent with an integrative review of teachers' psychological characteristics related to effectiveness and interpersonal relationships [11], as well as studies that explicitly assess the influence of EI on teacher performance in educational institutions [13]. The positive effect of learning effectiveness on teacher performance confirms that the quality of instructional processes is a critical determinant of professional outcomes. Learning effectiveness reflects how well teachers design, implement, and evaluate teaching activities, including student engagement, feedback mechanisms, and learning environment management. Teachers who are able to orchestrate effective learning experiences are more likely to achieve higher performance outcomes. This finding is consistent with the literature on teaching effectiveness, which emphasizes that successful instruction depends on the integration of instructional design, interaction quality, and continuous evaluation [23]. Thus, learning effectiveness serves as a practical manifestation of teacher competence in action.

The DC → TP effect indicates that the ability to utilise technology pedagogically and professionally is a key determinant of teacher performance in the context of modern learning. This finding is consistent with the literature, which identifies digital competence as a multidimensional and crucial construct in higher education practice and the context of educational technology [16], as well as with evidence that online teaching competence is associated with perceptions of learning outcomes [18]. The EI → DC pathway ($\beta = 0.600$) indicates a strong association between emotional capacity and teachers' readiness/competence in the digital domain. Conceptually, the ability to manage emotions and maintain motivation can facilitate technology learning, persistence in platform use, and adaptation to digital demands, in line with studies linking EI and psychological factors to technology adoption by teachers [22], and the notion that emotional competence remains important in digitally mediated interactions [20].

The findings regarding EI → LE and DC → LE confirm that personal and digital competences do not stop at 'capabilities', but rather operate through the quality of the learning process. The literature on learning effectiveness emphasises that effective learning depends on instructional design, engagement, and continuous adaptation [23], whilst studies on teacher–student interaction in online environments highlight that the quality of interaction can enhance learning engagement [25]. Thus, improvements in EI and digital competence can be understood as prerequisites for the orchestration of more effective learning processes, which in turn influence teacher performance.

3.4 Mediation Result Indirect and Total Effects

To assess the mediation mechanism, the results for specific indirect effects and total effects are presented following the direct effects. Table 17 presents the results of the indirect (mediation) effects via learning effectiveness.

Table 17. Specific indirect effects (mediation via learning effectiveness)

Indirect path	βindirect	t	p	Decision
EI → LE → TP	0.088	3.389	0.001	Supported
DC → LE → TP	0.103	3.749	0.000	Supported

Similarly, the indirect effect of digital competence on teacher performance through learning effectiveness highlights the role of technology as a facilitator of instructional quality. Digital competence enhances teachers' ability to design interactive and student-centered learning experiences, which in turn leads to improved performance outcomes. This finding is consistent with research on technology-enhanced learning environments, which emphasizes that the effectiveness of digital tools depends on how they are integrated into pedagogical practices rather than on their mere availability [25], [26]. Therefore, digital competence contributes to performance not only as a technical skill but as a mechanism that transforms teaching processes and enriches learning experiences.

Both mediation effects were significant, as the direct paths EI → TP and DC → TP remained significant (Table 17). The significant indirect effect of emotional intelligence on teacher performance through learning effectiveness indicates that emotional competence is not only a direct driver of performance but also operates through the quality of instructional processes. This finding supports a process-oriented perspective in which teachers' internal capacities are translated into observable outcomes through their enactment in teaching practices. Emotional intelligence enhances teachers' ability to create supportive learning environments, maintain effective classroom interactions, and adapt instructional strategies to students' needs. As a result, improved learning effectiveness becomes a key pathway through which emotional intelligence contributes to performance. This interpretation aligns with pedagogical theories emphasizing that effective teaching emerges from the integration of cognitive, relational, and instructional dimensions within the learning process [23], [24]. The mediation that took place was partial, the presence of partial mediation suggests that emotional intelligence and digital competence influence teacher performance through both direct and indirect pathways. This dual-path mechanism indicates that competencies function at multiple levels: as inherent personal and professional capacities, and as drivers of effective instructional processes. From a theoretical standpoint, this finding supports a multidimensional view of teacher performance, where outcomes are shaped by the interaction between internal competencies and their practical enactment in teaching activities. Such a perspective aligns with contemporary models of teacher effectiveness that emphasize the interplay between competence, practice, and context in determining professional outcomes [37].

Table 18 presents the total effects (combined direct and indirect effects) to examine the overall impact on teacher performance.

Table 18. Total effects (direct + indirect)

Relationship	Direct	Indirect (via LE)	Total
EI → TP	0.318	0.088	0.406
DC → TP	0.426	0.103	0.529

The total effect of DC → TP (0.529) is greater than that of EI → TP (0.406), indicating that, in the context of this study, digital competence provides a stronger overall boost to teacher performance, although EI continues to play a significant role both directly and through learning effectiveness.

Conceptually, partial mediation reinforces the argument that the relationship between competencies (EI and digital competence) and teacher performance operates via two pathways: (i) a direct pathway as personal/professional capabilities that influence performance, and (ii) a process pathway via learning effectiveness as a mechanism of instructional delivery. The literature on effective learning emphasises that the quality of teaching is determined by how teachers manage the learning process including engagement, the quality of interaction, and evaluation-feedback [23], [25] which aligns with the position of learning effectiveness as a mediator in your model. On the other hand, partial (rather than full) mediation indicates that EI and digital competence also impact performance through aspects of a teacher's work not fully covered by indicators of learning effectiveness (e.g. work discipline, organisational communication, and professional initiative), which is consistent with the notion that teachers' psychological characteristics are broadly linked to well-being and work relationships, not merely instructional aspects [11].

Taken together, the mediation results provide strong support for a process-oriented model of teacher performance, in which competencies are translated into outcomes through instructional effectiveness. This highlights that teacher performance is not merely a function of what teachers possess (emotional and digital competencies), but also of how these competencies are enacted in teaching and learning processes. The integration of direct and indirect effects thus offers a more comprehensive understanding of teacher performance as a dynamic and multilayered construct. By demonstrating the simultaneous operation of competency-based and process-based pathways, this study contributes to the development of an integrative framework that captures the complexity of teaching in contemporary educational environments.

These findings also carry important implications for both theory and practice. Theoretically, they advance a holistic understanding of teacher performance by integrating emotional intelligence, digital competence, and learning effectiveness within a unified framework. Practically, the results suggest that efforts to improve teacher performance should not focus on isolated competencies but rather on developing integrated capacity through professional development programs that combine socio-emotional training with technology-enhanced pedagogy. Such an approach is essential for equipping teachers to meet the complex and evolving demands of contemporary education systems.

From a practical standpoint, the findings suggest that improving teacher performance requires integrated professional development that simultaneously strengthens (1) emotional intelligence (e.g., emotional regulation, empathy, social skills), (2) digital competence (e.g., information literacy, digital collaboration, content creation, safety, and problem solving), and (3) teachers' capacity to translate these competencies into effective learning processes (e.g., engagement, instructional quality, learning environment, and feedback). School leaders and education stakeholders may therefore prioritize structured training, mentoring, and ongoing coaching that combine socio-emotional competence with technology-enabled pedagogy to improve classroom practices and professional outcomes.

This study is limited by its cross-sectional survey design and reliance on self-reported measures, which restrict causal interpretation and may introduce common method bias. Future studies may employ longitudinal or mixed-method designs to strengthen causal inference and triangulate measurement through classroom observation, supervisor evaluation, or learning analytics. In addition, the scope was confined to private elementary schools in one city; replication across regions, school types, and educational levels is recommended to enhance generalizability and to test whether the strength of competency–performance relationships varies across contexts.

4. CONCLUSION

This study advances the understanding of teacher performance by moving beyond fragmented perspectives of individual competencies toward an integrated, process-oriented framework. The findings demonstrate that emotional intelligence and digital competence are not merely parallel predictors, but function within a dynamic system in which emotional intelligence operates as a foundational psychological resource that enables the development of digital competence and enhances instructional processes. In turn, learning effectiveness emerges as a critical mechanism through which these competencies are translated into observable professional performance. Theoretically, this study contributes to the literature by reconceptualizing teacher competence as a multi-layered and interdependent construct, rather than a set of isolated capabilities. By empirically validating the role of emotional intelligence as an antecedent of digital competence and positioning learning effectiveness as a mediating process, this study extends existing competency–performance models into a more explanatory framework that captures both capability and enactment. This process-based perspective provides a clearer explanation of how and why competencies influence performance, thereby addressing a key limitation in prior research that has largely focused on direct effects.

Another important contribution lies in highlighting the dual-path mechanism of competency influence. The results show that teacher competencies affect performance through both direct pathways (reflecting personal and professional capacity) and indirect pathways (through the quality of instructional processes). This finding underscores that improving teacher performance cannot rely solely on enhancing competencies in isolation; instead, it requires ensuring that these competencies are effectively operationalized within teaching–learning practices. From a practical and policy perspective, the findings suggest a shift in how teacher development programs are designed and implemented. Traditional professional development models that treat emotional, pedagogical, and technological competencies as separate domains may be insufficient in addressing the complex demands of contemporary education. Instead, there is a need for integrated professional development frameworks that simultaneously cultivate emotional intelligence, digital competence, and instructional effectiveness. Such integration is particularly crucial in the context of ongoing digital transformation in education, where teachers are required not only to adopt technology but also to sustain meaningful, engaging, and adaptive learning environments. Furthermore, the strong role of digital competence in shaping teacher performance indicates that educational policies should prioritize technology-enabled pedagogy as a core component of teacher professionalism. However, the findings also caution against a purely technical approach, emphasizing that digital competence is most effective when supported by strong emotional and psychological capacities. This implies that policy interventions should adopt a holistic approach, combining digital training with socio-emotional development to ensure sustainable improvements in teaching quality.

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AUTHOR CONTRIBUTIONS

Opi Vita Mayang Sari, Study design and Wrote the paper. Bambang Dwi Suseno, Conceptualized the research idea; Analyzed and contributed the references used; Reviewed the manuscript. Umalihayati Umalihayati, Analyzed and contributed the references used; Reviewed the manuscript.

CONFLICTS OF INTEREST

The author(s) declare no conflict of interest.

INFORMED CONSENT STATEMENT

Informed consent was obtained from all participants involved in the study. Participation was voluntary, and respondents were informed about the study purpose, the confidentiality of responses, and their right to withdraw at any time without penalty. No personally identifying information was disclosed in the reporting of results. All images in this article have been authorized and are the property of the authors.

USE OF ARTIFICIAL INTELLIGENCE (AI)-ASSISTED TECHNOLOGY

The authors declare that no artificial intelligence (AI) tools were used in the generation, analysis, or writing of this manuscript. All aspects of the research, including data collection, interpretation, and manuscript preparation, were carried out entirely by the authors without the assistance of AI-based technologies.

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