

Learning Management Effectiveness And Student Academic Achievement: The Sequential Effects Of Planning, Implementation, And Evaluation

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Abstract

This study examines learning management effectiveness and its relationship with student academic achievement through a sequential process involving student understanding, learning planning, learning implementation, and learning evaluation. A quantitative explanatory design was employed with 200 elementary school teachers selected through purposive sampling. Data were collected using a five-point Likert-scale questionnaire and analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS. The results showed that Student Understanding significantly influenced Learning Planning ($\beta = 0.878, p < .001$), Learning Planning significantly influenced Learning Implementation ($\beta = 0.847, p < .001$), and Learning Implementation significantly influenced Learning Evaluation ($\beta = 0.841, p < .001$). Learning Planning ($\beta = 0.366, p < .001$), Learning Implementation ($\beta = 0.280, p < .001$), and Learning Evaluation ($\beta = 0.222, p = .001$) significantly influenced Student Academic Achievement, whereas the direct effect of Student Understanding was not significant ($\beta = 0.098, p = .148$). The complete sequential pathway from Student Understanding through Planning, Implementation, and Evaluation to Student Academic Achievement was significant, indicating that learner-related information contributes to achievement primarily when translated into coordinated managerial actions. The model explained 83.5% of the variance in Student Academic Achievement. These findings strengthen a process-oriented perspective of educational management by demonstrating that learning effectiveness depends on the continuity of planning, implementation, and evaluation rather than on isolated instructional activities.

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Keywords: educational management; learning management; learning planning; learning evaluation; student academic achievement; PLS-SEM.

INTRODUCTION

Student academic achievement remains a central concern in educational management because it reflects not only students' individual capabilities but also the effectiveness of the processes through which learning is planned, implemented, and evaluated. At the elementary-school level, teachers are responsible for transforming curriculum objectives and information about students into coordinated instructional activities. Consequently, learning effectiveness depends on the ability to align planning, classroom implementation, and evaluation with expected educational outcomes. Empirical studies have similarly shown that educational management and the quality of learning processes are closely associated with student outcomes (Sipayung & Bernarto, 2025; Susetyo & Lie, 2025).

Learning management can be understood as an integrated cycle consisting of planning, implementation, and evaluation. Planning determines instructional objectives, materials, methods, resources, and expected outcomes; implementation translates these decisions into classroom activities; and evaluation provides evidence regarding the extent to which learning objectives have been achieved. These functions are interdependent, meaning that weaknesses at one stage may reduce the effectiveness of subsequent stages. Accordingly, effective learning management requires continuity among managerial functions rather than the treatment of planning, implementation, and evaluation as separate administrative activities (Alhamidi et al., 2024).

This sequential relationship is consistent with the Input–Process–Output perspective in educational effectiveness. Educational outcomes are produced through interactions between educational inputs and the processes through which those inputs are transformed into measurable results (Creemers & Scheerens, 1994; Scheerens, 1990). In this study, teachers' understanding of students represents the informational input for instructional decision-making. Learning planning, implementation, and evaluation constitute the process through which that information is transformed into student academic achievement. Thus, the managerial value of understanding students lies not merely in possessing information about learner characteristics but in using that information to guide subsequent instructional decisions



Learning planning represents the first operational stage of this management process. Teachers require information about students' characteristics, needs, abilities, and potential to establish appropriate learning objectives and determine suitable materials, methods, and resources. Effective planning therefore provides direction for classroom activities and establishes the basis for subsequent implementation. Its quality should not be assessed solely through the completeness of instructional documents but through its capacity to translate learner information and curriculum objectives into coherent instructional actions.

Learning implementation represents the operationalization of planned decisions. At this stage, teachers organize classroom activities, apply instructional strategies, facilitate teacher–student interaction, allocate learning time, and respond to emerging classroom conditions. The quality of implementation is therefore closely related to the quality of planning. A well-developed plan may have limited educational value when it is implemented inconsistently, while classroom activities conducted without systematic planning may lack direction and alignment with learning objectives.

Evaluation completes the learning-management process by determining whether instructional objectives have been achieved and generating information for subsequent improvement. Evaluation is therefore not merely a terminal activity for assigning student scores but also a managerial feedback mechanism. Assessment information can be used to identify weaknesses in implementation, monitor student progress, and adjust future instructional decisions. Evidence from formative-assessment research also indicates that assessment becomes more meaningful when its results are systematically incorporated into instructional improvement (Goertzen et al., 2023).

Despite the theoretical interdependence of these stages, an important empirical gap remains. Existing studies have often examined planning, implementation, evaluation, or broader educational-management factors separately. Qualitative studies have provided valuable descriptions of learning-management practices but offer limited evidence regarding the magnitude of relationships among managerial stages (Alhamidi et al., 2024). Other quantitative studies tend to model educational-management variables as simultaneous predictors of learning outcomes rather than investigating how one managerial stage influences the next. Consequently, the sequential mechanism through which learning management contributes to student academic achievement remains insufficiently explained.



This gap is important because learning-management effectiveness may not originate from the independent contribution of individual activities. Instead, its effectiveness may depend on the continuity of the entire process. Information about students informs planning, planning provides direction for implementation, implementation generates learning experiences that are subsequently evaluated, and these processes collectively contribute to academic achievement. Examining these relationships sequentially can therefore provide a more comprehensive explanation of how classroom-level educational management produces student outcomes.

Accordingly, this study aims to examine learning management effectiveness and student academic achievement through the sequential relationships among Student Understanding, Learning Planning, Learning Implementation, and Learning Evaluation in elementary schools. Partial Least Squares Structural Equation Modeling (PLS-SEM) is employed to simultaneously examine direct and indirect relationships among these constructs.

The novelty of this study lies in conceptualizing learning management effectiveness as a sequential managerial mechanism rather than a set of independent instructional practices. Specifically, the study examines how teachers' understanding of students is transformed into academic outcomes through the ordered processes of planning, implementation, and evaluation. By testing both direct and sequential indirect relationships within a single structural model, this study extends the Input–Process–Output perspective to classroom-level educational management and provides empirical implications for academic supervision, teacher professional development, learning quality assurance, and evidence-based school management.

METHOD

Research Design

This study employed a quantitative explanatory design to examine the structural relationships between learning management effectiveness and student academic achievement. Partial Least Squares Structural Equation Modeling (PLS-SEM) was applied using SmartPLS because the model involved multiple latent constructs and simultaneous direct and indirect relationships. Recent methodological developments support PLS-SEM for estimating complex structural relationships while integrating measurement-model and structural-model assessment (Hair et al., 2024; Ringle et al., 2023). The model comprised five constructs: Student Understanding (KP), Learning Planning (PP), Learning Implementation (PL), Learning Evaluation (EV), and Student Academic Achievement (PA).



Population and Sampling

The study population consisted of elementary school teachers working in public and private schools within the research area. Purposive sampling was employed with three inclusion criteria: respondents had at least two years of teaching experience, were directly involved in learning planning and implementation, and voluntarily participated in the study. After screening the completed questionnaires, 200 teachers were retained as the final sample, comprising 106 public-school teachers and 94 private-school teachers.

Research Instrument and Construct Measurement

Data were collected using a structured questionnaire containing 20 indicators distributed equally across five reflective constructs. All items were measured on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

Student Understanding (KP1–KP4) measured teachers' ability to identify students' characteristics, learning needs, abilities, and potential. Learning Planning (PP1–PP4) assessed the formulation of learning objectives, instructional materials, teaching methods, and learning resources. Learning Implementation (PL1–PL4) measured classroom management, instructional strategies, and teacher–student interaction. Learning Evaluation (EV1–EV4) assessed the design and implementation of assessment and the utilization of evaluation results. Student Academic Achievement (PA1–PA4) reflected students' competency mastery, evaluation results, and achievement of predetermined learning targets.

The term Learning Planning was used to represent the original Learning Design construct because its indicators substantively measure planning-related managerial activities, including the determination of objectives, materials, methods, and instructional resources. No questionnaire items or empirical observations were altered during this conceptual adjustment.

Data Collection Procedure

Questionnaires were distributed directly and online to respondents who fulfilled the inclusion criteria. Returned questionnaires were screened for completeness before coding and tabulation. Only complete responses were retained, resulting in a final dataset of 200 respondents. The dataset was subsequently analyzed using SmartPLS.



Data Analysis

PLS-SEM analysis was conducted through measurement-model and structural-model evaluation. This analytical sequence is consistent with contemporary recommendations for applying SmartPLS in educational and behavioral research (Ringle et al., 2023; Subhaktiyasa, 2024).

The reflective measurement model was evaluated using outer loadings, Cronbach's alpha, rho_A, composite reliability, Average Variance Extracted (AVE), and discriminant validity. HTMT was included as the principal assessment of empirical distinction among the latent constructs, consistent with recent PLS-SEM reporting recommendations (Ringle et al., 2023).

The structural model was evaluated using path coefficients (β), coefficients of determination (R^2 and adjusted R^2), effect sizes (f^2), predictive relevance (Q^2), and the significance of direct and indirect relationships. Bootstrapping was performed to determine the statistical significance of the structural paths using a 5% significance level ($p < .05$). The analysis examined the sequential relationships from Student Understanding to Learning Planning, Learning Implementation, and Learning Evaluation, followed by their direct and indirect relationships with Student Academic Achievement. This procedure enabled the study to determine whether learning management effectiveness operates through isolated effects or through an integrated sequential mechanism.

RESULTS

Respondent Profile

A total of 200 elementary school teachers were included in the analysis. The sample comprised 104 male teachers (52.0%) and 96 female teachers (48.0%). Respondents were distributed across the four reported age groups, with 27.0% aged 23–30 years, 28.0% aged 31–40 years, 20.0% aged 41–50 years, and 25.0% aged above 50 years. Most respondents held a bachelor's degree (81.5%), while 18.5% held a master's degree. Teaching experience was distributed across the reported categories, and the sample included 106 public-school teachers (53.0%) and 94 private-school teachers (47.0%). Table 1 summarizes these characteristics.

Table 1. Respondent Characteristics

Characteristic	Category	Frequency	Percentage (%)
Gender	Male	104	52.0



	Female	96	48.0
Age	23–30 years	54	27.0
	31–40 years	56	28.0
	41–50 years	40	20.0
	>50 years	50	25.0
Education	Bachelor's degree	163	81.5
	Master's degree	37	18.5
Teaching experience	1–5 years	57	28.5
	6–10 years	50	25.0
	11–15 years	50	25.0
	>15 years	43	21.5
School status	Public	106	53.0
	Private	94	47.0

Measurement Model Assessment

The reflective measurement model showed satisfactory indicator reliability and convergent validity. Outer loadings ranged from 0.819 to 0.866 for Student Understanding, 0.853 to 0.888 for Learning Planning, 0.872 to 0.905 for Learning Implementation, 0.849 to 0.900 for Learning Evaluation, and 0.890 to 0.908 for Student Academic Achievement. Thus, all reported indicators loaded above 0.80 on their intended constructs.

Internal-consistency estimates were also high. Cronbach's alpha ranged from 0.870 to 0.922, rho_A from 0.871 to 0.922, and composite reliability from 0.911 to 0.944. AVE values ranged from 0.720 to 0.809, exceeding the conventional 0.50 criterion for convergent validity. These results support indicator reliability, internal consistency, and convergent validity, but they do not by themselves establish that the five constructs are empirically distinct.

Table 2. Measurement Model Evaluation

Construct	Loading Range	Cronbach's α	rho_A	Composite Reliability	AVE
Student Understanding	.819–.866	.870	.871	.911	.720
Learning Planning	.853–.888	.901	.902	.931	.771
Learning Implementation	.872–.905	.913	.913	.939	.793

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Learning Evaluation	.849–.900	.899	.901	.930	.768
Student Academic Achievement	.890–.908	.922	.922	.944	.809

Discriminant validity was not established. The HTMT values in Table 3 ranged from 0.923 to 0.991, and every pairwise value exceeded 0.90. The highest value was observed between Student Understanding and Learning Planning (HTMT = 0.991), while the remaining construct pairs also showed substantial empirical overlap. Accordingly, the measurement results indicate that the latent dimensions are highly related and should not be interpreted as fully distinct constructs in this sample.

Table 3. Heterotrait–Monotrait Ratio (HTMT)

Construct	LE	LI	SU	LP	SAA
Learning Evaluation (LE)	—				
Learning Implementation (LI)	.928	—			
Student Understanding (SU)	.923	.955	—		
Learning Planning (LP)	.949	.933	.991	—	
Student Academic Achievement (SAA)	.935	.939	.937	.965	—

Because discriminant validity was not achieved, the subsequent structural coefficients should be interpreted cautiously. The paths can describe the pattern of associations within the specified sequential model, but the estimated effects cannot be treated as fully independent relationships among clearly separated latent variables. This measurement limitation is particularly relevant when comparing the relative magnitude of the direct paths.

Structural Model Assessment

The estimated structural model yielded an SRMR of 0.070 and an NFI of 0.895. The coefficients of determination were high: $R^2 = 0.771$ for Learning Planning, $R^2 = 0.717$ for Learning Implementation, $R^2 = 0.708$ for Learning Evaluation, and $R^2 = 0.835$ for Student Academic Achievement. Thus, within the specified model and observed sample, the predictors accounted for a substantial proportion of variance in each endogenous construct. However, inner VIF values for the predictors of Student Academic Achievement ranged from approximately 4.61 to 6.07,



with Student Understanding and Learning Planning exceeding 5, indicating notable structural collinearity.

Blindfolding produced positive Q^2 values for all endogenous constructs: 0.586 for Learning Planning, 0.562 for Learning Implementation, 0.536 for Learning Evaluation, and 0.668 for Student Academic Achievement. These values indicate in-sample predictive relevance under the reported blindfolding procedure. They should nevertheless be considered together with the discriminant-validity and collinearity findings rather than as evidence that the constructs operate independently.

Table 4. Explanatory Power and Predictive Relevance

Endogenous Construct	R^2	Adjusted R^2	Q^2
Learning Planning	.771	.770	.586
Learning Implementation	.717	.715	.562
Learning Evaluation	.708	.707	.536
Student Academic Achievement	.835	.832	.668

Effect-size estimates were largest for the adjacent stages of the proposed learning-management sequence. Student Understanding $\rightarrow$ Learning Planning produced $f^2 = 3.361$, Learning Planning $\rightarrow$ Learning Implementation $f^2 = 2.531$, and Learning Implementation $\rightarrow$ Learning Evaluation $f^2 = 2.426$. The incremental effects on Student Academic Achievement were considerably smaller: $f^2 = 0.135$ for Learning Planning, 0.097 for Learning Implementation, 0.065 for Learning Evaluation, and 0.011 for Student Understanding.

Table 5. Effect Sizes

Structural Relationship	f^2
Student Understanding $\rightarrow$ Learning Planning	3.361
Learning Planning $\rightarrow$ Learning Implementation	2.531
Learning Implementation $\rightarrow$ Learning Evaluation	2.426
Learning Planning $\rightarrow$ Student Academic Achievement	.135
Learning Implementation $\rightarrow$ Student Academic Achievement	.097
Learning Evaluation $\rightarrow$ Student Academic Achievement	.065
Student Understanding $\rightarrow$ Student Academic Achievement	.011

The effect-size pattern is consistent with a tightly connected sequence among the learning-management variables. At the same time, the extremely large f^2 values for adjacent stages occur alongside HTMT values above 0.90 and elevated inner VIF values. Therefore, these large effects are best interpreted as evidence of strong shared variation within the proposed process rather than as proof that each stage contributes a fully independent effect.

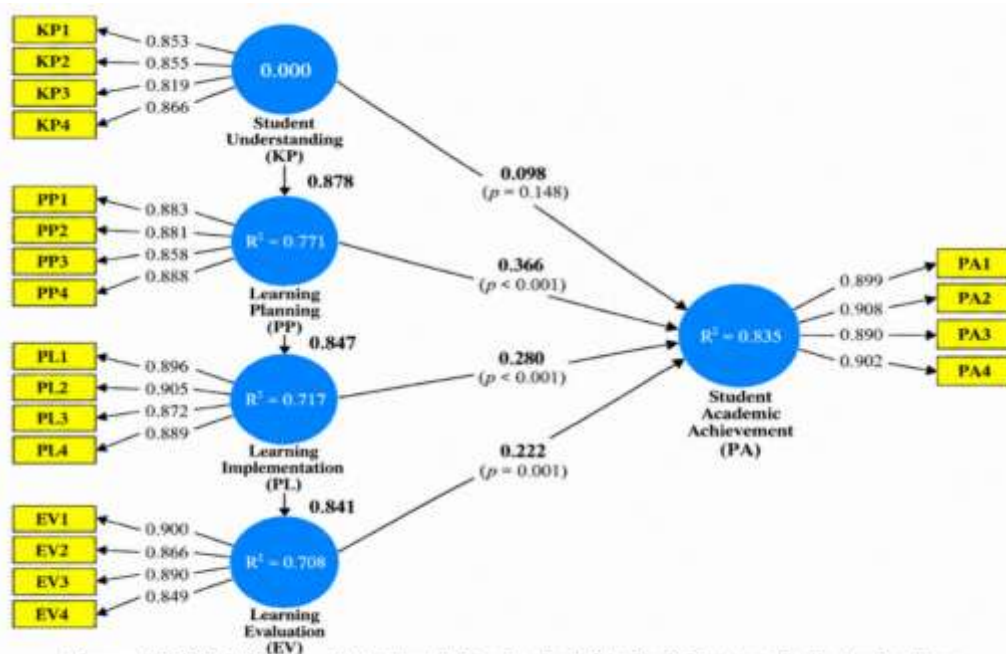


Figure 1. PLS-SEM Structural Model

Figure 1 displays the standardized structural coefficients and indicator loadings. The adjacent paths were Student Understanding $\rightarrow$ Learning Planning ($\beta = 0.878$), Learning Planning $\rightarrow$ Learning Implementation ($\beta = 0.847$), and Learning Implementation $\rightarrow$ Learning Evaluation ($\beta = 0.841$). The direct paths to Student Academic Achievement were smaller: $\beta = 0.366$ for Learning Planning, $\beta = 0.280$ for Learning Implementation, $\beta = 0.222$ for Learning Evaluation, and $\beta = 0.098$ for Student Understanding. The figure retains the original SmartPLS construct codes (KP, PP, PL, EV, and PA), which correspond to the construct names reported in the text.

Direct Effects and Hypothesis Testing

Bootstrapping showed that six of the seven specified direct paths were statistically significant. Student Understanding was positively associated with Learning Planning ($\beta = 0.878$, $t = 56.839$, $p < .001$), Learning Planning with Learning Implementation ($\beta = 0.847$, $t = 40.557$, $p < .001$), and Learning Implementation with Learning Evaluation ($\beta = 0.841$, $t = 40.205$, $p < .001$). These three coefficients were large, although their interpretation is constrained by the substantial overlap among the corresponding constructs.

For the direct paths to Student Academic Achievement, Learning Planning had the largest observed coefficient ($\beta = 0.366$, $t = 5.007$, $p < .001$), followed by Learning Implementation ($\beta = 0.280$, $t = 4.207$, $p < .001$) and Learning Evaluation ($\beta = 0.222$, $t = 3.432$, $p = .001$). The Student Understanding $\rightarrow$ Student Academic Achievement path was not statistically significant ($\beta = 0.098$, $t = 1.449$, $p = .148$), and its 95% confidence interval included zero $[-0.019, 0.237]$. Because the predictors of achievement showed elevated VIF values, the ordering of these direct coefficients should be treated as descriptive rather than as a definitive ranking of independent contributions.

Table 6. Direct Structural Effects

Hypothesis	Relationship	β	t-value	p-value	95% CI	Decision
H1	SU $\rightarrow$ LP	.878	56.839	<.001	[.844, .904]	Supported
H2	LP $\rightarrow$ LI	.847	40.557	<.001	[.802, .884]	Supported
H3	LI $\rightarrow$ LE	.841	40.205	<.001	[.799, .877]	Supported
H4	SU $\rightarrow$ SAA	.098	1.449	.148	[-.019, .237]	Not supported
H5	LP $\rightarrow$ SAA	.366	5.007	<.001	[.221, .499]	Supported
H6	LI $\rightarrow$ SAA	.280	4.207	<.001	[.136, .414]	Supported
H7	LE $\rightarrow$ SAA	.222	3.432	.001	[.108, .356]	Supported



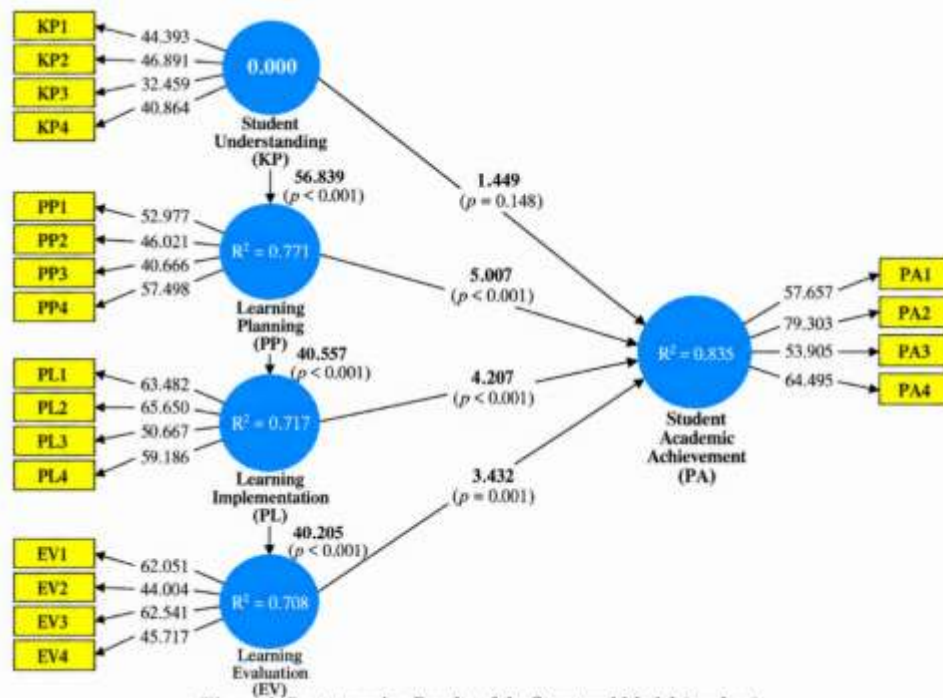


Figure 2. Bootstrapping Results

Sequential Indirect Effects

The specific indirect effects were positive and statistically significant for all pathways reported in Table 7. Student Understanding was indirectly associated with Learning Implementation through Learning Planning ($\beta = 0.743$, $p < .001$), Learning Planning was indirectly associated with Learning Evaluation through Learning Implementation ($\beta = 0.712$, $p < .001$), and Student Understanding was indirectly associated with Learning Evaluation through Learning Planning and Learning Implementation ($\beta = 0.625$, $p < .001$). These estimates are consistent with the ordered structure specified in the model.

Indirect relationships with Student Academic Achievement were also significant. Learning Planning was associated with achievement through Learning Implementation ($\beta = 0.237$, $p < .001$), and Learning Implementation was associated with achievement through Learning Evaluation ($\beta = 0.187$, $p = .001$). The complete sequential indirect pathway from Student Understanding through Learning Planning, Learning Implementation, and Learning Evaluation to

Student Academic Achievement was significant ($\beta = 0.139$, $t = 3.275$, $p = .001$; 95% CI [0.066, 0.226]). Additional specific indirect effects are reported in Table 7.

Table 7. Specific Indirect Effects

Relationship	β	t-value	p-value	95% CI
SU $\rightarrow$ LP $\rightarrow$ LI	.743	26.211	<.001	[.681, .794]
LP $\rightarrow$ LI $\rightarrow$ LE	.712	22.579	<.001	[.649, .766]
SU $\rightarrow$ LP $\rightarrow$ LI $\rightarrow$ LE	.625	17.512	<.001	[.557, .691]
LP $\rightarrow$ LI $\rightarrow$ SAA	.237	4.203	<.001	[.116, .351]
LI $\rightarrow$ LE $\rightarrow$ SAA	.187	3.371	.001	[.091, .296]
LP $\rightarrow$ LI $\rightarrow$ LE $\rightarrow$ SAA	.158	3.321	.001	[.076, .255]
SU $\rightarrow$ LP $\rightarrow$ SAA	.322	5.047	<.001	[.195, .433]
SU $\rightarrow$ LP $\rightarrow$ LI $\rightarrow$ SAA	.208	4.186	<.001	[.101, .310]
SU $\rightarrow$ LP $\rightarrow$ LI $\rightarrow$ LE $\rightarrow$ SAA	.139	3.275	.001	[.066, .226]

The non-significant direct Student Understanding $\rightarrow$ Student Academic Achievement path, together with the significant indirect paths originating from Student Understanding, is consistent with the proposed sequential pattern. However, because the study is cross-sectional, all variables were obtained from the same teacher survey, and discriminant validity was not established, these indirect effects should be described as statistical indirect associations rather than definitive evidence of causal mediation. Student Academic Achievement should also be interpreted as teacher-reported achievement because it was measured through teachers' questionnaire responses rather than objective student records.

DISCUSSION

The results reveal a clear statistical sequence linking Student Understanding, Learning Planning, Learning Implementation, and Learning Evaluation with teacher-reported Student Academic Achievement. The largest path coefficients occurred between adjacent management stages, whereas the direct paths to achievement were smaller. This pattern is compatible with a process-oriented view of learning management, but it must be interpreted in light of two important measurement findings: all HTMT values exceeded 0.90 and the predictors of achievement showed elevated inner VIF values. Accordingly, the evidence supports a strongly



interconnected process, but it does not demonstrate that every stage operates as a fully distinct and independent latent dimension.

This interpretation is broadly consistent with the teaching-quality literature. Alp Christ et al. (2022) showed that intermediate learning processes are important for understanding how teaching quality is related to student achievement and that direct relationships alone may not capture the mechanisms connecting instructional conditions with outcomes. The present model similarly emphasizes an ordered process, although its cross-sectional design means that the observed sequence represents a theoretically specified pattern of associations rather than a verified temporal chain.

Student Understanding and Learning Planning

Student Understanding showed a very large positive association with Learning Planning ($\beta = 0.878$). Substantively, this relationship is consistent with the proposition that knowledge of students' characteristics, needs, abilities, and potential informs decisions about learning objectives, materials, methods, and resources. However, the HTMT value between these two constructs was 0.991, indicating near-complete empirical overlap. The coefficient should therefore be interpreted as evidence that these dimensions move very closely together in the observed data rather than as a clean estimate of an independent causal effect.

Student Understanding did not have a statistically significant direct association with teacher-reported Student Academic Achievement ($\beta = 0.098$, $p = .148$). In contrast, several indirect paths beginning with Student Understanding were significant. Within the proposed framework, this pattern is consistent with the idea that information about learners becomes relevant to reported achievement when it is linked to subsequent planning, implementation, and evaluation activities. The result does not imply that understanding students has no educational value; rather, the present data do not support a distinct direct effect after the other highly correlated management variables are included.

For educational management, the practical implication is that student information is most useful when it is incorporated into instructional decision-making. Diagnostic information, student profiles, and teachers' knowledge of learner characteristics should therefore be connected to planning processes rather than treated as separate administrative activities. This implication is conceptually reasonable, although the high overlap between Student Understanding and



Learning Planning means that future studies should improve the measurement separation of these dimensions before making stronger claims about their individual roles.

Learning Planning as a Managerial Mechanism

Learning Planning had the largest observed direct coefficient with teacher-reported Student Academic Achievement ($\beta = 0.366$) and was strongly associated with Learning Implementation ($\beta = 0.847$). These coefficients suggest that planning occupies an important position in the specified model. Nevertheless, the term 'largest' should be understood descriptively: inner VIF values for achievement predictors reached approximately 6.07, and the HTMT values involving Learning Planning were high. Consequently, the present results do not justify treating the 0.366 coefficient as an uncontaminated estimate of planning's unique contribution relative to the other management dimensions.

The substantive role assigned to planning is consistent with Zaragoza et al. (2023), who describe lesson planning as the application of professional knowledge to instructional decision-making rather than merely the production of formal teaching documents. From this perspective, planning integrates information about learners, curriculum expectations, instructional resources, and anticipated classroom activities. The strong association between planning and implementation in this study is therefore theoretically coherent even though the two constructs remain empirically close.

The findings also suggest that the quality of planning should not be inferred simply from the presence of lesson-plan documents. What matters conceptually is whether plans align learner information, objectives, methods, resources, and assessment. Because the outcome in this study was reported by teachers rather than obtained from objective student records, the observed planning-achievement relationship should be understood as an association with teachers' perceptions of achievement within the same survey context.

At the school-management level, academic supervision can use this process perspective by examining the alignment between student needs, instructional objectives, classroom strategies, and evaluation procedures. Such supervision would focus on the substantive coherence of planning rather than administrative completeness alone. Future research using independent achievement data would be needed to determine whether the same pattern is reproduced when the predictor and outcome measures come from different sources.



Learning Implementation and the Operationalization of Planning

Learning Planning was strongly associated with Learning Implementation ($\beta = 0.847$), while Learning Implementation showed a smaller but statistically significant direct association with teacher-reported Student Academic Achievement ($\beta = 0.280$, $p < .001$). The first coefficient is consistent with the theoretical expectation that instructional plans are translated into classroom practice. At the same time, the high construct correlations mean that planning and implementation should not be interpreted as empirically independent stages on the basis of this dataset alone.

Implementation represents the operational component of learning management, including classroom organization, instructional strategies, teacher-student interaction, and the allocation of learning time. A plan can only influence classroom experience to the extent that it is enacted through these activities. This conceptual relationship helps explain why planning and implementation were closely associated, although the magnitude of the coefficient may also reflect shared measurement content and the use of a single respondent source.

The current result is consistent with research emphasizing the importance of classroom-management processes. Marder et al. (2023) discuss how classroom management is related to students' mathematics achievement through the organization of the learning environment. This literature supports the substantive relevance of implementation, but it does not remove the need to distinguish implementation empirically from adjacent management constructs in the present model.

Similarly, Korpershoek et al. (2026) reported positive effects of classroom-management interventions across academic, behavioral, social-emotional, and motivational outcomes. Such evidence strengthens the theoretical expectation that organized classroom processes matter for learning. In the present study, however, the result is observational and based on teacher reports; it should therefore be interpreted as a cross-sectional association rather than as an intervention effect.

Taken together, the findings position implementation as the stage through which managerial intentions are expressed in classroom practice. The empirical evidence supports its statistical relevance within the model, but the contribution of implementation should be discussed alongside the measurement overlap and collinearity rather than as a fully isolated effect.



Learning Evaluation and Teacher-Reported Student Achievement

Learning Implementation was strongly associated with Learning Evaluation ($\beta = 0.841$), and Learning Evaluation was positively associated with teacher-reported Student Academic Achievement ($\beta = 0.222$, $p = .001$). Conceptually, evaluation provides information about the extent to which learning objectives are achieved and can inform subsequent instructional adjustments. The results are consistent with this managerial role, although the high correlations among constructs again limit claims about a fully independent evaluation effect.

The positive Evaluation $\rightarrow$ Student Academic Achievement path is consistent with evidence on formative assessment. Yao et al. (2024) synthesized evidence from K–12 studies and reported an overall positive effect of formative assessment on academic achievement. This literature supports the broader proposition that assessment can contribute to learning when assessment information is used to guide instructional decisions.

Accordingly, evaluation in the present framework should not be reduced to score generation. Its managerial relevance lies in monitoring progress, judging the attainment of learning objectives, and providing feedback for subsequent decisions. Because Student Academic Achievement was measured through teacher perceptions, the observed coefficient indicates that teachers who reported stronger evaluation practices also tended to report stronger student achievement; it does not establish that evaluation caused measured gains in objective achievement.

Sequential Indirect Relationships

The most important structural pattern is the set of significant specific indirect effects. Student Understanding did not show a significant direct association with Student Academic Achievement, yet the complete indirect pathway Student Understanding $\rightarrow$ Learning Planning $\rightarrow$ Learning Implementation $\rightarrow$ Learning Evaluation $\rightarrow$ Student Academic Achievement was significant ($\beta = 0.139$, $p = .001$). Other shorter indirect pathways were also significant, including Student Understanding $\rightarrow$ Learning Planning $\rightarrow$ Student Academic Achievement ($\beta = 0.322$) and Student Understanding $\rightarrow$ Learning Planning $\rightarrow$ Learning Implementation $\rightarrow$ Student Academic Achievement ($\beta = 0.208$).

These results are compatible with the proposed sequential framework, but they should not be described as definitive causal mediation. The data were collected at one point in time, so temporal precedence among Student Understanding, Planning, Implementation, Evaluation, and



Achievement was not observed directly. In addition, the very high HTMT coefficients indicate that the variables used to form the indirect paths are not clearly separated empirically. The safest interpretation is therefore that the data show a statistically significant pattern of indirect associations that is consistent with, rather than proof of, the proposed managerial sequence.

This cautious interpretation remains consistent with Alp Christ et al. (2022), whose review highlights the importance of intermediate learning processes for explaining relationships between teaching quality and achievement. The contribution of the present study lies in organizing the observed associations into an integrated management sequence, while recognizing that stronger designs are required to establish temporal and causal mechanisms.

This distinction is important for educational-management research, where planning, implementation, and evaluation are often modeled as separate predictors. The present results indicate that these dimensions are strongly connected and may be better studied as parts of an integrated process. Future measurement work should determine whether they can be represented as empirically distinct first-order constructs, as dimensions of a higher-order learning-management construct, or through another specification that better matches their observed overlap.

Implications for Educational Management

For principals and academic supervisors, the findings support attention to process alignment. Learning quality should be reviewed across the sequence from understanding learner characteristics to planning, classroom implementation, and evaluation rather than through isolated administrative checks. This implication follows from the strong covariation among the management dimensions, although the present study does not establish which individual stage independently produces changes in objective student achievement.

Teacher professional development can likewise be organized around the continuity of instructional decision-making. Training in learner diagnosis, lesson planning, classroom management, and assessment may be more coherent when these areas are connected within a single improvement cycle rather than delivered as unrelated themes. This recommendation reflects the process logic of the model and should not be interpreted as evidence that the reported path coefficients represent causal training effects.

The results also provide a basis for a process-oriented approach to learning quality assurance. Schools may evaluate whether information about students is reflected in plans,



whether plans are implemented consistently, and whether evaluation results are used for subsequent decisions. Such an approach is more consistent with the observed interdependence of the constructs than an interpretation that treats each management function as an isolated performance domain.

Measurement Considerations and Interpretation Limits

The principal measurement concern is the absence of discriminant validity. HTMT coefficients ranged from 0.923 to 0.991, with every pair exceeding 0.90. Thus, although reliability and AVE values were satisfactory, the five latent variables were not sufficiently differentiated empirically. The issue is especially pronounced for Student Understanding and Learning Planning (HTMT = 0.991). Structural coefficients involving these variables should therefore be interpreted as relationships among highly overlapping dimensions.

Structural collinearity provides a second reason for caution. Inner VIF values for predictors of Student Academic Achievement ranged from approximately 4.61 to 6.07, with Student Understanding and Learning Planning exceeding 5. Under these conditions, the size and significance of an individual direct coefficient can be affected by shared variance with the other predictors. The comparison of Planning, Implementation, Evaluation, and Student Understanding as independent predictors should therefore not be overinterpreted.

A third limitation concerns design and measurement source. The study used a cross-sectional teacher survey, and Student Academic Achievement was represented by teachers' perceptions of competency mastery, evaluation results, and learning-target attainment rather than objective student records. Because predictors and outcome were obtained from the same respondents at the same time, shared method variance cannot be ruled out. The design also prevents definitive conclusions about temporal ordering or causality, even when indirect effects are statistically significant.

Taken together, the study provides evidence of a strong, coherent pattern among learning-management activities and teacher-reported achievement, but the contribution is strongest at the level of the overall process rather than the isolated direct effects of individual constructs. Future studies should use clearer measurement specifications, independent or objective achievement indicators, longitudinal or multilevel designs, and broader samples to test whether the sequential pattern remains when construct overlap and same-source measurement are reduced.



CONCLUSION

This study demonstrates that learning management effectiveness in elementary schools operates through a sequential and interconnected process involving Student Understanding, Learning Planning, Learning Implementation, Learning Evaluation, and Student Academic Achievement. The structural model showed strong relationships across the management sequence, particularly from Student Understanding to Learning Planning ($\beta = 0.878$), from Learning Planning to Learning Implementation ($\beta = 0.847$), and from Learning Implementation to Learning Evaluation ($\beta = 0.841$). Learning Planning, Learning Implementation, and Learning Evaluation also had significant direct effects on Student Academic Achievement, whereas the direct effect of Student Understanding was not statistically significant ($\beta = 0.098$; $p = .148$).

The findings indicate that understanding students does not automatically translate into higher academic achievement. Its contribution becomes meaningful when information about student characteristics is transformed into systematic planning, implemented through effective classroom practices, and followed by appropriate evaluation. This interpretation is reinforced by the significant sequential indirect pathway from Student Understanding through Learning Planning, Learning Implementation, and Learning Evaluation to Student Academic Achievement. The model explained 83.5% of the variance in Student Academic Achievement, indicating substantial explanatory power within the observed sample.

From an educational management perspective, the study contributes to the understanding of learning management as a process-oriented system rather than a set of independent instructional activities. The effectiveness of learning is determined not only by the quality of individual management functions but also by the continuity between stages. Therefore, school principals and academic supervisors should focus on the alignment between student diagnosis, learning planning, implementation, and evaluation when developing academic supervision, teacher professional development, and learning quality assurance programs.

The study is limited by its cross-sectional design, reliance on teacher-reported perceptions of student academic achievement, and the high empirical overlap among several learning-management constructs. Future studies should validate the model using longitudinal data, objective student achievement indicators, broader school populations, and alternative measurement specifications that provide stronger discriminant validity. Further research may also incorporate school leadership, organizational climate, digital learning management, teacher



professional development, or student engagement to provide a more comprehensive explanation of learning management effectiveness.

Overall, the study confirms that **student academic achievement is more appropriately** explained through a sequential learning-management mechanism than through isolated instructional factors. The continuity of planning, implementation, and evaluation is therefore central to transforming teachers' understanding of students into measurable educational outcomes.

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