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Deep Learning Pedagogy, Learning Motivation, and Conceptual Understanding in Islamic Religious Education: Evidence from Senior High School Students in Bandung

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ABSTRACT

This study examines the relationships between deep learning pedagogy, learning motivation, and conceptual understanding in Islamic Religious Education (IRE) among senior high school students in Bandung, Indonesia. A quantitative approach with a cross-sectional survey design was employed, involving 130 respondents selected from students participating in Islamic Religious Education. Data were collected using a structured questionnaire with a five-point Likert scale, and multiple linear regression was performed using SPSS version 25. The results showed a positive and statistically significant relationship between deep learning and conceptual understanding ($B = 0.465$, $\beta = 0.500$, $p = 0.001$). A positive and significant relationship was also found between learning motivation ($B = 0.368$, $\beta = 0.388$, $p = 0.001$). At the same time, there is evidence that both variables contribute significantly to the variation in conceptual understanding ($F = 65.947$, $p < 0.001$), and the coefficient of determination (R^2) of 0.509 indicates that the regression model accounts for 50.9% of the observed variation. Deep learning pedagogy showed a stronger standardized relationship with conceptual understanding than learning motivation. These results highlight the importance of combining effective teaching practices with motivational support to encourage students to better understand Islamic concepts. This study provides quantitative evidence for Islamic education research and practical implications for creating a reflective, engaging, and contextually relevant learning environment. The results indicate a statistical relationship, not a causal effect, as this study employs a cross-sectional design and measurements were conducted via self-reports.

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INTRODUCTION

Education is crucial for developing students' intellectual abilities, critical thinking skills, moral awareness, and the ability to tackle increasingly complex social challenges. Modern educational practices emphasize a shift from teacher-centered instruction and rote memorization to meaningful learning experiences that encourage active participation, reflection, and conceptual understanding. This transformation is particularly relevant to Islamic Religious Education (PAI), which aims not only to impart religious knowledge to students but also to help them understand Islamic teachings and apply religious values in their daily lives. Hattie and Donoghue (2016) emphasize that effective learning requires progression from surface knowledge acquisition toward deeper understanding and knowledge transfer through cognitive and metacognitive strategies. Similarly, Ibrohim et al. (2025) emphasize the importance of effective teaching practices that connect Islamic educational content with students' experiences. Therefore, gaining a better conceptual understanding remains crucial to ensuring that religious education does not merely focus on rote memorization but also helps students become more critical, analytical, and contextually relevant.

Deep learning pedagogy has emerged as a promising educational approach that emphasizes contextual application, reflective engagement, critical inquiry, and the development of meaningful knowledge. Deep learning encourages students to identify conceptual connections, evaluate data, and transfer their knowledge to various contexts. This distinguishes deep learning from surface learning (Hattie & Donoghue, 2016). Within Indonesia's educational transformation agenda, the Ministry of Primary and Secondary Education (2025) promotes deep learning based on three key principles: mindful learning, meaningful learning, and enjoyable learning. These principles encourage conscious participation, the integration of new experiences with prior knowledge, and a positive learning environment that supports sustained engagement. The National Research Council (2000) further emphasizes that meaningful understanding requires knowledge to be organized within coherent conceptual frameworks that facilitate interpretation and transfer. In Islamic Religious Education, these pedagogical principles may strengthen students' ability to interpret Islamic teachings, recognize relationships between religious concepts, and apply ethical principles in contemporary social contexts. Nevertheless, their contribution to students' conceptual understanding requires systematic empirical investigation.

In addition to instructional approaches, learning motivation constitutes an important psychological factor associated with students' educational engagement and conceptual understanding. Pintrich (2003) explains that motivation influences learning behavior through students' interests, goals, beliefs, and self-regulatory processes, shaping their willingness to invest cognitive effort and persist in challenging academic activities. From the perspective of Self-Determination Theory, Ryan and Deci (2020) distinguish intrinsic and extrinsic motivation while emphasizing autonomy, competence, and relatedness as fundamental psychological needs supporting meaningful educational participation. Furthermore, Fredricks et al. (2004) identify behavioral, emotional, and cognitive engagement as interconnected dimensions through which students participate in learning activities. Within Islamic Religious Education, motivated students may demonstrate greater willingness to discuss religious concepts, examine ethical issues, seek clarification, and connect Islamic teachings with personal experiences. Deep learning pedagogy and learning motivation therefore represent complementary dimensions of educational development, as meaningful instructional opportunities require students' active engagement to support conceptual comprehension.

Previous studies have demonstrated the relevance of meaningful and deep learning approaches in Islamic Religious Education, although important empirical limitations remain. Ibrohim et al. (2025) examined meaningful learning practices in senior high school religious education and emphasized the importance of connecting instructional content with students' experiences. Askah et al. (2026) investigated deep learning-based pedagogical innovation at SMA UII Yogyakarta and reported improvements in student participation, instructional innovation, conceptual understanding, and the contextualization of religious values. Similarly, Sa'adah et al. (2026) investigated the application of deep learning at Babat State High School No. 1 and emphasized its importance for students' conceptual understanding. Despite these contributions, previous investigations have predominantly employed qualitative, classroom-based, or context-specific approaches, leaving limited quantitative evidence regarding the independent and simultaneous relationships between deep learning pedagogy, learning motivation, and conceptual understanding. Furthermore, while Hattie and Donoghue (2016), Pintrich (2003), and Ryan and Deci (2020) provide theoretical foundations for understanding instructional and motivational processes, their combined statistical associations with conceptual understanding in Islamic Religious Education remain insufficiently examined, particularly among senior high school students in Bandung, Indonesia.

Consequently, this study aims to examine how high school students in Bandung, Indonesia, who are taking Islamic Religious Education interact with deep learning pedagogy, as well as their motivation to learn and their conceptual understanding. Specifically, this study investigates how deep learning pedagogy correlates with learning motivation and conceptual understanding. It also examines whether differences in students' conceptual understanding can be explained by combining these two variables. This study conceptualizes learning motivation and deep learning pedagogy as independent variables, and self-reported conceptual understanding as the dependent variable. It also draws on theoretical concepts from Hattie and Donoghue (2016), Pintrich (2003), and Ryan and Deci (2020). By integrating pedagogical and motivational perspectives in Islamic religious education, this study contributes theoretically; empirically, by providing quantitative evidence regarding its statistical relationship with conceptual understanding; and practically, by offering insights for teachers and educational institutions seeking to enhance meaningful religious learning. These findings are interpreted as statistical correlations rather than definitive causal effects because the study design is observational.

LITERATURE REVIEW

2.1 Theoretical Foundations of Deep Learning Pedagogy

Deep learning pedagogy emphasizes meaningful knowledge construction, critical thinking, reflection, and knowledge application beyond memorization. Biggs (1987) distinguishes deep learning, characterized by intrinsic motivation and conceptual comprehension, from surface learning focused on basic academic requirements. Hattie and Donoghue (2016) further explain that learning progresses through surface, deep, and transfer stages, enabling students to acquire, integrate, and apply knowledge. In Indonesia, deep learning incorporates mindful, meaningful, and joyful learning to promote active engagement, conceptual integration, and positive learning experiences. Within Islamic Religious Education (IRE), this approach supports students' understanding of religious principles and their application in everyday life. Suryadi et al. (2026) and Agung and Sa'diyah (2026) highlight its relevance to conceptual understanding, character development, and student engagement. Accordingly, this study conceptualizes deep learning

pedagogy through mindful engagement, meaningful learning, joyful learning, and reflective application to examine its relationship with students' conceptual understanding.

2.2 Learning Motivation

Learning motivation is a psychological factor influencing students' participation, persistence, cognitive engagement, and academic achievement. Pintrich (2003) describes motivation as a multidimensional construct involving learning goals, beliefs, values, and self-regulation. Ryan and Deci (2020), used Self-Determination Theory to distinguish between intrinsic and extrinsic motivation. They also emphasized relatedness, autonomy, and competence as important psychological needs for supporting sustained engagement in learning. Furthermore, Fredricks et al. (2004) identified behavioral, emotional, and cognitive engagement as interrelated components of educational participation. Learning motivation in Islamic Religious Education (PAI) encourages students to participate in discussions, critically interpret Islamic teachings, study religious concepts, and apply religious values in daily life. Therefore, this study conceptualizes learning motivation as follows: interest in learning, perceived value of learning, academic perseverance, self-confidence in learning, and active participation.

2.3 Conceptual Understanding in Islamic Religious Education

Conceptual understanding refers to students' ability to interpret knowledge, recognize relationships among concepts, explain underlying principles, and apply learning in different contexts. The National Research Council (2000) emphasizes the importance of organizing knowledge within coherent conceptual frameworks, while Hattie and Donoghue (2016) highlight elaboration and conceptual integration as essential strategies for deeper understanding. In Islamic Religious Education (IRE), conceptual understanding involves interpreting Islamic teachings, connecting religious principles with ethical values, and applying them to everyday situations. Sa'adah et al. (2026) further emphasize the role of meaningful learning in strengthening students' conceptual comprehension. Accordingly, this study measures conceptual understanding through conceptual interpretation, conceptual connections, analytical reasoning, and contextual application. As these dimensions are assessed using self-reported questionnaires, the findings reflect students' perceived conceptual understanding rather than objectively verified academic mastery.

2.4 Relationship Between Deep Learning Pedagogy and Conceptual Understanding

By encouraging critical inquiry, reflection, active knowledge construction, and contextual problem-solving, this deep learning approach fosters conceptual understanding. Hattie and Donoghue (2016) emphasize that deep learning strategies facilitate conceptual integration and knowledge transfer by linking new information to prior knowledge. In Islamic Religious Education (PAI), this method encourages students to interpret religious principles, explore moral implications, and apply Islamic teachings in their daily lives. Sa'adah et al. (2026) highlight the contribution of deep learning practices to students' conceptual comprehension and contextual application, while Saputri and Madjid (2026) identify improvements in critical thinking, learning motivation, and student engagement. This study shows that deep learning methods have a positive correlation with students' conceptual understanding of Islamic religious education.

H1: Deep learning pedagogy has a positive and statistically significant relationship with students' conceptual understanding in Islamic Religious Education.

2.5 Relationship Between Learning Motivation and Conceptual Understanding

Learning motivation is positively associated with conceptual understanding by encouraging cognitive engagement, persistence, and meaningful learning strategies. Pintrich (2003) emphasizes that motivation influences cognition, self-regulation, and academic performance by strengthening

students' willingness to explore complex concepts and reflect on acquired knowledge. Similarly, Ryan and Deci (2020), through Self-Determination Theory, highlight autonomy, competence, and relatedness as essential factors supporting sustained motivation and deeper learning. In Islamic Religious Education (IRE), motivated students are more likely to examine religious principles, participate in reflective discussions, and connect Islamic teachings with everyday experiences. However, the effectiveness of motivation also depends on instructional quality and learning environments. Accordingly, this study proposes that learning motivation has a positive relationship with students' perceived conceptual understanding in Islamic Religious Education.

H2: Learning motivation has a positive and statistically significant relationship with students' conceptual understanding in Islamic Religious Education.

2.6 Simultaneous Relationship of Deep Learning Pedagogy and Learning Motivation with Conceptual Understanding

Deep learning pedagogy and learning motivation represent complementary factors influencing students' conceptual understanding through meaningful instructional experiences and psychological engagement. Deep learning pedagogy promotes critical thinking, reflection, and knowledge application, while motivation encourages active participation, persistence, and cognitive effort. Fredricks et al. (2004) emphasize that behavioral, emotional, and cognitive engagement contribute to meaningful educational experiences. In Islamic Religious Education (IRE), integrating these factors may strengthen students' ability to interpret religious concepts and apply Islamic teachings in everyday life. Saputri and Madjid (2026) highlight the importance of conceptual learning, reflection, and motivation, while Suryadi et al. (2026) emphasize the role of deep learning in meaningful comprehension and religious value internalization. Accordingly, this study examines the simultaneous relationship between deep learning pedagogy, learning motivation, and students' perceived conceptual understanding among senior high school students in Bandung.

H3: Deep learning pedagogy and learning motivation simultaneously demonstrate a statistically significant relationship with students' conceptual understanding in Islamic Religious Education.

RESEARCH METHODS

To investigate how deep learning pedagogy, learning motivation, and conceptual understanding in Islamic Religious Education (PAI) interact with one another among high school students in Bandung, Indonesia, this study employed a quantitative approach. The study involved 130 respondents enrolled in Islamic Religious Education, with students serving as the unit of analysis. This study examined two independent variables: deep learning pedagogy (X1) and learning motivation (X2). It also examined one dependent variable: conceptual understanding (Y). Statistical relationships were assessed without altering teaching conditions using an observational design. The principles of reproducibility and transparency, as outlined by von Elm et al. (2007) form the basis of the methodological reporting. The results are interpreted as statistical relationships rather than cause-and-effect relationships because this study was conducted using a cross-sectional design.

Initial data were collected using a structured questionnaire with a five-point Likert scale, ranging from "strongly disagree" (1) to "strongly agree" (5). Deep learning pedagogy was measured in terms of conscious, meaningful, enjoyable, and reflective learning. Learning motivation was assessed through learning interest, perceived learning value, academic persistence, learning confidence, and active participation, drawing on the motivational perspectives of Pintrich (2003) and Ryan and Deci (2020). Conceptual understanding was measured through conceptual interpretation, conceptual connections, analytical reasoning, and contextual application, based on the theoretical

framework of Hattie and Donoghue (2016). Questionnaire responses reflected students' perceptions rather than objectively verified conceptual mastery. Instrument validity was evaluated using corrected item-total correlations, with 0.30 as a preliminary screening criterion, while reliability was assessed using Cronbach's alpha, adopting 0.70 as the conventional minimum threshold.

To analyze the data, Statistical Package for the Social Sciences (SPSS) version 25 was used. Regression assumption tests, multiple linear regression analysis, and descriptive statistics were employed. While descriptive analysis examines the distribution, mean, and standard deviation of each research variable, regression diagnostics examine outliers, normality of residuals, linearity, heteroscedasticity, and multicollinearity. Multiple linear regression was used to estimate the relationships between deep learning pedagogy, learning motivation, and conceptual understanding both individually and simultaneously. The significance of individual regression coefficients was assessed using the partial t-test, while the overall statistical significance of the model was assessed using the simultaneous F-test. The proportion of variance in conceptual understanding explained by the independent variables was measured using the coefficient of determination (R^2) and the adjusted R^2. All hypotheses were tested at a significance level of 0.05, taking into account the direction of the coefficients, the magnitude of the effects, and the 95% confidence interval.

RESULTS AND DISCUSSION

4.1 Descriptive Statistical Analysis

Descriptive statistical analysis was conducted, including the minimum score, maximum score, mean, and standard deviation for each research variable. The variables were represented on a five-point measurement scale.

Table 1. Descriptive Statistics of Research Variables

Variable	N	Minimum	Maximum	Mean	Std. Deviation
Deep Learning Pedagogy (X_1)	130	2.358	5.000	3.637	0.549
Learning Motivation (X_2)	130	2.344	4.890	3.739	0.539
Conceptual Understanding (Y)	130	1.916	4.596	3.608	0.511

Table 1 presents the descriptive statistics of the research variables based on 130 valid respondents. Deep learning pedagogy (X1) had a mean score of 3.637, a standard deviation of 0.549, and scores ranging from 2.358 to 5.000. Learning motivation (X2) showed the highest mean score of 3.739, with a standard deviation of 0.539, and scores ranging from 2.344 to 4.890. However, conceptual understanding (Y) has a mean score of 3.608, a standard deviation of 0.511, and a score range between 1.916 and 4.596. Overall, the findings indicate relatively favorable student perceptions across all three variables, with learning motivation showing the highest average score and conceptual understanding exhibiting the lowest variability.

4.2 Regression Assumption Testing

These procedures included residual normality assessment, multicollinearity analysis, and heteroscedasticity testing.

Table 2. Regression Diagnostic Results

Diagnostic	Statistical indicator	Result	Interpretation
Residual normality	Shapiro–Wilk p-value	0.815	No significant departure detected
Multicollinearity (X_1)	VIF	1.086	No substantial multicollinearity
Multicollinearity (X_2)	VIF	1.086	No substantial multicollinearity
Heteroscedasticity	Breusch–Pagan LM p-value	0.144	No significant heteroscedasticity detected
Residual autocorrelation	Durbin–Watson	1.937	No marked first-order autocorrelation indicated

Table 2 presents the regression diagnostic results, indicating that the model satisfies the assessed statistical assumptions. The Shapiro–Wilk test yielded a p-value of 0.815, suggesting no significant departure from residual normality. Multicollinearity was not a substantial concern, as both deep learning pedagogy (X_1) and learning motivation (X_2) recorded variance inflation factor (VIF) values of 1.086. Furthermore, the Breusch–Pagan test produced a p-value of 0.144, indicating no statistically significant evidence of heteroscedasticity. The Durbin–Watson statistic of 1.937 also suggested no marked first-order residual autocorrelation. Overall, these diagnostic results indicate no substantial violations of the tested regression assumptions, supporting the suitability of the model for subsequent multiple linear regression analysis.

4.3 Multiple Linear Regression Analysis

Multiple linear regression analysis was conducted to estimate the relationship between deep learning pedagogy, learning motivation, and conceptual understanding. Deep learning pedagogy (X_1) and learning motivation (X_2) were entered as independent variables, while conceptual understanding (Y) was specified as the dependent variable.

Table 3. Multiple Linear Regression Coefficients

Predictor	B	Std. Error	Beta	t	Sig.
Constant	0.543	0.271	—	2.005	0.047
Deep Learning Pedagogy (X_1)	0.465	0.060	0.500	7.719	<0.001
Learning Motivation (X_2)	0.368	0.061	0.388	5.991	<0.001

Table 3 presents the multiple linear regression results, indicating that deep learning pedagogy and learning motivation are positively and significantly associated with students' conceptual understanding. The regression model produced a constant of 0.543 ($t = 2.005$, $p = 0.047$). Deep learning pedagogy (X_1) demonstrated a positive and statistically significant coefficient ($B = 0.465$, $SE = 0.060$, $\beta = 0.500$, $t = 7.719$, $p < 0.001$), indicating that higher levels of perceived deep learning

pedagogy are associated with greater conceptual understanding when learning motivation is held constant. Similarly, learning motivation (X_2) exhibited a positive and significant relationship (B = 0.368, SE = 0.061, β = 0.388, t = 5.991, p < 0.001). The standardized coefficients indicate that deep learning pedagogy has a stronger relative association with conceptual understanding than learning motivation. Overall, both independent variables demonstrate statistically significant positive relationships with students' perceived conceptual understanding in Islamic Religious Education.

4.4 Simultaneous Hypothesis Testing (F-Test)

Table 4. ANOVA Results for the Multiple Regression Model

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	17.140	2	8.570	65.947	<0.001
Residual	16.504	127	0.130	—	—
Total	33.644	129	—	—	—

Table 4 presents the ANOVA results for the multiple linear regression model, indicating that deep learning pedagogy and learning motivation jointly demonstrate a statistically significant relationship with students' conceptual understanding. The regression model yielded a sum of squares of 16,504 with 127 degrees of freedom and a mean square of 0.130. In contrast, the total sum of squares was 17.140 with 2 degrees of freedom and a mean square of 8.570. The total sum of squares was 33.644, with 129 degrees of freedom. The F-test result indicates that the regression model as a whole is statistically significant, with a value of 65.947 (p < 0.001). These results support the simultaneous hypothesis (H3), which asserts that most of the differences in students' conceptual understanding in Islamic Religious Education are attributable to deep learning pedagogy and collective learning motivation.

4.5 Coefficient of Determination

The model summary presents the explanatory capacity of the multiple linear regression model, indicating a substantial relationship between deep learning pedagogy, learning motivation, and students' conceptual understanding. There is a fairly strong relationship between observed and predicted conceptual understanding scores, as indicated by a correlation coefficient (R) of 0.714. According to the coefficient of determination (R^2) of 0.509, 50.9% of the variation in students' perceived conceptual understanding is accounted for by a combination of deep learning pedagogy and learning motivation. The remaining 49.1% cannot be explained by the model. The adjusted R^2 of 0.502 indicates that, considering the number of predictors, the model explains approximately 50.2% of the variance. In addition, there is residual variation around the predicted values, as indicated by the standard error of the estimate of 0.360. Overall, these results suggest that the regression model provides a significant explanation of how students understand the concepts of Islamic Religious Education.

4.6 Discussion

The regression coefficients (B = 0.465, β = 0.500, t = 7.719, p = 0.001) indicate a positive and statistically significant relationship between deep learning pedagogy and students' conceptual understanding of Islamic Religious Education (PAI). These results suggest that students who perceive greater opportunities for meaningful learning, contextual application of knowledge, and critical reflection tend to report better conceptual understanding. The finding aligns with Hattie and Donoghue (2016), who emphasize that deep learning strategies facilitate conceptual integration,

knowledge elaboration, and the transfer of learning across different contexts. It is also consistent with Sa'adah et al. (2026), who highlighted the contribution of deep learning practices to strengthening conceptual understanding in Islamic Religious Education. Similarly, Saputri and Madjid (2026) identified critical thinking, reflective learning, and conceptual comprehension as important outcomes associated with deep learning approaches. These findings reinforce the importance of instructional practices that encourage students to interpret Islamic teachings, establish relationships among religious principles, and apply their understanding to everyday situations rather than relying exclusively on memorization.

A positive and statistically significant relationship was also found between students' learning motivation and conceptual understanding ($B = 0.368$, $\beta = 0.388$, $t = 5.991$, $p = 0.001$). These findings indicate that students with higher learning motivation tend to demonstrate greater self-confidence and better ability to understand, interpret, and apply Islamic concepts. The result supports Pintrich (2003), who emphasizes the relationship between motivation, cognitive engagement, self-regulation, and academic learning. It is also consistent with Ryan and Deci (2020), whose Self-Determination Theory highlights autonomy, competence, and relatedness as essential psychological conditions supporting sustained educational engagement. Furthermore, Fredricks et al. (2004) explain that behavioral, emotional, and cognitive engagement are interconnected dimensions of meaningful learning participation. Within Islamic Religious Education, motivation may encourage students to explore religious principles, participate actively in discussions, and connect Islamic values with personal experiences. However, the standardized regression coefficients indicate that deep learning pedagogy (0.500) has a relatively stronger association with conceptual understanding than does learning motivation (0.388), suggesting that learning experiences may be a very important factor alongside students' motivational characteristics.

The simultaneous regression analysis further demonstrates that deep learning pedagogy and learning motivation jointly have a statistically significant relationship with students' conceptual understanding ($F = 65.947$, $p < 0.001$). The coefficient of determination ($R^2 = 0.509$) indicates that both variables collectively explain 50.9% of the observed variation in perceived conceptual understanding, while the remaining 49.1% is not accounted for by the model. This finding supports the theoretical perspective that meaningful instructional experiences and motivational engagement represent complementary components of educational development. Suryadi et al. (2026) emphasize the importance of deep learning in strengthening meaningful comprehension and religious value internalization, while Saputri and Madjid (2026) highlight the integration of conceptual learning, reflection, and student engagement in Islamic education. The present findings extend these perspectives by providing quantitative evidence from senior high school students in Bandung. Practically, the results suggest that Islamic Religious Education teachers should combine reflective discussions, contextual learning activities, and opportunities for critical inquiry with classroom environments that encourage student motivation and participation. However, because the study employed a cross-sectional survey and self-reported measurements, the findings establish statistical associations rather than causal effects or objectively verified conceptual mastery. Future research could incorporate longitudinal designs, classroom observations, and objective assessments to provide a more comprehensive understanding of these educational relationships.

CONCLUSION

This study concludes that deep learning pedagogy and learning motivation have positive and statistically significant relationships with students' perceived conceptual understanding in

Islamic Religious Education among senior high school students in Bandung, Indonesia. Deep learning pedagogy demonstrates a stronger standardized association ($\beta = 0.500$, $p < 0.001$) than learning motivation ($\beta = 0.388$, $p < 0.001$), indicating the importance of meaningful instructional experiences alongside students' motivational characteristics. Simultaneously, both variables significantly explain variations in conceptual understanding ($F = 65.947$, $p < 0.001$), accounting for 50.9% of the observed variance ($R^2 = 0.509$). These findings suggest that integrating mindful, meaningful, and joyful learning with strategies that encourage student interest, persistence, and active participation may support deeper understanding of Islamic religious concepts. Practically, educators should emphasize reflective discussions, contextual applications, and supportive learning environments to strengthen students' engagement with religious knowledge. However, the cross-sectional design and reliance on self-reported questionnaires limit causal interpretation and do not establish objectively measured conceptual mastery. Future research should incorporate longitudinal approaches, broader samples, and objective learning assessments to further examine the relationships between pedagogical practices, motivation, and conceptual understanding.

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