The Eastasouth Journal of Learning and Educations
Vol. 2, No. 03, November 2024, pp. 173-187
ISSN: 3025-2504, DOI: 10.58812/esle.v2i03

Assessing the Role of School Leadership in Mediating the Impact of Teacher Professional Development on Curriculum Implementation in Indonesia

Loso Judijanto[1], A. Idun Suwarna[2], Siti Aisyah Hanim[3], Patriandi Nuswantoro[4], Rafiqa Noviyani[5]
[1] IPOSS Jakarta
[2] STIE Pasim Sukabumi
[3] Universitas Malikussaleh
[4] Universitas Gajah Putih
[5] IAI Sumbar Pariaman

Article Info

Article history:

Received Nov, 2024
Revised Nov, 2024
Accepted Nov, 2024

Keywords:

Curriculum Implementation
Indonesian Education
School Leadership
Structural Equation Modeling
Teacher Professional Development

ABSTRACT

This study examines the mediating role of school leadership in the relationship between teacher professional development (TPD) and curriculum implementation in Indonesian schools. Using a quantitative approach, data were collected from 160 teachers across various regions, utilizing a Likert-scale questionnaire to measure perceptions of TPD, leadership practices, and curriculum implementation effectiveness. Structural Equation Modeling with Partial Least Squares (SEM-PLS) was applied to test the hypothesized relationships. The findings indicate that school leadership has a significant direct impact on curriculum implementation and an indirect effect through its influence on TPD. School leadership was shown to enhance TPD outcomes, which in turn positively affected curriculum implementation, highlighting the importance of an integrated approach where leadership and TPD efforts are aligned to drive successful curriculum outcomes. These results have practical implications, suggesting that investment in leadership training and needs-based TPD can strengthen curriculum application, contributing to improved educational quality.

Corresponding Author:

Name: Loso Judijanto
Institution: IPOSS Jakarta
Email: losojudijantobumn@gmail.com

1. INTRODUCTION

Effective curriculum implementation requires not only curriculum materials but also strategic alignment of teacher professional development, school leadership, and resource management to transform educational frameworks into effective classroom practices. Key factors include teacher involvement, curriculum management, and addressing challenges. Teacher participation in curriculum reform enhances ownership, as co-designing promotes commitment [1] Professional development is essential for equipping teachers, yet insufficient training can hinder implementation [2]. Curriculum management, which involves planning, organizing, and evaluating, ensures alignment with educational goals [3], [4].

Regular meetings among teachers and curriculum teams support policy refinement [5]. Addressing challenges like resource limitations and diverse needs requires strategies such as improved resource allocation and support systems [2], [5].

Teacher professional development (TPD) is essential for enhancing educators' capabilities to meet evolving curriculum demands, equipping them with crucial skills and knowledge, though its effectiveness in improving classroom practices is influenced by the school leadership environment. Research supports that TPD programs positively impact teacher performance and instructional quality, leading to better student outcomes. TPD programs provide new knowledge, pedagogical techniques, and innovative strategies, improving instructional effectiveness and student learning outcomes [6], [7]. The TPD Monitor, an 18-item instrument, assesses TPD program quality across dimensions like clarity, cognitive activation, collaboration, and practical relevance to ensure well-structured programs [8]. Institutional support, including leadership and resource allocation, is vital for implementing TPD insights in classrooms [9], while a culture of continuous learning, fostered by strong leadership, helps overcome challenges like resistance to change and resource limitations [10]. Collaboration and experience-based learning are effective strategies for sustainable teacher development [9], and technology integration, along with ongoing support mechanisms, further enhances TPD impact [10].

School leadership, particularly the role of principals, is essential in fostering an environment conducive to effective curriculum delivery, where collaborative leadership, instructional guidance, and motivational practices significantly influence teachers' implementation of curriculum initiatives. Principals who recognize teachers as curriculum leaders (TCL) empower them to assume roles as decision-makers and designers, enhancing their involvement in curriculum matters [11]. Collective decision-making and fair task distribution further encourage a collaborative atmosphere [12], [13]. Instructional leadership, including feedback and clear educational goals, is strongly linked to teacher development and a positive school culture, creating an environment that promotes continuous improvement and aligns teaching with curriculum objectives [14]. Additionally, a principal's leadership style, marked by openness, discipline, and commitment, enhances staff motivation and performance [13]. Principals who champion change and implement innovative programs positively impact education quality and inspire teachers to embrace new instructional methods [15], [16].

Efforts to enhance teacher capacity and school leadership quality in Indonesia have been central to recent educational reforms, yet challenges persist in effectively translating professional development into classroom practices. Variations in school leadership practices significantly contribute to these barriers. The Merdeka Curriculum, though positively received by teachers, faces implementation challenges due to limited understanding and infrastructure issues, which are worsened by inconsistent leadership across schools [17]–[19].

Infrastructure inadequacies hamper curriculum implementation [17]t, while limited understanding and training among teachers affect their ability to effectively apply new curricula, necessitating ongoing professional development [18], [20]. Variations in leadership practices further lead to inconsistent support for teachers, impacting the effective application of training in classrooms [18]. Teachers generally view the Independent Curriculum positively but encounter practical challenges such as time management and adapting to students' diverse learning needs [19], indicating a need for adaptive strategies and continued support.

Additionally, resource distribution disparities and changes in performance assessments pose further obstacles for capacity building [20]. Strengthening human resources through continuous training is recommended to enhance professionalism and educational quality [21].

As a result, there is a growing need to investigate the dynamics between teacher professional development, school leadership, and curriculum implementation to identify factors that support successful outcomes in Indonesian schools. This study aims to assess the mediating role of school leadership in the impact of teacher professional development on curriculum implementation in Indonesia.

2. LITERATURE REVIEW

2.1 Teacher Professional Development (TPD)

Teacher professional development (TPD) is crucial for enhancing teacher performance and improving student outcomes, with effective TPD programs characterized by ongoing engagement, alignment with curricular goals, and active learning opportunities. These programs help teachers acquire the skills needed to adapt to modern educational demands and manage diverse classroom environments. Effective TPD is continuous and contextually embedded within the work environment, promoting gradual learning and application [6], [7]. Programs that incorporate practical exercises, discussions, and feedback are more successful in enhancing teacher skills [7], and alignment with specific curricular goals ensures effectiveness [6], [9], [22]. However, challenges in implementation persist, such as insufficient institutional support, which makes it difficult for teachers to apply their learning [9], and program design issues, like those seen in Kenya, where lack of teacher involvement has hindered effectiveness [23]. Nonetheless, well-designed TPD programs positively impact teacher performance, improving instructional practices [6], [24] and student learning outcomes by equipping teachers with innovative strategies [6], [7], [24].

2.2 Role of School Leadership in Supporting TPD

School leadership is pivotal in shaping the educational environment, significantly impacting teacher motivation, professional growth, and curriculum implementation. Effective leaders provide a clear vision, foster collaboration, encourage continuous learning, and instill a culture of accountability and high expectations. They act as facilitators, offering structural and emotional support for teachers in professional development, providing resources, setting realistic expectations, and creating opportunities for peer collaboration and shared learning. This support is essential for teachers to feel empowered to apply new practices from teacher professional development (TPD) in the classroom. School leaders play a crucial role in nurturing teacher leadership, which contributes to improved student outcomes and school achievement by helping teachers embrace their roles within the school [25]. Effective school leadership is fundamental in achieving educational standards and high results, making leadership training programs vital [26]. There is a strong link between effective leadership and a positive school culture that promotes success and collaboration [27], with leadership styles like transformational, instructional, distributed, and authentic leadership enhancing teaching quality [28], [29]. Although school leaders face challenges such as limited resources and time constraints, they can address these through customized growth opportunities and fostering a positive organizational atmosphere that values educators' contributions [30]. However, challenges remain, as many school leaders lack the skills or resources to fully support TPD and

curriculum implementation, highlighting the need for a leadership approach that bridges the gap between TPD and classroom practice, particularly in Indonesia's evolving educational landscape.

2.3 Curriculum Implementation

Curriculum implementation is a multifaceted process requiring teachers to adapt guidelines to diverse student needs while adhering to educational standards, with teachers playing a central role in interpreting and translating curriculum frameworks into effective practices. Teachers must be adaptable and sensitive to student needs, modifying curriculum content to provide relevant and transformative learning experiences [31]', while professional development is essential for equipping them with the skills necessary for implementing new curricular approaches [2], [3]. However, resource limitations and inadequate stakeholder support pose significant barriers [2], and schools that support teachers struggling with curriculum application can significantly enhance implementation success [5]. School leaders also play a role by fostering a collaborative environment and encouraging innovation, facilitating curriculum alignment with school policies through regular discussions among teachers and curriculum teams [5], [31]. Involving teachers in curriculum design, from the planning stages through implementation, can improve their ownership and fidelity to the curriculum, ensuring alignment with educational goals [1].

2.4 The Indonesian Educational Context

Indonesia's education system has undergone significant reforms in recent years, focusing on teacher professional development (TPD) and leadership enhancement, yet curriculum implementation continues to face challenges due to variability in resources, leadership quality, and teacher readiness. While Indonesian educational policies underscore TPD's importance in addressing these issues, difficulties remain, especially in rural and underserved areas where resources and leadership support may be limited [17], [19]. This study examines these dynamics within the Indonesian educational context, emphasizing the mediating role of school leadership in translating TPD into effective curriculum implementation. Employing a quantitative approach, the research seeks to provide insights into how school leadership can optimize TPD outcomes, offering potential guidance for policies and practices that enhance curriculum delivery across Indonesian schools [32].

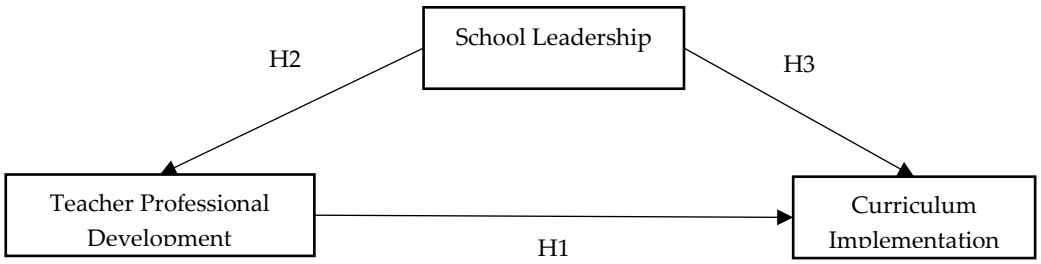

Figure 1. Conceptual and Hypothesis
Source: Literature Review, 2024

3. METHODS

3.1 Research Design

The study is designed as a cross-sectional quantitative analysis, aiming to understand the relationships among TPD, school leadership, and curriculum implementation within a specific time frame. The quantitative approach is appropriate for measuring the strength and direction of these relationships and for analyzing the mediating effect of school leadership.

3.2 Sample and Sampling Procedure

The target population for this study consists of primary and secondary school teachers in Indonesia who have undergone professional development training within the last two years. A sample size of 160 teachers was selected to ensure sufficient power for SEM-PLS analysis, as recommended by Kline (2015) for studies with complex models. A purposive sampling method was used, focusing on both urban and rural schools to capture diverse educational settings. The selection criteria for participants included (1) teachers who participated in TPD programs within the past two years and (2) teachers working under school leaders responsible for managing curriculum implementation. This purposive sampling approach ensures the sample's relevance to the research objectives and that selected teachers have experience with the variables under study.

3.3 Data Collection

Data were collected through a structured questionnaire designed to measure perceptions of teacher professional development, school leadership, and curriculum implementation. Each item was rated on a 5-point Likert scale, from 1 ("Strongly Disagree") to 5 ("Strongly Agree"), providing a standardized measure of participants' responses. The questionnaire was pre-tested with a small group of teachers to ensure clarity and reliability, leading to minor adjustments in wording and item structure. Data collection spanned four weeks, with participants completing the questionnaires anonymously to encourage honest responses.

3.4 Data Analysis

Data analysis was conducted using Structural Equation Modeling with Partial Least Squares (SEM-PLS) via SmartPLS 3 software, chosen for its capability to handle complex mediation models and suitability for exploratory research with relatively small sample sizes (Hair et al., 2017). The analysis included several steps: first, descriptive statistics were calculated, providing an overview of the data through means, standard deviations, and frequency distributions. Second, the measurement model was assessed for reliability and validity; Cronbach's alpha and composite reliability (CR) ensured internal consistency, while Average Variance Extracted (AVE) values above 0.5 indicated adequate convergent validity (Fornell & Larcker, 1981). Discriminant validity was confirmed using the Fornell-Larcker criterion. Third, the structural model was evaluated to test the hypothesized relationships between TPD, school leadership, and curriculum implementation, with path coefficients indicating the strength and significance of these relationships. The mediating role of school leadership was tested using bootstrapping with 5,000 resamples to calculate indirect effects (Preacher & Hayes, 2008). Finally, hypotheses were tested based on path coefficient significance, with a p-value of 0.05 or lower considered statistically significant, and mediation analysis determined the extent to which school leadership mediates the

relationship between TPD and curriculum implementation.

4. RESULTS AND DISCUSSION

4.1 Results

a. Demographic Profile of the Sample

This section provides an overview of the demographic characteristics of the sample, consisting of 160 teachers from various schools across Indonesia, helping to contextualize the study by detailing participant backgrounds in terms of age, gender, years of teaching experience, education level, and school type. Age distribution revealed a fairly diverse range, with the majority between 30-39 years (40%), followed by 40-49 years (27.5%), 20-29 years (20%), and those 50 years and above (12.5%). Gender distribution was relatively balanced, with females comprising 55% of the sample and males 45%. Years of teaching experience varied, with most participants having 11-15 years (30%), followed by 6-10 years (25%), 16-20 years (20%), 1-5 years (15%), and over 21 years (10%). Educational qualifications were primarily bachelor's degree holders (60%), followed by master's degree holders (35%) and a small proportion with doctorates (5%). The sample represented both public (70%) and private (30%) schools, highlighting a predominance of public-school educators. Descriptive statistics, including frequencies and percentages, provided a detailed view of each demographic variable.

b. Measurement Model Discussion

The measurement model assessment evaluates the reliability and validity of each construct: School Leadership, Teacher Professional Development (TPD), and Curriculum Implementation. This assessment ensures that the constructs are well-defined, with each indicator accurately reflecting its respective construct. Reliability is measured through Cronbach's Alpha and Composite Reliability (CR), while validity is examined through Average Variance Extracted (AVE), Factor Loadings (LF), and Variance Inflation Factors (VIF).

Table 2. Measurement Model

Variable	Indicator and Code	LF	VIF
School Leadership	Cronbach's Alpha = 0.910, Composite Reliability = 0.931, AVE = 0.693.		
	SL.1 Instructional Leadership	0.813	2.507
	SL.2 Vision and Goals	0.902	2.789
	SL.3 Decision-Making	0.876	1.950
	SL.4 Communication	0.876	2.217
	SL.5 Staff Management	0.740	2.053
	SL.6 School Culture and Climate	0.776	2.271
Teacher Professional Development	Cronbach's Alpha = 0.906, Composite Reliability = 0.930, AVE = 0.727.		
	TPD.1 Participation in Training	0.857	2.829
	TPD.2 Improvement in Student Outcomes	0.858	2.814
	TPD.3 Collaboration and Sharing	0.880	2.977
	TPD.4 Reflective Practice	0.836	2.329
	TPD.5 Feedback and Evaluation	0.833	2.325

Variable	Indicator and Code	LF	VIF
Curriculum Implementation	Cronbach's Alpha = 0.915, Composite Reliability = 0.936, AVE = 0.747.		
	CI.1 Alignment with Standards	0.873	2.394
	CI.2 Teacher Preparedness	0.840	2.867
	CI.3 Instructional Strategies	0.848	2.187
	CI.4 Student Engagement	0.861	2.142
	CI.5 Assessment and Evaluation	0.897	1.355

Source: Data processing results (2024)

The School Leadership construct shows high reliability, with a Cronbach's Alpha of 0.910 and Composite Reliability (CR) of 0.931, surpassing the 0.7 threshold and demonstrating internal consistency. Its AVE of 0.693 confirms convergent validity, with factor loadings from 0.740 to 0.902 and VIF values between 1.950 and 2.789, indicating no multicollinearity. The Teacher Professional Development (TPD) construct also has strong reliability (Cronbach's Alpha of 0.906, CR of 0.930) and an AVE of 0.727, with loadings from 0.833 to 0.880 and VIF values from 2.325 to 2.977. The Curriculum Implementation construct shows similar strength, with a Cronbach's Alpha of 0.915, CR of 0.936, AVE of 0.747, factor loadings from 0.840 to 0.897, and VIF values between 1.355 and 2.867, confirming robust reliability, validity, and distinct contributions of each indicator.

c. Internal Variance Inflation Factor (VIF) Discussion

The Variance Inflation Factor (VIF) values in the model indicate multicollinearity levels among predictor variables. A VIF below 3 is acceptable, suggesting no multicollinearity issues. In this study, VIF values are analyzed for relationships between School Leadership, Teacher Professional Development, and Curriculum Implementation, as shown in the table below.

Table 3. Internal VIF

Variable	VIF
School Leadership → Curriculum Implementation	2.856
School Leadership → Teacher Professional Development	1.000
Teacher Professional Development → Curriculum Implementation	2.856

Source: Data processing results (2024)

The VIF analysis shows acceptable collinearity levels, confirming that each predictor uniquely contributes to the model. With a VIF of 2.856, School Leadership independently impacts Curriculum Implementation, while a VIF of 1.000 between School Leadership and Teacher Professional Development indicates no collinearity. Similarly, the VIF of 2.856 for Teacher Professional Development and Curriculum Implementation confirms that both School Leadership and Teacher Professional Development independently influence Curriculum Implementation.

d. Discriminant Validity Discussion

Discriminant validity assesses whether constructs that

are supposed to be distinct are, in fact, distinct from each other. It is confirmed when a construct shares more variance with its own indicators than it does with other constructs in the model. This study evaluates discriminant validity using the Fornell-Larcker criterion, which compares the square root of the Average Variance Extracted (AVE) of each construct with its correlations with other constructs. The square root of the AVE for each construct (shown on the diagonal in bold) should be higher than its correlations with other constructs.

Table 4. Discriminant Validity

Variable	Curriculum Implementation	School Leadership	Teacher Professional Development
Curriculum Implementation	0.864		
School Leadership	0.775	0.832	
Teacher Professional Development	0.842	0.806	0.853

Source: Data processing results (2024)

The square root of the AVE for each construct supports discriminant validity, as each construct shares more variance with its own indicators than with others. For Curriculum Implementation, the square root of the AVE is 0.864, higher than its correlations with School Leadership (0.775) and Teacher Professional Development (0.842), confirming its distinctiveness. School Leadership has a square root of the AVE at 0.832, greater than its correlations with Curriculum Implementation (0.775) and Teacher Professional Development (0.806), indicating it is distinct. Similarly, Teacher Professional Development's AVE square root is 0.853, exceeding its correlations with Curriculum Implementation (0.842) and School Leadership (0.806), showing it remains a separate construct in the model.

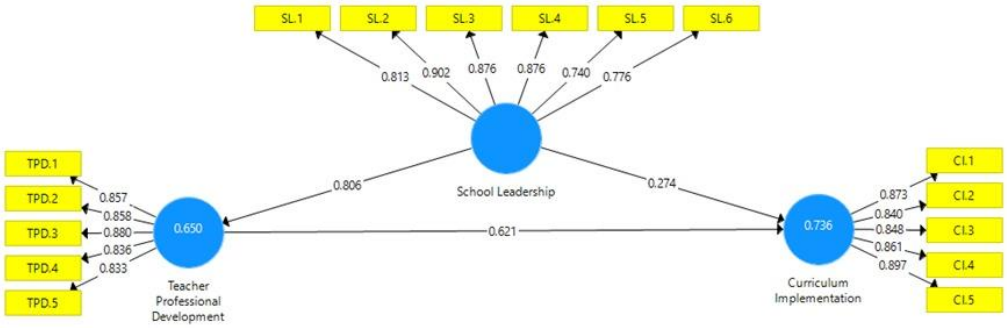

Figure 2. Internal Assessment Model

e. Model Fit Discussion

Model fit indicators assess how well the hypothesized model represents the observed data. In this study, several fit indices—Standardized Root Mean Square Residual (SRMR), d_ULS, d_G, Chi-Square, and Normed Fit Index (NFI)—are used to evaluate both the

Saturated Model and the Estimated Model. Ideally, these indices should indicate that the model fits the data well, supporting the reliability of the relationships among constructs.

Table 4. GOF test Results

	Saturated Model	Estimated Model
SRMR	0.075	0.075
d_ULS	0.757	0.757
d_G	0.608	0.608
Chi-Square	252.253	252.253
NFI	0.793	0.793

Source: Processing data analysis (2024)

The model fit indices indicate an acceptable fit between the hypothesized model and the observed data. The SRMR value of 0.075, for both Saturated and Estimated Models, is below the 0.08 threshold, indicating a good fit with minimal residuals (Hu & Bentler, 1999). The low d_ULS (0.757) and d_G (0.608) values suggest minimal discrepancies between the observed and model-implied covariance matrices, further supporting a good fit. The Chi-Square value of 252.253 suggests no substantial misfit, though it may be influenced by sample size. The NFI value of 0.793, though slightly below the ideal threshold of 0.90, is acceptable for exploratory models, indicating that the model adequately captures the relationships among variables while allowing room for minor improvements.

The R-Square value for Curriculum Implementation is 0.736, indicating that 73.6% of its variance is explained by School Leadership and Teacher Professional Development, reflecting strong explanatory power and the significant role of these factors in effective curriculum implementation. The Adjusted R-Square of 0.729 suggests the model's robustness without overfitting, underscoring the suitability of these variables in explaining Curriculum Implementation. For Teacher Professional Development, the R-Square is 0.653, meaning that 65.3% of its variance is explained by School Leadership, highlighting the critical impact of leadership on teacher development. The Adjusted R-Square of 0.645, closely aligning with the R-Square, indicates a well-fitted model, confirming that School Leadership is a strong, relevant predictor of Teacher Professional Development.

Table 5. R2 Test

Variable	R Square	R Square Adjusted
Curriculum Implementation	0.736	0.729
Teacher Professional Development	0.653	0.645

Source: Processing data analysis (2024)

f. Blindfolding Test Discussion

The Blindfolding Test, using Stone-Geisser's Q^2 statistic, evaluates the predictive relevance of an endogenous construct in the model. A Q^2 value above zero indicates that the model can accurately predict

data points for the constructs. Applied to Curriculum Implementation and Teacher Professional Development, this test confirms the model's predictive capability for these constructs based on established relationships.

Table 6. Blindfolding Test Result

Variable	SSO	SSE	Q^2 (=1-SSE/SSO)
Curriculum Implementation	400	184.287	0.539
School Leadership	480	480	
Teacher Professional Development	400	214.205	0.464

Source: Processing data analysis (2024)

The Q^2 value for Curriculum Implementation is 0.539, indicating strong predictive relevance, as School Leadership and Teacher Professional Development effectively predict Curriculum Implementation outcomes with over 50% accuracy. This confirms the model's suitability for explaining variations in Curriculum Implementation based on these predictors, highlighting their significance in curriculum-related outcomes. For Teacher Professional Development, the Q^2 value is 0.464, further demonstrating predictive relevance; School Leadership plays a vital role in supporting teachers' growth, with 46.4% predictive accuracy. Q^2 is not calculated for School Leadership, as it is an exogenous variable, but its influence on Curriculum Implementation and Teacher Professional Development is evident through the strong predictive relevance scores of these constructs.

g. Hypothesis Testing Discussion

Hypothesis testing in this model evaluates the significance and strength of relationships among School Leadership, Teacher Professional Development, and Curriculum Implementation, using metrics like Original Sample (O), Sample Mean (M), Standard Deviation (STDEV), T Statistics, and P Values. A p-value below 0.05 indicates significance, and each hypothesis in this model shows a significant effect.

Table 5. Bootstrapping Test

Hypothesis	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
School Leadership -> Curriculum Implementation	0.474	0.487	0.114	5.408	0.002
School Leadership -> Teacher Professional Development	0.806	0.812	0.043	18.887	0.000
Teacher Professional Development -> Curriculum Implementation	0.621	0.611	0.106	5.852	0.000

Source: Data processing results (2024)

Hypothesis testing shows that each relationship in the model is significant. For Hypothesis 1, the path coefficient of 0.474 indicates a moderately strong effect of School Leadership

on Curriculum Implementation, with a T Statistic of 5.408 and a p-value of 0.002, confirming statistical significance. This suggests that leadership practices positively impact curriculum implementation. In Hypothesis 2, School Leadership strongly affects Teacher Professional Development, with a path coefficient of 0.806, T Statistic of 18.887, and p-value of 0.000, emphasizing the critical role of leadership in fostering professional growth. Hypothesis 3 shows that Teacher Professional Development positively influences Curriculum Implementation, with a path coefficient of 0.621, T Statistic of 5.852, and p-value of 0.000, confirming that professional development equips teachers for effective curriculum delivery.

4.2 Discussion

The results of this study provide valuable insights into the interconnected relationships among School Leadership, Teacher Professional Development (TPD), and Curriculum Implementation, highlighting the mediating role of School Leadership.

a. School Leadership and Curriculum Implementation

The significant positive effect of School Leadership on Curriculum Implementation highlights the vital role of leadership in facilitating effective curriculum application. This aligns with prior research [3], [11], [26], [33], which suggests that school leaders who provide clear instructional guidance, set high expectations, and promote collaboration positively impact teachers' curriculum alignment. In the Indonesian context of evolving curriculum reforms, this finding implies that policymakers should prioritize leadership development, equipping principals with skills in instructional leadership and resource allocation to bridge gaps between curriculum design and classroom practices, ultimately enhancing educational quality for students.

b. School Leadership and Teacher Professional Development

The highly significant relationship between School Leadership and TPD underscores the crucial role of leadership in fostering teachers' professional growth. This strong positive effect suggests that when school leaders offer structured support, encourage active participation in training, and promote a culture of continuous learning, teachers are more likely to engage deeply in professional development. This aligns with previous studies [14], [29], [34] emphasizing leadership's role in motivating teachers toward development programs that enhance instructional skills. Practically, this implies that proactive leadership, which encourages collaborative learning, supports feedback, and prioritizes resourceful training, is essential—especially in resource-limited settings like Indonesia, where effective leadership can maximize the impact of available professional development opportunities.

c. Teacher Professional Development and Curriculum Implementation

The positive and significant relationship between TPD and Curriculum Implementation underscores that TPD initiatives directly enhance teachers' ability to implement curricula effectively. Teachers

who participate in high-quality TPD are better prepared to adapt curriculum content, apply instructional strategies, and achieve diverse learning outcomes, aligning with [35]–[37], findings that professional development strengthens subject knowledge, pedagogy, and classroom management. This emphasizes the importance of aligning TPD programs with curriculum goals, especially in Indonesia, where frequent curriculum changes require adaptable skills. Well-aligned TPD makes training practically relevant, facilitating teachers' integration of learned concepts into classroom practices.

d. The Mediating Role of Teacher Professional Development

The study's findings indicate that Teacher Professional Development (TPD) partially mediates the relationship between School Leadership and Curriculum Implementation, showing that while leadership directly impacts curriculum implementation, its influence is stronger when it also supports effective TPD. School leaders who prioritize TPD create an environment that equips teachers with essential skills for curriculum application, amplifying leadership's impact on curriculum success [38]–[40]. This mediating effect highlights the need for an integrated approach, where leadership and TPD are complementary. In Indonesia, where policy reforms frequently introduce new curriculum standards, fostering synergy between leadership and TPD ensures teachers are well-prepared to meet these demands, supporting sustained educational quality improvements.

4.3 Implications for Educational Practice and Policy

The study's findings suggest important practical implications for educational practice and policy. Policymakers should recognize the dual role of school leadership in directly supporting curriculum implementation and enhancing it through Teacher Professional Development (TPD). Investing in leadership programs that train principals in instructional leadership, communication, and resource management can foster supportive environments for curriculum changes. Additionally, aligning TPD programs with curriculum goals ensures that training is relevant and directly applicable to instructional practices. Schools may benefit from a needs-based approach to TPD, addressing specific curriculum challenges teachers face. A systemic approach that integrates leadership and TPD can encourage collaboration, support professional growth, and enhance curriculum implementation, ultimately improving student outcomes.

4.4 Contributions to Theory

This study contributes to the literature by providing empirical evidence of the mediating role of TPD in the relationship between School Leadership and Curriculum Implementation. While previous research has examined the isolated impacts of leadership and TPD on curriculum outcomes, this study demonstrates their interdependent effects, highlighting the importance of leadership in enhancing professional development and curriculum application. This perspective supports a systems approach to educational improvement, emphasizing that successful curriculum implementation requires

not only skilled teachers but also a supportive leadership structure.

4.5 Limitations and Directions for Future Research

This study provides valuable insights but has limitations. The cross-sectional design restricts causal inference, as data were collected only once; future research could use a longitudinal approach to observe how these relationships develop over time, offering deeper insights into the lasting effects of leadership and TPD on curriculum implementation. Additionally, reliance on self-reported data may introduce response bias, as reported perceptions might differ from actual practices. Future studies could use observational methods or multi-source data to validate self-reports. Exploring additional mediating factors, such as peer collaboration or instructional coaching, could further clarify how school leadership impacts curriculum implementation.

5. CONCLUSION

The study highlights that effective school leadership is essential for successful curriculum implementation, directly and through its support of teacher professional development (TPD). School leaders create environments that foster continuous growth, enabling teachers to align instructional practices with curriculum standards. The strong link between TPD and curriculum implementation shows that well-prepared teachers, through relevant professional development, are better equipped to translate curriculum goals into impactful classroom practices. These findings emphasize an integrated approach to educational improvement, where leadership and TPD work in tandem to achieve curriculum objectives. For Indonesian policymakers, this underscores the need for leadership training and TPD aligned with curriculum requirements to bridge the gap between policy and practice, enhancing educational quality and student outcomes. Future research could explore the long-term effects of leadership and TPD on curriculum implementation and additional supportive factors, such as collaboration and instructional coaching.

REFERENCES

[1] P. Chimbunde and B. B. Moreeng, "The Sustainability of Curriculum Reform and Implementation Through Teacher Participation: Evidence from Social Studies Teachers," *J. Curric. Stud. Res.*, vol. 6, no. 1, pp. 83–98, 2024.

[2] P. Aslam, Q. Mushtaq, F. Noor, S. Maqbool, N. Y. Khan, and J. Sarfraz, "The Literature Review on Curriculum Implementation Problems," *J. Heal. Rehabil. Res.*, vol. 4, no. 2, pp. 497–501, 2024.

[3] A. F. Yasmin and A. M. Hs, "Inovasi Kurikulum Dalam Upaya Meningkatkan Mutu Pendidikan Di Indonesia," *J. Pena Karakter J. Pendidik. Anak dan Karakter*, vol. 5, no. 1, pp. 27–31, 2023.

[4] S. Sagama, "Analisis konsep keadilan, kepastian hukum dan kemanfaatan dalam pengelolaan lingkungan," *Mazahib*, vol. 15, no. 1, pp. 20–41, 2016.

[5] A. S. Hodijah and M. S. Nugraha, "Implementasi Pengelolaan Kurikulum dalam Peningkatan Kualitas Pendidikan Berdasarkan Instrumen Akreditasi Satuan Pendidikan (IASP) Tahun 2020 di MIN 2 Kota Bandung," *Al-DYAS*, vol. 3, no. 2, pp. 825–833, 2024.

[6] S. D. K. Nasution, R. Madhakomala, R. Rugaiyah, and A. Dany, "Professional Development Effective From a Teacher Performance Perspective (Study of Literature in Various Countries)," *al-fikrah J. Manaj. Pendidik.*, vol. 12, no. 1, pp. 64–76, 2024.

[7] A.-C. E. Ding, L. Shi, H. Yang, and I. Choi, "Enhancing teacher AI literacy and integration through different types of cases in teacher professional development," *Comput. Educ. Open*, vol. 6, p. 100178, 2024.

[8] C. Setiawan, N. Freitas, and J. Pereira, "Capital Structure, Liquidity, And Firm Size Impact On Profitability Of Mining Industry In Indonesia," 2021.

[9] S. Seprudin, "Teacher Professional Development: A Systematic Literature Review on Strategies for Effective Continuous Learning," *Int. J. Multidiscip. Approach Sci. Technol.*, vol. 1, no. 1, pp. 45–54, 2024.

[10] X. Peisen, "Exploring the Impact of Interactive Multimedia Elements on the Effectiveness of Online Teaching in

Higher Education: A Quality Evaluation Perspective".
[11] R. Bessong, "Teachers as Curriculum Leaders: What Does This Mean to School Principals?," *e-BANGI J.*, vol. 21, no. 2, 2024.
[12] D. Desvianti, M. Safitri, and Z. Hasan, "The Role of Islamic Economics in Overcoming Economic Inequality and Realizing Development in Indonesia," *Al-Fadilah Islam. Econ. J.*, vol. 2, no. 1, pp. 1–9, 2024.
[13] K. Komariyah, N. A. N. Murniati, and N. Egar, "Pengaruh Gaya Kepemimpinan Kepala Sekolah Dan Motivasi Berprestasi Terhadap Produktivitas Kerja Guru Taman Kanak-Kanak Di Kecamatan Patebon Kabupaten Kendal," *J. Manaj. Pendidik.*, vol. 9, no. 2, 2020.
[14] I. TAHIR and N. FATIMA, "Effect of principal's instructional leadership practices on teachers' professional development: A cross sectional study of secondary school level from selected areas of Lahore, Punjab, Pakistan," *Int. J. Sci. Res. Arch.*, vol. 10, no. 2, pp. 590–606, 2023.
[15] R. Jannah and O. Wahyuningsih, "The Leadership Role of The School Principal in Effective Educational Management," *Asian J. Eng. Soc. Heal.*, vol. 3, no. 3, pp. 663–668, 2024.
[16] C. Öner, G. Öner, R. O. Ercan, And K. Üce, "The Impact Of School Principals'leadership Roles On Educational Objectives: An Analysis Of Personal And Psychological Characteristics.," *Int. J. Eurasia Soc. Sci. Avrasya Sos. Bilim. Derg.*, vol. 14, no. 55, 2024.
[17] Y. A. Tobondo, "Challenges and Solutions in the Implementation of Educational Policies in Indonesia: A Literature Analysis of Merdeka Belajar Kampus Merdeka and Teacher Reform," *EDUKASIA J. Pendidik. dan Pembelajaran*, vol. 5, no. 1, pp. 1157–1164, 2024.
[18] C. Sutinah, A. R. Riyadi, A. Muftianti, M. A. Wulandari, and S. Ruqoyyah, "Navigating Change: An Analysis of Elementary School Teachers' Readiness and Implementation Challenges with the Merdeka Curriculum," *AL-ISHLAH J. Pendidik.*, vol. 16, no. 2, pp. 1718–1729, 2024.
[19] S. N. Maulida, W. Lubis, W. M. Siregar, and Y. Nasution, "Teachers' Perception of the Implementation of the Independent Curriculum in Elementary Schools," *Mahir J. Ilmu Pendidik. dan Pembelajaran*, vol. 3, no. 2, pp. 301–307, 2024.
[20] M. S. Ummah, Structural Analysis of Covariance on Health-Related Indicators in the Elderly at Home, Focusing on Subjective Health Perception, vol. 11, no. 1. 2019.
[21] H. Nashihin, A. Baroroh, and A. Ali, "Implikasi hukum teknologi informasi dalam perkembangan teknologi pendidikan islam (Telaah atas Hukum Moore, Hukum Metcalfe, dan Hukum Coase)," *Turots J. Pendidik. Islam*, vol. 2, no. 2, pp. 136–147, 2020.
[22] R. W. Sari, A. Purba, S. Nasution, and L. H. Pulungan, "Educational Resource Management System Design for Inclusive Education," *EDUCTUM J. Res.*, vol. 3, no. 2, pp. 49–54, 2024.
[23] E. M. Andafu, "Evaluation of the Teacher Professional Development (TPD) Programme in Kenya in the light of Knowles' Conception of Andragogy," *Msingi J.*, vol. 7, no. 1, pp. 32–53, 2023.
[24] K. O. Adu, N. Duku, and E. O. Adu, "Role of continuing professional teacher development (CPTD) on teachers' and learners' achievement in South Africa: A literature review," *Int. J. Res. Bus. Soc. Sci.*, vol. 12, no. 7, pp. 542–548, 2023.
[25] C. P. Lakuma, R. Marty, and F. Muhumuza, "Financial inclusion and micro, small, and medium enterprises (MSMEs) growth in Uganda," *J. Innov. Entrep.*, vol. 8, no. 1, Dec. 2019, doi: 10.1186/s13731-019-0110-2.
[26] F. Hysa and R. Jakupi, "Education Is A Key Tool In The Development Of Society And Educational Leadership And Is A Key Element For Effective School And Education," *Educ. Adm. Theory Pract.*, vol. 30, no. 4, pp. 7895–7906, 2024.
[27] B. Bozkurt, "Effective School Leadership as a Predictor of School Culture.," *Int. J. Progress. Educ.*, vol. 19, no. 5, 2023.
[28] S. M. R. Zaidi, A. Alam, and M. Y. Khan, "Enhancing Efficiency in Advanced Manufacturing through IoT Integration," *Eng. Headw.*, vol. 11, pp. 55–61, 2024.
[29] S. F. A. Zaidi, N. Ullah, M. Kamran, and J. Urooj, "School Leadership Scale for Teachers' Pedagogical Competence (SLSS-TPC): Designing and Validity Evaluation," *Educ. Res. Innov.*, vol. 3, no. 2, pp. 194–210, 2023.
[30] D. B. A. Mohd Sofian, "Investigating the Essential Function of School Leadership in Nurturing Teacher Professional Advancement and Sustaining Long-Term Commitment," *Available SSRN 4684813*, 2024.
[31] R. Coelho, S. Jayantilal, and J. J. Ferreira, "The impact of social responsibility on corporate financial performance: A systematic literature review," *Corporate Social Responsibility and Environmental Management*, vol. 30, no. 4. John Wiley and Sons Ltd, pp. 1535–1560, Jul. 2023. doi: 10.1002/csr.2446.
[32] B. Means, Y. Toyama, R. Murphy, and M. Baki, "The effectiveness of online and blended learning: A meta-analysis of the empirical literature," *Teach. Coll. Rec.*, vol. 115, no. 3, pp. 1–47, 2013.
[33] W. Huang, "Curriculum Leadership of Academic Administrators in Selected Higher Vocational Schools in China," *J. Educ. Educ. Res.*, vol. 7, no. 2, pp. 16–21, 2024.
[34] O. B. Sasere and S. D. Makhasane, "School-based teacher professional development framework (SBTPDF): a blueprint for school principals in Nigeria," *Int. J. Learn. Teach. Educ. Res.*, vol. 22, no. 8, pp. 391–414, 2023.
[35] A. Namubiru, M. Kisembo, T. Kasiita, E. Kagambe, and T. Kasiita, "Perceptions of Teachers on the Implementation of the Competence-Based Curriculum in Secondary Schools in Bundibugyo and Ntoroko Districts, Uganda," *East African J. Educ. Stud.*, vol. 7, no. 3, pp. 13–27, 2024.
[36] A. F. Ramli, M. S. Rasul, and M. Omar, "Issues and challenges in the implementation of professional development programs for design and technology teachers," *Int. J. Learn. Teach. Educ. Res.*, vol. 23, no. 7, pp. 64–83, 2024.
[37] S. Wafula, S. Likoko, and P. Obino, "An Investigation into Collaborative Stakeholder Engagement's Effect on Teacher Professional Development Implementation in Kenya," *East African J. Educ. Stud.*, vol. 7, no. 3, pp. 245–259, 2024.
[38] E. Dorukbaşi and R. Cansoy, "Examining the mediating role of teacher professional learning between perceived

instructional leadership and teacher instructional practices," *Eur. J. Educ.*, p. e12672, 2024.
[39] B. Y. Utami, N. Nelitawati, and H. Al-Kadri, "The Influence of Principal Transformational Leadership on Teacher Performance and Learning Quality in Schools," *Int. J. Educ. Dyn.*, vol. 6, no. 2, pp. 555–559, 2024.
[40] C. Shin, "How social entrepreneurs affect performance of social enterprises in Korea: The mediating effect of innovativeness," *Sustain.*, vol. 10, no. 8, Jul. 2018, doi: 10.3390/su10082643.