Journal of Education and Learning (EduLearn)
Vol. 20, No. 3, August 2026, pp. 1319~1332
ISSN: 2089-9823, DOI: 10.11591/edulearn.v20i3.24419

The mediating role of professional commitment on teacher contextual factors and science teacher performance in Indonesia

Irwandani[1], Ardian Asyhari[1], Misbah[2], Heru Juabdin Sada[3], Dominikus Djago Djoa[4], Nurul Hidayati Murtafiah[5], Muhammad Aridan[6]
[1]Department of Physics Education, Faculty of Tarbiyah and Teacher Training, Universitas Islam Negeri Raden Intan Lampung, Bandar Lampung, Indonesia
[2]Department of Physics Education, Faculty of Education and Teacher Training, Universitas Lambung Mangkurat, Banjarmasin, Indonesia
[3]Department of Educational Management, Faculty of Tarbiyah and Teacher Training, Universitas Islam Negeri Raden Intan Lampung, Bandar Lampung, Indonesia
[4]Department of Mathematics Education, Faculty of Education and Teacher Training, Universitas Flores, Ende, Indonesia
[5]Department of Islamic Religious Education, Faculty of Tarbiyah and Teacher Training, Universitas Islam An-Nur Lampung, Jati Agung, Indonesia
[6]Department of Scientific Journal Development and Publishing, WISE Pendidikan Indonesia, Bandar Lampung, Indonesia

Article Info

Article history:

Received Feb 10, 2025
Revised Jan 14, 2026
Accepted Jan 31, 2026

Keywords:

Job satisfaction
Pedagogical beliefs
Professional commitment
Science education
Teacher performance

ABSTRACT

Teacher performance is critical to educational success, particularly in Indonesia's science education landscape. This study explores the mediating role of professional commitment in the relationship between teacher contextual factors—job satisfaction, pedagogical beliefs, and perceived support—and science teacher performance. Using social exchange theory (SET) as the theoretical foundation, data were collected from 288 science teachers across Indonesia and analyzed using structural equation modeling (SEM) via SmartPLS 4.0. The results reveal that pedagogical beliefs strongly predict professional commitment (β=0.583, $p<0.001$), while job satisfaction significantly influences both professional commitment (β=0.280, $p=0.006$) and teacher performance (β=0.283, $p=0.002$). Professional commitment itself has a strong effect on performance (β=0.536, $p<0.001$) and mediates the indirect effects of job satisfaction (β=0.150, $p=0.008$) and pedagogical beliefs (β=0.312, $p<0.001$) on teacher performance. Conversely, perceived support weak direct and indirect effects. These findings underscore the importance of fostering professional commitment through improved job satisfaction and culturally grounded pedagogical development. Policy implications include reinforcing institutional support systems, especially in underserved regions, to boost science teacher effectiveness and national science, technology, engineering, and mathematics (STEM) competitiveness.

Corresponding Author:

Irwandani
Faculty of Tarbiyah dan Teacher Training, Universitas Islam Negeri Raden Intan Lampung
Letkol Endro Suratmin Street No. 1, Bandar Lampung, Lampung, Indonesia
Email: irwandani@radenintan.ac.id

1. INTRODUCTION

In the dynamic landscape of educational reform, teacher performance remains pivotal in achieving institutional success and student outcomes. Teachers' ability to deliver high-quality education significantly relies on contextual factors such as job satisfaction, pedagogical beliefs, and perceived support from their institutions. These factors shape professional behavior and serve as critical predictors of teacher commitment

and performance in educational settings [1]–[3]. In Indonesia, particular attention has been directed toward enhancing the performance of science teachers as part of broader national efforts to strengthen competitiveness in the domains of science, technology, engineering, and mathematics (STEM) on the global stage.

The importance of teacher performance is underscored by its direct impact on student achievement and institutional effectiveness. Recent studies have highlighted how intrinsic and extrinsic factors such as job satisfaction and institutional support influence teacher efficacy and commitment. For instance, Baroudi *et al*. [4] conducted a quantitative analysis in Lebanon examining how personal (intrinsic) and environmental (extrinsic) determinants contribute to educators' sense of job fulfillment. Although intrinsic aspects were rated more favorably, external conditions including workplace environment and opportunities for professional growth were found to have stronger associations with overall satisfaction. This finding highlights the need to strengthen external support mechanisms, especially within developing contexts, to enhance teachers' occupational well-being. Likewise, Nguyen *et al*. [5] investigated how contextual work features influence satisfaction and institutional loyalty among academic staff in Vietnamese universities. Their research indicated that managerial supervision, workplace infrastructure, compensation systems, and recognition mechanisms each exert a significant positive influence on job satisfaction, underscoring the necessity of a conducive professional environment to sustain teacher engagement. Furthermore, Mokhtar *et al*. [6] identified self-efficacy as a key mediating factor connecting satisfaction and commitment among Malaysian primary school teachers. Their evidence showed that enhanced self-efficacy fosters both higher motivation and greater professional dedication, suggesting that institutional initiatives aimed at empowering teachers can yield notable gains in performance and retention. Collectively, these studies provide an integrated understanding of how satisfaction, institutional support, and self-belief converge to strengthen teacher effectiveness.

As a psychological mechanism, professional commitment mediates the relationship between teacher contextual factors and performance. It reflects teachers' dedication to their profession and willingness to exert effort beyond contractual obligations. Professional commitment has been linked to increased instructional quality [7], resilience in challenging educational contexts [8], and sustained engagement with professional development opportunities [9]. However, the pathways through which contextual factors influence teacher performance via professional commitment remain underexplored, particularly in Indonesia's science education context.

Teacher performance plays a decisive role in shaping both student learning outcomes and the overall quality of educational institutions. A growing body of research demonstrates that internal and external determinants, particularly job satisfaction and the degree of institutional support, significantly affect teachers' sense of efficacy and professional commitment. Several studies have underscored the pivotal function of these factors in enhancing instructional performance. For instance, Ortan *et al*. [10] investigated the associations between job satisfaction and elements such as self-efficacy, workplace context, and interpersonal dynamics among 658 Romanian K-12 educators. Their analysis indicated that high self-efficacy, constructive student behavior, and supportive working environments were closely linked to greater satisfaction, helping to reduce burnout and strengthen teacher retention. Likewise, Toropova *et al*. [11] utilizing Trends in International Mathematics and Science Study (TIMSS) 2015 data, examined Swedish mathematics teachers and found that school-level working conditions—including workload, professional collaboration, and student discipline—were strongly associated with higher satisfaction levels. Their results also revealed differences influenced by teacher attributes, including self-efficacy and participation in professional learning opportunities. Dreer [12] drawing on the positive emotions, engagement, relationships, meaning and accomplishment (PERMA) framework, demonstrated that positive emotions emerged as the most powerful predictor of satisfaction, contributing to lower rates of teacher turnover. Furthermore, Madigan and Kim [13] through a meta-analytic review, identified a substantial negative relationship between burnout and job satisfaction, emphasizing the importance of addressing burnout to strengthen teacher well-being and reduce attrition.

While others suggest that these factors alone are insufficient without mediating variables such as professional commitment, further insights highlight this complexity. Eginli [14] investigated the mediating role of teacher and collective efficacy in the relationship between principal support and teacher commitment. The study found that collective efficacy partially mediated this relationship, suggesting that building collaborative environments is critical for enhancing teacher commitment. Similarly, Siri *et al*. [15] examined professional teachers in Bali and revealed that teacher competence and commitment significantly impacted teacher performance. Their findings emphasized the mediating role of teacher commitment in linking competence to performance, underscoring the need for targeted professional development to enhance teacher outcomes. These findings collectively underline the importance of effectively addressing mediating mechanisms like professional commitment to bridge contextual factors and performance outcomes.

The theoretical foundation of this study is rooted in social exchange theory (SET), which posits that reciprocal relationships between teachers and their institutions foster commitment and performance [2], [16].

Teachers who perceive adequate support and job satisfaction will likely reciprocate with increased dedication and productivity [17], [18], ultimately enhancing performance outcomes. Furthermore, professional commitment serves as a response to supportive environments and drives teachers to innovate and excel in their roles.

This study addresses these gaps by examining the mediating role of professional commitment on the relationship between teacher contextual factors (job satisfaction, pedagogical beliefs, and perceived support) and science teacher performance in Indonesia. By employing a structural equation modeling (SEM) approach, this research contributes to the growing literature on teacher performance by offering insights into the psychological mechanisms underpinning professional commitment. This study provides actionable recommendations for policymakers and school administrators to foster environments that support teacher satisfaction, reinforce pedagogical beliefs, and strengthen institutional support systems to enhance science education outcomes.

2. THEORETICAL FRAMEWORK AND HYPOTHESES

This section outlines the theoretical underpinnings and hypotheses that frame the study, emphasizing the dynamic interplay between teacher contextual factors, professional commitment, and science teacher performance. Grounded in SET, this framework posits that reciprocal and perceived beneficial interactions between institutions and teachers significantly shape attitudes and behaviors. Teachers who feel valued and supported by their institutions are more likely to respond with greater commitment and performance.

In this context, teacher contextual factors—comprising job satisfaction, pedagogical beliefs, and perceived support—are conceptualized as the primary "resources" provided by the organization. These resources are expected to generate a sense of obligation or reciprocal exchange, leading to heightened professional commitment, which in turn enhances science teacher performance. By integrating SET and empirical studies on teacher effectiveness, the framework provides a structured perspective to understand how institutional and psychological mechanisms synergize to foster instructional excellence, particularly in STEM-focused education.

2.1. Teacher contextual factors and science teacher performance

Teacher contextual factors, including job satisfaction, pedagogical beliefs, and perceived support, are critical determinants of teacher performance. Job satisfaction, defined as a teacher's overall contentment with their professional environment, enhances intrinsic motivation and engagement, directly improving teaching quality and student outcomes [19], [20]. According to SET, when teachers perceive fair treatment, recognition, and autonomy in their work, they feel obligated to reciprocate with higher commitment and performance. Satisfied teachers are more likely to remain in their roles [21], show resilience [22], and engage deeply with the complex demands of science instruction [23].

Pedagogical beliefs reflect the foundational principles that guide teachers in designing and delivering instructional practices [24]. SET suggests that alignment between institutional pedagogy and individual beliefs promotes a perception of mutual respect and support. When institutions empower teachers to implement active and student-centered approaches, it enhances a sense of professional identity, which strengthens teachers' willingness to invest effort and persist through instructional challenges [25]–[27].

Perceived support, encompassing managerial, collegial, and institutional dimensions, contributes to feelings of fairness, respect, and security—central tenets of SET. Teachers who feel supported are more confident [28], adaptable [29], [30], and satisfied with their roles [11]. Institutional support, including access to professional development, collaborative networks, and teaching resources [31], fosters the perception of a high-quality exchange relationship. This, in turn, encourages teachers to respond with increased commitment and improved instructional performance [32].

2.2. Professional commitment as a mediating variable

Professional commitment is a psychological construct reflecting teachers' dedication to their profession, characterized by their willingness to exceed contractual obligations and maintain high instructional standards [3]. Committed teachers are likelier to invest in continuous professional development and adopt innovative teaching methods essential for science education [33]. Research indicates that professional commitment enhances teacher performance and is a buffer against workplace challenges, such as high workloads and resource constraints [34].

SET provides a theoretical lens for understanding the mediating role of professional commitment [35]. SET posits that reciprocal relationships between teachers and their institutions foster trust, loyalty, and commitment, which drive performance. Teachers who experience job satisfaction, align with pedagogical beliefs, and perceive strong institutional support are more likely to reciprocate with increased professional

commitment [36]. This commitment facilitates instructional resilience and sustained effort, ensuring high performance even in challenging contexts.

2.3. Science teacher performance

Science teacher performance encompasses a range of competencies, including instructional clarity, student engagement, and innovation in pedagogy [37]. Effective science teachers are characterized by their ability to communicate complex scientific ideas clearly, cultivate inquiry-based learning, and adapt to technological advancements [38]. From the lens of SET, performance can be viewed as an outcome of reciprocal trust, where committed teachers, having received institutional support, respond by optimizing their teaching practices [39]–[41]. Moreover, performance is not solely a product of individual capability but also a reflection of the quality of the exchange relationship between the teacher and institution. Institutions that invest in teacher development and well-being create a culture of mutual commitment, which ultimately leads to sustainable improvements in science education delivery and student achievement.

2.4. Hypotheses development

The research model depicted in Figure 1 illustrates the relationships among job satisfaction, pedagogical beliefs, perceived support, professional commitment, and science teacher performance. Based on this framework, the following hypotheses are proposed:

- Hypothesis 1: a statistically positive and significant relationship exists between job satisfaction and science teacher performance if mediated by professional commitment.
- Hypothesis 2: a statistically positive and significant relationship exists between pedagogical beliefs and science teacher performance if mediated by professional commitment.
- Hypothesis 3: a statistically positive and significant relationship exists between perceived support and science teacher performance if mediated by professional commitment.
- Hypothesis 4: job satisfaction has a statistically positive and significant relationship with professional commitment.
- Hypothesis 5: pedagogical beliefs have a statistically positive and significant relationship with professional commitment.
- Hypothesis 6: perceived support has a statistically positive and significant relationship with professional commitment.
- Hypothesis 7: professional commitment has a statistically positive and significant relationship with science teacher performance.

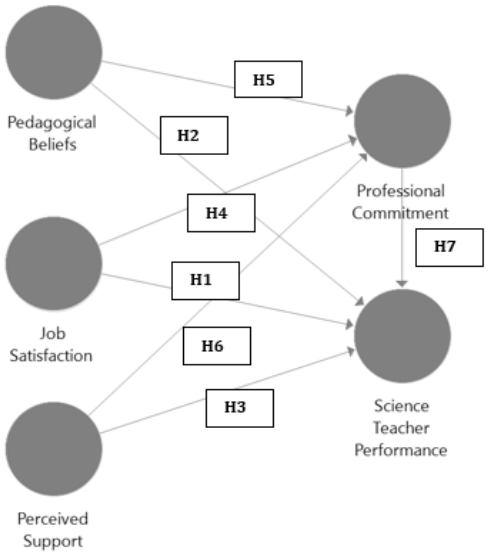

Figure 1. Research model

2.5. Research gaps and contributions

Despite the extensive literature on teacher performance, limited research has explored the combined effects of job satisfaction, pedagogical beliefs, and perceived support on science teacher performance in

developing countries such as Indonesia. Additionally, the mediating role of professional commitment in this relationship remains underexplored. This study addresses these gaps by employing a SEM approach to provide empirical evidence on the complex interrelationships between contextual factors, professional commitment, and teacher performance. The findings contribute to the literature on science education and offer actionable insights for policymakers and administrators aiming to enhance teacher effectiveness and student outcomes.

3. METHOD

This research adopts a quantitative methodological framework using a cross-sectional survey design to investigate the interrelationships among teacher contextual variables, professional commitment, and science teacher performance. This design facilitates the systematic collection of numerical data through standardized and validated instruments, allowing for the empirical examination of proposed hypotheses. To analyze the data, the study applies partial least squares structural equation modeling (PLS-SEM) using SmartPLS 4.0, a widely recognized and rigorous analytical technique well-suited for testing complex models involving latent constructs.

3.1. Participants and procedure

This study involved participants from various provinces in Indonesia, representing diverse demographic backgrounds, to ensure a comprehensive understanding of the research constructs. The participants were science teachers, with 288 respondents selected through stratified random sampling. Provinces, including Java, Sumatra, Sulawesi, Kalimantan, and Papua, were chosen to provide a balanced representation.

All questionnaires were administered anonymously to maintain anonymity and confidentiality, ensuring the participants' freedom to provide honest responses without fear of bias or repercussions. The inclusion criteria focused on teachers actively involved in classroom instruction and those with at least three years of teaching experience. Demographic information was gathered and is presented in Table 1.

Table 1. Demographic profile of participants

Demographic variable	Category	Frequency	Percentage (%)
Gender	Male	158	54.86
	Female	130	45.14
Age	<25 years	26	9.03
	26-35 years	83	28.82
	36-45 years	105	36.46
	46-55 years	59	20.49
	>56 years	15	5.21
Educational qualification	Bachelor's degree	208	72.22
	Master's degree	74	25.69
	Others (e.g., diploma and junior high school)	6	2.08
Teaching experience	<5 years	32	11.11
	5-10 years	69	23.96
	11-15 years	98	34.03
	16-20 years	51	17.71
	>21 years	38	13.19
Certification status	Certified	188	65.28
	Not certified	100	34.72
Employment status	Civil servant teacher	171	59.38
	Non-permanent (honorary)	117	40.63
Province of Origin	West Java	74	25.69
	East Java	39	13.54
	Riau	25	8.68
	South Sulawesi	20	6.94
	Other provinces	130	45.14

3.2. Instruments

The study employed established and psychometrically validated instruments to measure the key constructs, with each scale carefully adapted and revalidated to ensure conceptual relevance, reliability, and cultural appropriateness. Information on the constructs, indicators, and coding is summarized in Table 2. Ethical clearance was obtained from the Research Ethics Committee of Universitas Islam Negeri Raden Intan Lampung, ensuring adherence to recognized research ethics standards. Before data collection, participants received a digital informed consent form explaining the study's purpose, procedures, voluntary participation,

and confidentiality protections. Only individuals who provided explicit consent were permitted to complete the questionnaire, ensuring that all data were collected in accordance with ethical and legal guidelines.

The instrument was distributed electronically via a secure online platform (e.g., Google Forms), allowing broad access across various provinces in Indonesia. Institutional permissions were obtained from local education offices and school administrators to facilitate distribution. The constructs, their indicators, and coding are outlined in Table 2.

Table 2. Constructs and indicators

Construct	Indicators	Code
Pedagogical beliefs	Belief in student-centered teaching	PB1
	Belief in active learning strategies	PB2
	Belief in the role of assessment in learning	PB3
	Belief in curriculum alignment	PB4
Job satisfaction	Satisfaction with the work environment	JS1
	Satisfaction with recognition	JS2
	Satisfaction with career growth opportunities	JS3
	Satisfaction with relationships with colleagues	JS4
	Satisfaction with work-life balance	JS5
Perceived support	Perceived support from management	PS1
	Perceived support from colleagues	PS2
	Perceived institutional support	PS3
Professional commitment	Commitment to teaching quality	PC1
	Commitment to professional development	PC2
	Emotional attachment to the profession	PC3
	Willingness to continue contributing to the teaching profession	PC4
Science teacher performance	Effectiveness in delivering lessons	STP1
	Student engagement outcomes	STP2
	Achievement of teaching goals	STP3
	Innovation in teaching methods	STP4

3.3. Data analysis

The data was examined using PLS-SEM through SmartPLS 4.0 to assess both the measurement and structural models. This method was chosen because the sample size (N=288) was adequate, the data showed non-normal distribution, and the study followed an exploratory design involving mediation among latent variables. In addition, the use of reflective indicators was consistent with the assumptions of PLS-SEM. The analysis was carried out in several systematic steps to ensure accuracy and validity. The following steps were performed: measurement model assessment discriminant validity, model fit indices, and effect size (f^2) and predictive relevance (Q^2).

3.3.1. Measurement model assessment

Reliability and convergent validity: The analysis assessed internal consistency and construct validity by calculating composite reliability (CR), Cronbach's alpha, and average variance extracted (AVE) for each latent variable. Table 3 summarizes the results.

Table 3. Results of model constructs

Construct	Loadings	CR	Cronbach's alpha	AVE
Pedagogical beliefs	0.868-0.912	0.952	0.937	0.799
Job satisfaction	0.851-0.928	0.946	0.924	0.814
Perceived support	0.74-0.95	0.921	0.870	0.795
Professional commitment	0.834-0.939	0.940	0.913	0.798
Science teacher performance	0.939-0.959	0.969	0.957	0.885

3.3.2. Discriminant validity

The Fornell-Larcker criterion was applied to evaluate discriminant validity. The square root of the AVE for each construct exceeded its correlations with other constructs, confirming satisfactory discriminant validity. The results are summarized in Table 4. To strengthen the assessment of discriminant validity, the heterotrait-monotrait (HTMT) ratio was calculated. This method offers a more rigorous test than the Fornell-Larcker criterion, especially for variance-based SEM. All HTMT values were below the 0.85 threshold, confirming that the constructs were clearly distinct from one another. The results from Table 5

confirm that discriminant validity is adequately met for all pairs of constructs, reinforcing the structural integrity of the model and ensuring that the variables measure distinct concepts without conceptual overlap.

Table 4. Discriminant validity of constructs

Construct	Pedagogical beliefs	Job satisfaction	Perceived support	professional commitment	Science teacher performance
Pedagogical beliefs	0.894				
Job satisfaction	0.682	0.902			
Perceived support	0.671	0.654	0.891		
Professional commitment	0.621	0.732	0.714	0.893	
Science teacher performance	0.642	0.712	0.693	0.701	0.941

Table 5. HTMT criterion for discriminant validity

Construct	Pedagogical beliefs	Job satisfaction	Perceived support	Professional commitment	Science teacher performance
Pedagogical beliefs	—				
Job satisfaction	0.738	—			
Perceived support	0.694	0.671	—		
Professional commitment	0.653	0.761	0.722	—	
Science teacher performance	0.661	0.733	0.701	0.743	—

3.3.3. Model fit indices

To assess the overall goodness-of-fit of the proposed structural model, multiple fit indices were calculated, including standardized root mean square residual (SRMR), root mean square (RMS) theta, normed fit index (NFI), and the incremental indices comparative fit index (CFI) and Tucker-Lewis's index (TLI). The inclusion of these indices ensures a robust evaluation of model fitness. Table 6 summarizes the model fit indices for both the saturated and estimated models. As shown in Table 6 the model exhibits satisfactory fit across most indices. The SRMR value of 0.05 falls within the acceptable threshold (≤0.08), indicating a low level of discrepancy between the observed and predicted correlations. The CFI and TLI values exceed 0.90, reflecting strong incremental fit. Although the RMS Theta slightly exceeds the ideal threshold, the overall model can be deemed statistically acceptable for hypothesis testing within the SEM-PLS framework.

Table 6. Model fit indices

Index	Saturated model	Estimated model
SRMR	0.05	0.05
d_ULS	0.534	0.534
d_G	0.475	0.475
Chi-square	767.642	767.642
NFI	0.895	0.895
RMS theta	0.170	0.170
CFI	0.921	0.921
TLI	0.908	0.908
RMSEA	0.065	0.065

3.3.4. Effect size (f^2) and predictive relevance (Q^2)

To strengthen the explanatory depth and predictive capacity of the structural model, this study evaluated both effect size (Cohen's f^2) and predictive relevance (Q^2) for each endogenous variable. The f^2 index reflects the extent to which each exogenous construct contributes to the explained variance of its corresponding endogenous construct within the model. In line with Cohen's widely accepted benchmarks [42], f^2 values of 0.02, 0.15, and 0.35 represent small, medium, and large effects, respectively.

Predictive relevance (Q^2) was determined using the PLS predict procedure, which contrasts out-of-sample prediction errors generated by the PLS model with those from a linear benchmark model (LM). A Q^2 value greater than zero signifies that the model possesses predictive capability, and higher Q^2 values from the PLS model relative to the LM demonstrate superior predictive performance [43]. Table 7 displays the magnitude of the direct effects (f^2) among latent constructs, while Table 8 summarizes the comparative Q^2 values obtained from both models across all indicators. As shown in Table 7 pedagogical beliefs demonstrate a large effect on professional commitment (f^2=0.393) and a medium-large effect on science teacher performance (f^2=0.254), confirming their strong explanatory power. Job satisfaction shows a

medium effect on professional commitment (f^2=0.153), while its influence on science teacher performance is negligible (f^2=0.009). Perceived support has very small effects on both outcomes, aligning with earlier findings of its weak significance.

Table 8 confirms that the PLS-SEM model demonstrates strong predictive relevance, particularly for indicators KO1, KO2, KO3, and KI3. In several indicators, Q^2 values from the PLS model exceed those from the linear benchmark, indicating PLS-SEM's superiority in capturing predictive patterns, especially in a non-normal and complex exploratory context. These results justify the appropriateness of PLS-SEM in modeling relationships among constructs in this study.

Table 7. Effect size (Cohen's f^2) for endogenous variables

Predictor→outcome	Professional commitment	Science teacher performance
Job satisfaction	0.153 (medium)	0.009 (negligible)
Pedagogical beliefs	0.393 (large)	0.254 (medium-large)
Perceived support	0.004 (negligible)	0.034 (small)
Professional commitment	–	0.021 (Small)

Table 8. Predictive relevance (Q^2) via PLS predict vs linear model

Indicator	Q^2 (PLS)	Q^2 (LM)	Predictive capability
KO1	0.501	0.268	High predictive power
KO2	0.474	0.361	High predictive power
KO3	0.190	-0.244	PLS superior
KO4	0.365	0.039	PLS superior
KI1	0.350	0.201	Moderate predictive power
KI2	0.103	-0.136	Low but positive
KI3	0.455	0.200	High predictive power
KI4	0.385	0.092	Moderate predictive power

4. RESULTS AND DISCUSSION

This section presents and interprets the study's findings, focusing on the relationships between the variables and their implications for science teacher performance. The analysis begins by examining the path coefficients and providing insights into the direct and indirect effects of the constructs within the proposed model.

4.1. Path coefficients analysis

Before delving into the numerical analysis in Table 9, it is important to understand the structural model depicted in Figure 2. Figure 2 illustrates the relationships between latent variables: pedagogical beliefs, job satisfaction, perceived support, professional commitment, and science teacher performance. Each latent variable is represented as a blue circle, while their respective indicators are denoted as yellow rectangles. The arrows connecting these constructs indicate the hypothesized causal relationships, with path coefficients displayed along the arrows to signify the strength and direction of these effects. Additionally, the diagram includes measurement weights for each indicator, which reflect their contribution to the respective latent constructs. The findings reveal that pedagogical beliefs exert the most decisive direct influence on professional commitment (β=0.583, T=5.810, $p<0.001$), aligning with theoretical assertions that beliefs underpin professional dedication. As suggested by Liu and Zhang [44], teachers' pedagogical beliefs shape their instructional approaches, fostering higher commitment to their professional roles.

Job satisfaction also demonstrates significant effects on professional commitment (β=0.280, T=2.733, p=0.006) and science teacher performance (β=0.283, T=3.178, p=0.002). This reinforces existing research indicating that positive work environments and recognition enhance commitment and teaching effectiveness [2], [45]. However, perceived support shows weak relationships with both professional commitment (β=0.100, T=1.003, p=0.316) and science teacher performance (β=0.023, T=0.281, p=0.779). This suggests that institutional support mechanisms may lack the depth required to meaningfully impact teachers' professional outcomes, echoing Fernandes *et al*. [28] emphasis on robust support systems.

The mediating role of professional commitment is evident in its strong impact on science teacher performance (β=0.536, T=5.453, $p<0.001$). This underscores the importance of commitment as a bridge between contextual factors (e.g., job satisfaction) and performance outcomes. Notably, pedagogical beliefs show limited direct influence on science teacher performance (β=0.096, T=1.157, p=0.248), highlighting the need for additional support, such as professional development, to translate beliefs into tangible teaching improvements.

Table 9. Path coefficient

Hypotheses	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
Job satisfaction->professional commitment	0.28	0.285	0.103	2.733	0.006
Job satisfaction->science teacher performance	0.283	0.293	0.089	3.178	0.002
Pedagogical beliefs->professional commitment	0.583	0.571	0.1	5.81	0
Pedagogical beliefs->science teacher performance	0.096	0.091	0.083	1.157	0.248
Perceived support->professional commitment	0.1	0.107	0.1	1.003	0.316
Perceived support->science teacher performance	0.023	0.036	0.083	0.281	0.779
Professional commitment->science teacher performance	0.536	0.517	0.098	5.453	0

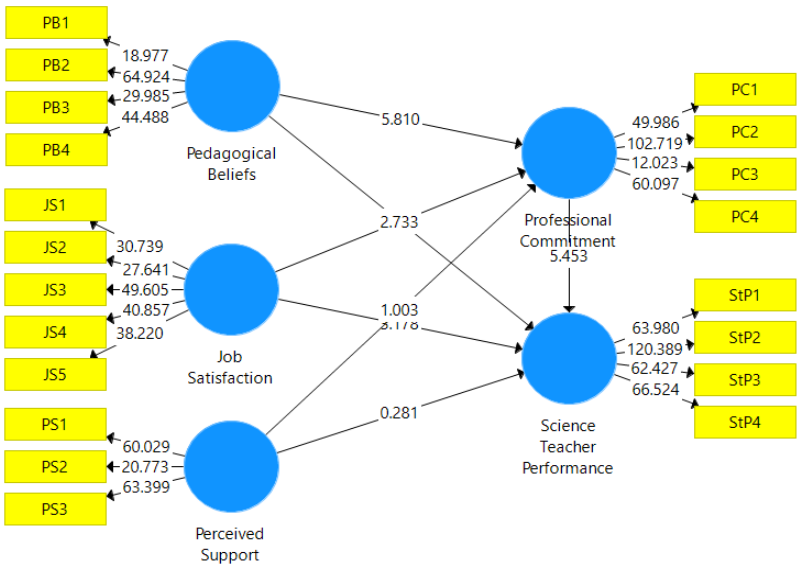

Figure 2. Path coefficient

4.2. Indirect effects analysis

Table 10 presents the indirect pathways through which job satisfaction, pedagogical beliefs, and perceived support influence science teacher performance via professional commitment. The results indicate that job satisfaction exerts a significant indirect effect on performance through professional commitment (β=0.15, p=0.008). This underscores the pivotal mediating role of professional commitment in transforming positive attitudes toward work into tangible performance outcomes. In the Indonesian context, this mechanism holds particular significance, as levels of teacher job satisfaction often vary markedly between public and private schools, shaped by disparities in salary structures, employment security, and working conditions [46], [47].

Table 10. Path coefficient for indirect effects

Hypotheses	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
Job satisfaction->professional commitment->science teacher performance	0.15	0.148	0.056	2.674	0.008
Pedagogical beliefs->professional commitment->science teacher performance	0.312	0.292	0.083	3.779	0
Perceived support->professional commitment->science teacher performance	0.054	0.054	0.052	1.031	0.303

Similarly, pedagogical beliefs significantly indirectly affected science teacher performance via professional commitment (β=0.312, p<0.001). This emphasizes the importance of fostering strong

pedagogical foundations among teachers, which is essential for effective teaching practices. In the Indonesian context, where cultural and religious values heavily influence educational practices, reinforcing pedagogical beliefs through targeted training programs can significantly enhance teacher commitment and performance [3], [48].

In contrast, the indirect effect of perceived support on science teacher performance via professional commitment was insignificant (β=0.054, p=0.303). This indicates that institutional support systems, as perceived by teachers, may lack the necessary impact to enhance their professional commitment or performance. This finding aligns with reports from Indonesian teachers, particularly in rural areas, where limited access to resources and professional development opportunities often diminishes the perceived value of support systems [49], [50]. Addressing these challenges requires systemic reforms, including improved mentoring programs and better resource allocation.

The study's findings hold profound implications for Indonesia's diverse educational landscape. The strong connections between job satisfaction, pedagogical beliefs, and professional commitment highlight the need for targeted interventions that cater to contextual nuances. For instance, enhancing job satisfaction in rural and private schools could involve providing financial incentives or creating more inclusive working environments. Such measures have increased commitment and, consequently, performance.

Similarly, the influence of pedagogical beliefs on professional commitment reflects the need for teacher training programs that integrate local cultural contexts. In Indonesia, where education often intertwines with religious and traditional values, culturally sensitive pedagogies could strengthen these beliefs. Incorporating reflective practices into teacher development initiatives could further enhance their ability to adapt instructional strategies, thereby boosting commitment and performance.

The lack of significant effects associated with perceived support raises critical questions about the effectiveness of current support systems. Teachers in Indonesia frequently report feeling unsupported due to bureaucratic hurdles, limited resources, and inadequate professional development opportunities [49], [51], [52], [53]. Addressing these issues through systemic reforms could enhance the perceived value of institutional support. Examples include implementing school-based mentoring programs or fostering collaborative networks among teachers to share resources and expertise [54], [55]. Lastly, the robust relationship between professional commitment and teacher performance emphasizes prioritizing commitment in policy and practice. Recognizing and rewarding teacher dedication through tangible incentives or career advancement opportunities could enhance educational outcomes. This strategy is fundamental in Indonesia, where teacher retention and performance disparities remain a pressing challenge.

Beyond statistical significance, the study's findings offer substantial practical implications for educational stakeholders and policymakers. For example, the moderate to strong effect sizes and predictive relevance associated with job satisfaction and pedagogical beliefs underscore their real-world impact on shaping teacher commitment and performance. This highlights that interventions aimed at improving the work environment and aligning teacher beliefs with contemporary pedagogical practices are not only theoretically sound but also practically effective. Education authorities could use these insights to prioritize professional development investments, especially in under-resourced settings, and design evidence-based strategies that directly translate into enhanced teacher outcomes in classrooms. The ability of professional commitment to serve as a critical mediating variable reinforces its value as a leverage point for systemic improvement efforts.

This study has several limitations. The cross-sectional design restricts causal interpretations, and the reliance on self-reported data may introduce response bias. Future research should consider longitudinal or mixed methods approaches to validate and expand upon these findings. Additionally, the study focuses exclusively on Indonesian science teachers, which limits the generalizability of results to other educational contexts. Broader comparative studies across countries or regions are needed to examine the cross-cultural applicability of the findings. Furthermore, the current research does not incorporate institutional or policymaker perspectives, which are crucial in understanding systemic support structures. Future qualitative studies involving school leaders, educational policymakers, or institutional administrators are recommended to gain deeper insight into organizational dynamics and contextual factors influencing teacher performance. Such studies would help explain the limited role of perceived support observed in this research and guide more effective institutional interventions.

5. CONCLUSION

This study provides nuanced insights into job satisfaction, pedagogical beliefs, perceived support, professional commitment, and science teacher performance, focusing on their interactions in the Indonesian context. The findings confirm that professional commitment plays a pivotal mediating role, particularly between job satisfaction, pedagogical beliefs, and teacher performance. However, the limited influence of

perceived support underscores the need for systemic reforms and targeted support mechanisms. Policymakers and educational leaders should consider these dynamics when designing interventions to enhance teacher motivation and performance, ultimately fostering Indonesia's more equitable and effective education system.

FUNDING INFORMATION

This research received no external funding and was fully self-funded by the authors.

AUTHOR CONTRIBUTIONS STATEMENT

This journal uses the Contributor Roles Taxonomy (CRediT) to recognize individual author contributions, reduce authorship disputes, and facilitate collaboration.

Name of Author	C	M	So	Va	Fo	I	R	D	O	E	Vi	Su	P	Fu
Irwandani	✓	✓		✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
Ardian Asyhari	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓			
Misbah	✓	✓		✓	✓	✓		✓	✓	✓				
Heru Juabdin Sada		✓		✓		✓	✓	✓		✓				
Dominikus Djago Djoa					✓	✓	✓	✓		✓	✓			
Nurul Hidayati Murtafiah		✓		✓		✓		✓	✓	✓				
Muhammad Aridan					✓	✓	✓	✓		✓	✓			

C : **C**onceptualization
M : **M**ethodology
So : **So**ftware
Va : **Va**lidation
Fo : **Fo**rmal analysis
I : **I**nvestigation
R : **R**esources
D : **D**ata Curation
O : Writing - **O**riginal Draft
E : Writing - Review & **E**diting
Vi : **Vi**sualization
Su : **Su**pervision
P : **P**roject administration
Fu : **Fu**nding acquisition

CONFLICT OF INTEREST STATEMENT

Authors state no conflict of interest.

DATA AVAILABILITY

The data that support the findings of this study are available from the corresponding author, [I], upon reasonable request.

REFERENCES

[1] R. A. Elyashiv and K. Rozenberg, "Fostering early career teachers' preparedness, self-efficacy and professional commitment: the role of teacher education," *Teaching and Teacher Education*, vol. 148, 2024, doi: 10.1016/j.tate.2024.104691.

[2] T. Van Waeyenberg, R. Peccei, and A. Decramer, "Performance management and teacher performance: the role of affective organizational commitment and exhaustion," *The International Journal of Human Resource Management*, vol. 33, no. 4, pp. 623–646, Feb. 2022, doi: 10.1080/09585192.2020.1754881.

[3] G. Wang, M. Strong, S. Zhang, and K. Liu, "Preservice teacher professional commitment: a conceptual model and literature review," *Teaching and Teacher Education*, vol. 104, 2021, doi: 10.1016/j.tate.2021.103373.

[4] S. Baroudi, R. Tamim, and Z. Hojeij, "A quantitative investigation of intrinsic and extrinsic factors influencing teachers' job satisfaction in Lebanon," *Leadership and Policy in Schools*, vol. 21, no. 2, pp. 127–146, Apr. 2022, doi: 10.1080/15700763.2020.1734210.

[5] L. Nguyen *et al.*, "The impact of extrinsic work factors on job satisfaction and organizational commitment at higher education institutions in Vietnam*," *Journal of Asian Finance, Economics and Business*, vol. 8, no. 8, pp. 259–0270, 2021.

[6] A. Mokhtar, V. M. Maouloud, A. K. Omowunmi, and M. S. bin Nordin, "Teachers' commitment, self-efficacy and job satisfaction as communicated by trained teachers," *Management in Education*, vol. 37, no. 3, pp. 127–139, Jul. 2023, doi: 10.1177/08920206211019400.

[7] J.-H. Park, N. Cooc, and K.-H. Lee, "Relationships between teacher influence in managerial and instruction-related decision-making, job satisfaction, and professional commitment: a multivariate multilevel model," *Educational Management Administration & Leadership*, vol. 51, no. 1, pp. 116–137, Jan. 2023, doi: 10.1177/1741143220971287.

[8] A. J. Schultheiss, E. Koekemoer, and A. Masenge, "Career commitment and subjective career success: considering the role of career resilience and self-efficacy," *Australian Journal of Career Development*, vol. 32, no. 2, pp. 135–146, Jul. 2023, doi: 10.1177/10384162231172560.

[9] J. Qi and A. Derakhshan, "Chinese EFL teachers' desire to attend professional development programs: exploring the role of job satisfaction and organizational commitment," *Porta Linguarum*, vol. 2023, no. 2023, pp. 311–327, Dec. 2023, doi: 10.30827/portalin.vi2023c.29656.

[10] F. Ortan, C. Simut, and R. Simut, "Self-efficacy, job satisfaction and teacher well-being in the K-12 educational system," *International Journal of Environmental Research and Public Health*, vol. 18, no. 23, p. 12763, Dec. 2021, doi: 10.3390/ijerph182312763.
[11] A. Toropova, E. Myrberg, and S. Johansson, "Teacher job satisfaction: the importance of school working conditions and teacher characteristics," *Educational Review*, vol. 73, no. 1, pp. 71–97, Jan. 2021, doi: 10.1080/00131911.2019.1705247.
[12] B. Dreer, "Teachers' well-being and job satisfaction: the important role of positive emotions in the workplace," *Educational Studies*, vol. 50, no. 1, pp. 61–77, Jan. 2024, doi: 10.1080/03055698.2021.1940872.
[13] D. J. Madigan and L. E. Kim, "Towards an understanding of teacher attrition: a meta-analysis of burnout, job satisfaction, and teachers' intentions to quit," *Teaching and Teacher Education*, vol. 105, p. 103425, Sep. 2021, doi: 10.1016/j.tate.2021.103425.
[14] I. Eginli, "In search of keeping good teachers: mediators of teacher commitment to the profession," *Journal of Language and Linguistic Studies*, vol. 17, pp. 911–936, 2021, doi: 10.17263/jlls.904088.
[15] A. Siri, I. W. G. Supartha, I. P. G. Sukaatmadja, and A. G. Rahyuda, "Does teacher competence and commitment improve teacher's professionalism," *Cogent Business & Management*, vol. 7, no. 1, p. 1781993, Jan. 2020, doi: 10.1080/23311975.2020.1781993.
[16] M. Romani-Dias and J. Carneiro, "Internationalization in higher education: faculty tradeoffs under the social exchange theory," *International Journal of Educational Management*, vol. 34, no. 3, pp. 461–476, 2020, doi: 10.1108/IJEM-04-2019-0142.
[17] M. Oubibi, A. Fute, W. Xiao, B. Sun, and Y. Zhou, "Perceived organizational support and career satisfaction among Chinese teachers: the mediation effects of job crafting and work engagement during COVID-19," *Sustainability (Switzerland)*, vol. 14, no. 2, 2022, doi: 10.3390/su14020623.
[18] M. Soto-Pérez, J. Y. Sánchez-García, and J. E. Núñez-Ríos, "Factors to improve job performance and school effectiveness," *International Journal of Educational Management*, vol. 34, no. 5, pp. 805–822, 2020, doi: 10.1108/IJEM-07-2019-0237.
[19] K. E. Hoque, X. Wang, Y. Qi, and N. Norzan, "The factors associated with teachers' job satisfaction and their impacts on students' achievement: a review (2010–2021)," *Humanities and Social Sciences Communications*, vol. 10, no. 1, p. 177, Apr. 2023, doi: 10.1057/s41599-023-01645-7.
[20] S. G. A. S. Bukhari, S. G. Jamali, A. R. Larik, and M. S. Chang, "Fostering intrinsic motivation among teachers: importance of work environment and individual differences," *International Journal of School & Educational Psychology*, vol. 11, no. 1, pp. 1–19, Jan. 2023, doi: 10.1080/21683603.2021.1925182.
[21] S. Demır, "The role of self-efficacy in job satisfaction, organizational commitment, motivation and job involvement," *Eurasian Journal of Educational Research*, vol. 20, no. 85, pp. 205–224, 2020.
[22] X. Wang, Y. Gao, Q. Wang, and P. Zhang, "Relationships between self-efficacy and teachers' well-being in middle school English teachers: the mediating role of teaching satisfaction and resilience," *Behavioral Sciences*, vol. 14, no. 8, 2024, doi: 10.3390/bs14080629.
[23] Y. F. Zakariya, "Effects of school climate and teacher self-efficacy on job satisfaction of mostly STEM teachers: a structural multigroup invariance approach," *International Journal of STEM Education*, vol. 7, no. 1, p. 10, Dec. 2020, doi: 10.1186/s40594-020-00209-4.
[24] Y. Li and A. Z. Khairani, "Social support, pedagogical beliefs and teacher professional identity among preservice teachers in China: a moderated mediation analysis," *Teaching and Teacher Education*, vol. 154, 2025, doi: 10.1016/j.tate.2024.104856.
[25] A. MacPhail, D. Tannehill, P. E. Leirhaug, and L. Borghouts, "Promoting instructional alignment in physical education teacher education," *Physical Education and Sport Pedagogy*, vol. 28, no. 2, pp. 153–164, Mar. 2023, doi: 10.1080/17408989.2021.1958177.
[26] E. A. Abedi, "Tensions between technology integration practices of teachers and ICT in education policy expectations: implications for change in teacher knowledge, beliefs and teaching practices," *Journal of Computers in Education*, vol. 11, no. 4, pp. 1215–1234, Dec. 2024, doi: 10.1007/s40692-023-00296-6.
[27] N. A. G. Matias, P. H. D. Bartolome, S. L. R. Carreon, F. M. L. Tallara, and J. A. Villarama, "Meme-ingful actions: uncovering the influence of political memes on leadership performance and values formation," *Language, Technology, and Social Media*, vol. 2, no. 2, pp. 204–219, Nov. 2024, doi: 10.70211/ltsm.v2i2.141.
[28] S. Fernandes, A. M. Araújo, I. Miguel, and M. Abelha, "Teacher professional development in higher education: the impact of pedagogical training perceived by teachers," *Education Sciences*, vol. 13, no. 3, p. 309, Mar. 2023, doi: 10.3390/educsci13030309.
[29] S. Rostami, M. Tavakoli, and Z. Amirian, "Adaptation and validation of a measure for evaluating teacher adaptability in English teaching higher education. Teaching English as a second language quarterly," *Formerly Journal of Teaching Language Skills)*, vol. 42, no. 3, pp. 79–115, 2023, doi: 10.22099/tesl.2023.47106.3181.
[30] L. Vulpe and S. Pribac, "Teachers' adaptability to online education during COVID-19," *Journal of Educational Sciences*, vol. 44, no. 2, pp. 63–78, 2021, doi: 10.35923/jes.2021.2.05.
[31] S. F. Rasool, M. Wang, M. Tang, A. Saeed, and J. Iqbal, "How toxic workplace environment effects the employee engagement: The mediating role of organizational support and employee wellbeing," *International Journal of Environmental Research and Public Health*, vol. 18, no. 5, pp. 1–17, 2021, doi: 10.3390/ijerph18052294.
[32] L. Chen and S. Xiao, "Perceptions, challenges and coping strategies of science teachers in teaching socioscientific issues: a systematic review," *Educational Research Review*, vol. 32, 2021, doi: 10.1016/j.edurev.2020.100377.
[33] X. Zhang, W. Admiraal, and N. Saab, "Teachers' motivation to participate in continuous professional development: relationship with factors at the personal and school level," *Journal of Education for Teaching*, vol. 47, no. 5, pp. 714–731, Oct. 2021, doi: 10.1080/02607476.2021.1942804.
[34] J. C. Cayupe *et al.*, "Self-efficacy, organizational commitment, workload as predictors of life satisfaction in elementary school teachers: the mediating role of job satisfaction," *Frontiers in Psychology*, vol. 14, p. 1066321, 2023, doi: 10.3389/fpsyg.2023.1066321.
[35] R. Ahmad, M. R. Nawaz, M. I. Ishaq, M. M. Khan, and H. A. Ashraf, "Social exchange theory: systematic review and future directions," *Frontiers in Psychology*, vol. 13, 2023, doi: 10.3389/fpsyg.2022.1015921.
[36] Z. Xu and N. S.-K. Pang, "Promoting teachers' organizational commitment: the effects of authentic leadership, teachers' well-being and social–emotional competence," *Behavioral Sciences*, vol. 14, no. 10, p. 862, Sep. 2024, doi: 10.3390/bs14100862.
[37] A. Al Darayseh, "Acceptance of artificial intelligence in teaching science: science teachers' perspective," *Computers and Education: Artificial Intelligence*, vol. 4, p. 100132, 2023, doi: 10.1016/j.caeai.2023.100132.
[38] G. C. S. Baptista and A. Molina-Andrade, "Science teachers' conceptions about the importance of teaching and how to teach Western science to students from traditional communities," *Human Arenas*, vol. 6, no. 4, pp. 704–731, Dec. 2023, doi: 10.1007/s42087-021-00257-4.

[39] M. Şen, "Suggestions for the analysis of science teachers' pedagogical content knowledge components and their interactions," *Research in Science Education*, vol. 53, no. 6, pp. 1081–1095, Dec. 2023, doi: 10.1007/s11165-023-10124-7.
[40] P. R. Wells, K. Goodnough, S. Azam, and G. Galway, "Changes in high school distance education science teachers' pedagogical content knowledge (PCK) during remote lesson study," *Teacher Professional Learning through Lesson Study in Virtual and Hybrid Environments: Opportunities, Challenges, and Future Directions*, pp. 203–222, 2023, doi: 10.4324/9781003286172-15.
[41] A. Asyhari and I. Islamia, "The influence of massive open online courses (Moocs) and face-to-face learning on motivation and self-regulated learning (SRL)," *The Journal of Educators Online*, vol. 20, no. 1, 2023, doi: 10.9743/JEO.2023.20.1.2.
[42] G. E. Gignac and E. T. Szodorai, "Effect size guidelines for individual differences researchers," *Personality and Individual Differences*, vol. 102, pp. 74–78, 2016, doi: 10.1016/j.paid.2016.06.069.
[43] J. F. Hair, J. J. Risher, M. Sarstedt, and C. M. Ringle, "When to use and how to report the results of PLS-SEM," *European Business Review*, vol. 31, no. 1, pp. 2–24, Jan. 2019, doi: 10.1108/EBR-11-2018-0203.
[44] X. Liu and L. Zhang, "Exploring the relationship between teachers' professional capital and technology-enhanced teaching innovation: The mediating role of constructivist belief," *Teaching and Teacher Education*, vol. 139, 2024, doi: 10.1016/j.tate.2023.104434.
[45] G. Zhenjing, S. Chupradit, K. Y. Ku, A. A. Nassani, and M. Haffar, "Impact of employees' workplace environment on employees' performance: a multi-mediation model," *Frontiers in Public Health*, vol. 10, 2022, doi: 10.3389/fpubh.2022.890400.
[46] A. Suryani, "'I chose teacher education because…': a look into Indonesian future teachers," *Asia Pacific Journal of Education*, vol. 41, no. 1, pp. 70–88, Jan. 2021, doi: 10.1080/02188791.2020.1783202.
[47] B. R. Werang, D. Wea, and A. K. Wolomasi, "Working conditions of Indonesian remote elementary school teachers: a qualitative case study in Southern Papua," *Qualitative Report*, vol. 27, no. 11, pp. 2446–2468, 2022, doi: 10.46743/2160-3715/2022.5834.
[48] M. Alzoraiki, A. R. Ahmad, A. A. Ateeq, G. M. A. Naji, Q. Almaamari, and B. A. H. Beshr, "Impact of teachers' commitment to the relationship between transformational leadership and sustainable teaching performance," *Sustainability (Switzerland)*, vol. 15, no. 5, 2023, doi: 10.3390/su15054620.
[49] M. Muhaimin, A. Asrial, A. Habibi, A. Mukminin, and P. Hadisaputra, "Science teachers' integration of digital resources in education: A survey in rural areas of one Indonesian province," *Heliyon*, vol. 6, no. 8, 2020, doi: 10.1016/j.heliyon.2020.e04631.
[50] I. P. I. Kusuma, "EFL teachers' online teaching in rural schools during the COVID-19 pandemic: stories from Indonesia," *Studies in English Language and Education*, vol. 9, no. 1, pp. 203–221, 2022, doi: 10.24815/siele.v9i1.21239.
[51] N. Sulaeman, S. Efwinda, and P. D. A. Putra, "Teacher readiness in stem education: voices of Indonesian physics teachers," *Journal of Technology and Science Education*, vol. 12, no. 1, pp. 68–82, 2022, doi: 10.3926/jotse.1191.
[52] S. R. Abedi, F. Divanpour, S. Reza Molaee, and H. Tesfay Gebremariam, "Harnessing artificial intelligence for ESL assessments: efficiency, challenges, and future directions," *Language, Technology, and Social Media*, vol. 3, no. 1, pp. 119–130, 2025, doi: 10.70211/ltsm.v3i1.83.
[53] G. P. Georgiou, "Mapping the ethical discourse in generative artificial intelligence: a topic modeling analysis of scholarly communication," *Language, Technology, and Social Media*, vol. 3, no. 2, pp. 250–265, 2025, doi: 10.70211/ltsm.v3i2.230.
[54] R. Y. Mm, Irwandani, M. Asniati, C. Anwar, and Subandi, "Development of Google Form based on scientific literacy principles for junior high school students in heat material," *Journal of Physics: Conference Series*, vol. 1467, no. 1, 2020, doi: 10.1088/1742-6596/1467/1/012055.
[55] I. Irwandani, S. Umarella, A. Rahmawati, M. Meriyati, and N. E. Susilowati, "Interactive multimedia lectora inspire based on problem based learning: development in the optical equipment," *Journal of Physics: Conference Series*, vol. 1155, no. 1, 2019, doi: 10.1088/1742-6596/1155/1/012011.

BIOGRAPHIES OF AUTHORS

Irwandani is an associate professor in the Department of Physics Education at the Faculty of Tarbiyah and Teacher Training, Universitas Islam Negeri Raden Intan Lampung, Indonesia. His research primarily focuses on sustainable physics education (SDGs), teacher professional development, educational media, and the integration of 21st-century skills into the curriculum. He has contributed to various national and international publications and is actively involved in improving the quality of education, particularly physics and science education. He is also active as a facilitator in the Sekolah Pengerak Program and is a facilitator for the Deep Learning Program. He can be contacted at email: irwandani@radenintan.ac.id.

Ardian Asyhari is an associate professor in the Department of Physics Education, Faculty of Tarbiyah and Teacher Training, Universitas Islam Negeri Raden Intan Lampung, Indonesia. His research focuses on distance learning in science and physics education, self-directed learning, self-regulated learning, computational thinking, science literacy, and 21st-century skills. He is also active as a facilitator in the Sekolah Pengerak Program in Lampung Province. He can be contacted at email: ardianasyhari@radenintan.ac.id.

Misbah is an assistant professor in the Department of Physics Education at the Faculty of Teacher Training and Education, Universitas Lambung Mangkurat, South Kalimantan, Indonesia. Her research interests focus on the development of physics teaching materials based on local wisdom, the integration of technology in education, and the enhancement of science literacy among students. She has made contributions to the field of physics education and learning with numerous publications in leading journals, particularly in creating culturally relevant educational resources and using digital tools to enhance learning outcomes. She can be contacted at email: misbah_pfis@ulm.ac.id.

Heru Juabdin Sada is an associate professor in the Department of Islamic Education at the Faculty of Tarbiyah and Teacher Training, Universitas Islam Negeri Raden Intan Lampung, Indonesia. His research focuses on Islamic education, curriculum development, character education, and the integration of Islamic values into educational practices. He has contributed to various scholarly publications, with recent work on hybrid learning in Islamic higher education institutions, the implementation of the Merdeka Curriculum to enhance student independence, and the development of Islamic contextual teaching materials. Additionally, he has been involved in developing educational resources, including Islamic-themed gamified modules and materials for character education, and has contributed to intellectual property rights in education. He can be contacted at email: herujuabdinsada@radenintan.ac.id.

Dominikus Djago Djoa is an assistant professor in the Mathematics Education Program at the Faculty of Education and Teacher Training, Universitas Flores, East Nusa Tenggara, Indonesia. His research focuses on mathematics education. His research interests include the development of effective teaching methodologies, e-learning media, and improving learning outcomes in mathematics. He is dedicated to advancing the field of education through his contributions to research and teaching practices. He can be contacted at email: djoa.uniflor@gmail.com.

Nurul Hidayati Murtafiah is an associate professor in the Department of Islamic Religious Education at Universitas Islam An-Nur Lampung, Indonesia. Her research focuses on the management of quality in Islamic education, teacher professional development, and the implementation of management systems in educational institutions. She has published several works on improving educational quality through strategic management, the role of school leadership in enhancing education, and the application of quality management systems in various Islamic educational settings. She can be contacted at email: nurul.hidayati@unislampung.ac.id.

Muhammad Aridan is the Director of Scientific Journal Development and Publishing at WISE Pendidikan Indonesia, an institution focused on educational innovation and research. He is also a lecturer at Universitas Islam Negeri Raden Intan Lampung, specializing in Arabic language education. His academic and research interests primarily focus on the integration of technology in education, particularly in language learning through digital platforms and artificial intelligence. He has made significant contributions to the development and publication of high-quality scientific journals and has been involved in various research initiatives to enhance language learning. With a strong commitment to advancing education through innovative practices and academic publishing, he plays a key role in shaping the future of educational research in Indonesia. He can be contacted at email: m_aridan@wiseedu.co.id.