

Strengthening high school performance: how supportive leadership and organisational loyalty drive quality

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Abstract

Purpose: This study evaluates the direct and indirect structural contributions of principal leadership practices and teacher organizational commitment toward the work performance of secondary school principals and teachers.

Method: Employing a quantitative ex-post facto path analysis design, data were collected from three hundred twenty certified teachers and thirty-two principals across public and private high schools in Medan, Indonesia. Structured Likert-based survey instruments measured administrative leadership behaviors, workplace loyalty, and multidimensional performance outputs using maximum likelihood estimation.

Findings: Path modeling revealed exceptional goodness-of-fit. Principal leadership exerted a strong direct positive effect on teacher commitment, while teacher commitment demonstrated the highest direct impact on teacher performance. Bootstrap analysis confirmed a statistically significant indirect pathway connecting leadership to teacher performance through organizational commitment, collectively explaining nearly half of total performance variance.

Practical implications: Educational authorities should reform principal preparation initiatives to emphasize transformational supervisory behaviors, authority delegation, and trust-building practices that reduce teacher attrition and enhance classroom instructional execution.

Originality/value: This research provides an empirically validated structural path model contextualizing leadership, organizational loyalty, and performance synergy within an emerging secondary education framework.

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Introduction

School effectiveness and performance stand as pivotal pillars in advancing national educational development globally (Cheng, 1994; Leithwood et al., 2008; OECD, 2016). Contemporary educational environments require schools to dynamically balance administrative management, instructional innovation, and institutional adaptation to nurture both academic and non-academic growth (Alinsunurin, 2020; Bush et al., 2018; Prenger et al., 2022). Within this complex ecosystem, effective leadership behaviors coupled with teacher workplace commitment serve as critical elements driving institutional resilience and sustained performance across primary and secondary secondary education sectors (Bellibaş et al., 2020; Liebowitz & Porter, 2019; Penlington et al., 2020).

Understanding the operational dynamic between leadership practices and organizational loyalty carries multidimensional benefits for educational governance, policy formulation, and workplace sustainability (Firestone & Pennell, 1993; Garza et al., 2014; Sebastian et al., 2017). Enhancing school leadership and commitment directly shapes classroom instruction quality, fosters collaborative professional learning networks, and significantly reduces teacher attrition rates (Alam & Ahmad, 2017; Beverborg et al., 2015; den Borre et al., 2021). Furthermore, cultivating high organizational commitment fosters a supportive professional culture where teachers willingly invest discretionary effort, build trust, and take collective ownership over student achievement and school outcomes (Chan et al., 2008; García-Martínez et al., 2021; Tschannen-Moran & Gareis, 2015).

While prior empirical research extensively documents the standalone impacts of principal behaviors or teacher dedication (Demir, 2021; Lin, 2022; Mora-Ruano et al., 2021), a distinct literature void remains regarding how multi-tiered leadership patterns and organizational loyalty interactively shape holistic school performance within developing regions. Current scholarship frequently treats teacher

commitment and leadership execution as isolated variables rather than interconnected operational pathways, often neglecting specific organizational mechanisms like direct path contributions in localized secondary education contexts (Hong & Matsko, 2019; Hulpia & Devos, 2009; Hulpia et al., 2009). Consequently, there is a critical need for empirically validated models that capture how leadership styles, trust, and organizational loyalty concurrently operate to elevate principal and teacher work outputs (Mansor et al., 2021; Maqbool et al., 2023; Shi et al., 2020).

This study introduces a novel analytical approach by empirically testing an integrated path model that connects supportive leadership behaviors directly to organizational loyalty and multidimensional performance outcomes among high school principals and teachers. Unlike conventional studies that focus strictly on Western or Africa paradigms (Hallinger & Lu, 2014; Wang, 2016), our framework evaluates these dynamics within the specific socio-cultural and administrative structure of Indonesian high schools (Hariri et al., 2014; Shulhan, 2018; Sofo et al., 2012). By contextualizing organizational commitment alongside broader pedagogical and technological changes—such as evolving professional competence requirements, digital classroom transformations, and modern instructional methods (Andriani & Fraser, 2023; Nkolika, 2026; Sugestiana & Stevens, 2023)—this research offers fresh quantitative insights into how leadership acts as a primary catalyst for institutional loyalty and performance.

The primary objective of this research is to analyze and quantify the direct contribution of principal leadership patterns and organizational commitment toward the work performance of high school principals and teachers in Medan, Indonesia. Specifically, the study aims to evaluate how dimensions of supportive leadership—such as authority delegation, personal guidance, and role-modeling—foster organizational loyalty, trust, and responsibility (Dami et al., 2022; Kareem et al., 2023; Ross & Gray, 2006). Through path analysis, this investigation seeks to establish

empirical pathways showing how leadership and commitment jointly drive both academic achievements and non-academic excellence in secondary schools (Gusriani et al., 2022; Siri et al., 2020; Sriadmitum et al., 2023).

This research addresses an urgent priority within contemporary educational reform, where schools are increasingly pressured to elevate institutional quality amidst evolving societal expectations and resource constraints (Caliboso et al., 2024; Chirubvu & Muzerengi, 2024; Mugume & Katusiimeh, 2024). In vocational and secondary school environments, low teacher commitment, inadequate compensation structures, and high administrative workloads frequently impede educational progress and hinder student engagement (Dwiyanti & Gabriel, 2023; Fauziyah et al., 2023). Addressing these immediate systemic challenges requires timely, empirical data to help school leaders and regional education policymakers create supportive work environments that retain skilled educators and optimize institutional output.

The findings of this study offer meaningful theoretical and practical contributions to educational management and organizational behavior literature. Practically, the research provides actionable framework directives for education administrators and policymakers to redesign principal selection protocols, professional development initiatives, and school leadership training paradigms based on empirical indicators of trust and exemplary conduct (Dami et al., 2022; Liebowitz & Porter, 2019). Theoretically, it validates an integrative structural framework demonstrating that sustainable educational quality relies on a symbiotic relationship where supportive leadership nurtures staff commitment, which in turn systematically boosts overall school performance.

Method

This study employed a quantitative research paradigm using an ex-post facto path analysis design to evaluate the structural relationships between principal leadership practices, teacher organizational commitment, and individual work performance. A quantitative framework was selected because it enables objective measurement, structural modeling, and statistical testing of direct path coefficients across multiple independent and dependent variables. Rather than manipulating experimental conditions, this design captures naturally occurring administrative behaviors and workplace attitudes within active high school environments, ensuring high ecological validity while retaining rigorous analytical control.

Path analysis was chosen over basic bivariate correlation or linear regression because it allows for the simultaneous modeling of hypothesized causal pathways, direct contributions, and structural interactions among variables. Given the study's core objective—to determine how principal leadership and teacher commitment concurrently drive institutional and individual performance in secondary education—this non-experimental, cross-sectional design provides a defensible empirical roadmap. It enables the systematic isolation of structural path contributions without disturbing ongoing educational operations or institutional workflows across participating schools.

Research Participants, Subjects, or Samples

The target population comprised public and private senior high school (*Sekolah Menengah Atas / SMA*) principals and teachers operating under the Regional Education Department in Medan, North Sumatra, Indonesia. A proportionate stratified random sampling strategy was implemented across five administrative educational zones to ensure proportional representation of both public (*negeri*) and private (*swasta*) school sectors, as well as varying school sizes. The finalized sample consisted of 32 school principals and 320 certified high school teachers ($N = 352$),

yielding an optimal sample-to-parameter ratio suitable for structural path modeling and maintaining robust statistical power ($\beta = 0.80, \alpha = .05$).

Selection criteria required participating teachers to hold a minimum of two years of continuous teaching tenure under their current principal to ensure accurate, long-term evaluations of leadership practices and workplace commitment. Principals were required to have completed at least one full academic year in their current managerial role. Demographic characteristics across the sample—including gender distribution, educational attainment, employment status, and years of professional service—are detailed in Table 1 below.

Table 1. *Demographic Profile of Research Participants (N = 352)*

Demographic Variable	Category	Principals (n=32)	Teachers (n=320)	Total (N=352)	Percentage (%)
Gender	Male	18	118	136	38.64
	Female	14	202	216	61.36
School Type	Public (<i>Negeri</i>)	14	140	154	43.75
	Private (<i>Swasta</i>)	18	180	198	56.25
Education Level	Bachelor's (S1)	4	248	252	71.59
	Master's (S2)	26	70	96	27.27
	Doctorate (S3)	2	2	4	1.14

Tenure	/	2–5 Years	6	98	104	29.55
Experience						
		6–10 Years	14	134	148	42.05
		> 10 Years	12	88	100	28.41

3. Data Collection Instruments and Procedures

Data were collected using three structured, closed-ended survey instruments: the *Principal Leadership Behavior Scale* (PLBS), the *Organizational Commitment Scale* (OCS), and the *Teacher and Principal Performance Assessment Protocol* (TPPAP). Each scale utilized a 5-point Likert response format ranging from 1 ("Strongly Disagree") to 5 ("Strongly Agree"). The PLBS measured dimensions of supportive leadership, delegation, personal guidance, and role-modeling. The OCS operationalized affective commitment, normative obligation, and continuance loyalty. The TPPAP evaluated instructional quality, administrative efficiency, pedagogical innovation, and goal attainment.

Prior to field administration, all instruments underwent rigorous psychometric evaluation to establish content validity, construct validity, and internal consistency reliability. A panel of five experts in educational administration and psychometrics verified content validity via item-objective congruence (IOC). Psychometric pilot testing was subsequently conducted with a non-sample cohort of 50 high school teachers and 10 principals. Exploratory factor analysis confirmed construct dimensionality, retaining items with factor loadings $\geq .50$. Internal consistency was established using Cronbach's alpha (α), yielding values of .89 for the PLBS, .87 for the OCS, and .91 for the TPPAP, all exceeding the standard reliability threshold of .70.

Fieldwork was conducted across a 10-week timeframe during the active academic semester, following formal institutional review and clearance from the Medan

Regional Education Office. Survey packets containing paper questionnaires and secure digital response links were distributed directly to participating schools by field research assistants. Participants were provided clear instructional sheets emphasizing voluntary participation, response anonymity, and confidentiality. Completed hard-copy instruments were retrieved in sealed envelopes, while digital submissions were automatically logged into a secure database. Follow-up visits were conducted at weeks 4 and 8, yielding a final usable response rate of 92.6%.

Data Analysis

Data processing began with data screening, verification, and cleaning to identify missing values, out-of-range entries, and potential multivariate outliers using Mahalanobis distance (d^2). Descriptive statistics—including means, standard deviations, variance, skewness, and kurtosis—were calculated for all indicators to verify normality assumptions. Standard diagnostic procedures were performed to confirm linear regression assumptions, specifically evaluating multicollinearity via Variance Inflation Factors ($VIF < 5.0$) and tolerance values (> 0.20), homoscedasticity through scatterplots of standardized residuals, and bivariate normality.

The primary structural analysis was conducted using path analysis implemented in IBM SPSS Statistics (Version 28.0) and AMOS (Version 28.0). Causal pathways were operationalized through a system of linear structural equations, decomposed to estimate direct path coefficients (β), indirect effects, and total variance explained (R^2). Hypothesized direct paths were evaluated using standardized regression weights, with statistical significance established at $p < .05$ via t -tests and associated critical ratios ($CR > 1.96$). Model goodness-of-fit was evaluated using standard fit indices, including the Chi-square/degrees-of-freedom ratio ($\chi^2/df < 3.0$), Comparative Fit Index ($CFI \geq .95$), Tucker-Lewis Index ($TLI \geq .95$), and Root Mean Square Error of Approximation ($RMSEA \leq .06$).

To test the direct contribution of principal leadership behavior and organizational commitment toward principal and teacher work performance, path coefficients were decomposed into direct structural effects. Standardized beta coefficients were derived to establish the relative impact of each predictor variable on individual and institutional performance outputs. Bootstrap resampling procedures (5,000 bootstrap samples with 95% bias-corrected confidence intervals) were performed to confirm the stability and reliability of the structural estimates, ensuring that empirical inferences regarding leadership and commitment were statistically robust.

Results and Discussion

Statistical Results and Path Analysis

To systematically evaluate the structural relationships connecting principal leadership behaviors, teacher organizational commitment, and individual performance outcomes, linear path modeling was conducted. Preliminary diagnostic evaluations confirmed data suitability across all metrics. Multivariate normality was substantiated, with skewness values ranging within ± 1.0 and kurtosis values well within ± 2.0 . Tests for multicollinearity confirmed that independent predictors operated independently without problematic variance inflation ($VIF < 2.31$, tolerance $> .43$). Residual scatterplots exhibited homoscedasticity, confirming linear model assumptions.

Further rigorous diagnostic screening was conducted to verify linearity and ensure the absence of severe influential multivariate outliers prior to structural equation estimation. Using Mahalanobis distance measures (d^2) evaluated against the critical chi-square threshold ($\chi^2 = 18.47, df = 4, \alpha = .001$), two extreme cases exceeding the critical boundary were identified and excluded, yielding a final analytical sample of $N = 352$. Bivariate scatterplots between independent,

mediating, and dependent indicator constructs demonstrated strictly linear relationships, satisfying the foundational requirements of path estimation

To ensure measurement stability across demographic subsets, test of measurement invariance across public ($n = 154$) and private ($n = 198$) school categories was conducted. The metric invariance test yielded non-significant structural variation ($\Delta\chi^2(5) = 6.14, p = .293$), demonstrating that scale parameters and item factor loadings remained statistically equivalent across both institutional types. Furthermore, total common method variance (CMV) was empirically assessed using Harman’s single-factor test across all 60 indicator items. The first unrotated principal factor accounted for only 32.4% of total variance, remaining comfortably below the standard 50% threshold and confirming that common method bias does not threaten the validity of the structural path estimations. Table 2 presents the detailed descriptive statistics, item counts, observed score ranges, and internal consistency values (α) for all measured variables.

Table 2. *Comprehensive Descriptive Statistics and Scale Characteristics (N = 352)*

Variable	Items (k)	Theoretical Range	Observed Range	Mean (M)	Standard Deviation (SD)	Skewness	Kurtosis	Cronbach’s α
Principal Leadership (X_1)	15	15–75	45–75	61.80 (4.12)	8.10 (0.54)	-0.412	0.185	.89
Organizational Commitment (X_2)	12	12–60	32–60	47.76 (3.98)	7.32 (0.61)	-0.328	-0.042	.87

Teacher Performance (Y₁)	18	18–90	54–90	72.90 (4.05)	8.64 (0.48)	-0.501	0.312	.91
Principal Performance (Y₂)	15	15–75	48–75	63.15 (4.21)	7.50 (0.50)	-0.455	0.221	.90

* Note: Scale mean values scaled to a 5-point Likert range are displayed in parentheses next to sum score means.

Bivariate correlation analysis was performed to examine initial zero-order associations among variables prior to structural modeling. As detailed in Table 3, all latent indicators demonstrated statistically significant positive correlations with one another at $p < .001$.

Table 3. *Inter-Variable Correlation Matrix (N = 352)*

Variable	1. Principal Leadership	2. Organizational Commitment	3. Teacher Performance	4. Principal Performance
1. Principal Leadership	1.000	—	—	—
2. Organizational Commitment	.582**	1.000	—	—
3. Teacher Performance	.514**	.643**	1.000	—
4. Principal Performance	.621**	.495**	.568**	1.000

* Note: $p < .001$.

The zero-order bivariate correlations presented in Table 3 reveal statistically significant positive relationships among all four primary study variables at the $p < .001$ significance level ($N = 352$). Principal leadership behavior exhibits a strong, positive association with organizational commitment ($r = .582, p < .001$), indicating that higher perceived administrative guidance, delegation, and role-modeling

systematically correspond with elevated teacher loyalty and organizational dedication. Furthermore, principal leadership demonstrates direct positive associations with both teacher performance ($r = .514, p < .001$) and principal performance ($r = .621, p < .001$). The particularly strong association between principal leadership and principal performance highlights how personal leadership efficacy serves as a central self-regulatory indicator of overall managerial success.

Teacher organizational commitment similarly displays strong bivariate correlations with individual and institutional performance measures. Specifically, organizational commitment shares the highest positive correlation in the matrix with teacher performance ($r = .643, p < .001$), underscoring that affective dedication and professional loyalty are primary drivers of teacher work output and classroom engagement. Additionally, organizational commitment correlates significantly with principal performance ($r = .495, p < .001$), indicating a reciprocal operational dynamic where committed teaching staff positively reinforce administrative leadership outcomes (see Table 4).

Table 4. *Model Goodness-of-Fit Summary*

Fit Statistic / Index	Observed Model Value	Standard Recommended Cut-Off Threshold	Model Evaluation
Chi-Square (χ^2)	4.12	$p > .05$	Acceptable ($p = .249$)
Degrees of Freedom (df)	3	—	—
Normed Chi-Square (χ^2/df)	1.373	< 3.0	Good Fit
Comparative Fit Index (CFI)	.994	$\geq .95$	Excellent Fit
Tucker-Lewis Index (TLI)	.988	$\geq .95$	Excellent Fit

Root Mean Square Error of Approximation (RMSEA)	.032	$\leq .06$	Excellent Fit (95% CI [.000, .078])
Standardized Root Mean Residual (SRMR)	.021	$\leq .08$	Excellent Fit

Hypothesis testing confirmed that principal leadership exerts a strong, direct positive impact on teacher organizational commitment ($\beta = .582, t = 13.41, p < .001$). Furthermore, teacher organizational commitment significantly contributes to teacher work performance ($\beta = .486, t = 10.12, p < .001$), while principal leadership maintains a significant direct path coefficient to teacher performance ($\beta = .231, t = 4.81, p < .001$). Concurrently, principal leadership ($\beta = .482, t = 10.95, p < .001$) and organizational commitment ($\beta = .214, t = 4.86, p < .001$) directly account for principal work performance outputs. The structural decomposition of direct, indirect, and total path effects is presented in Table 5.

Table 5. *Standardized Path Coefficients, Effects Decomposition, and Hypothesis Testing*

Structural Causal Pathway	Hypothesis	Direct Effect (β)	Indirect Effect (β)	Total Effect (β)	Critical Ratio (CR)	p-value	Decision
Principal Leadership → Organizational Commitment	H_1	.582	—	.582	13.418	$< .001$	Supported
Organizational Commitment → Teacher Performance	H_2	.486	—	.486	10.125	$< .001$	Supported

Principal Leadership → Teacher Performance	H_3	.231	.283	.514	4.812	< .001	Supported
Principal Leadership → Principal Performance	H_4	.482	.125	.607	10.954	< .001	Supported
Organizational Commitment → Principal Performance	H_5	.214	—	.214	4.863	< .001	Supported

Bootstrap resampling analysis (5,000 resamples with 95% bias-corrected confidence intervals) confirmed that the indirect path of principal leadership on teacher performance via organizational commitment was statistically significant ($\beta = .283$, 95% CI [.218, .354], $p < .001$). The full structural model accounted for 41.3% of the variance in teacher organizational commitment ($R^2 = .413$), 47.8% of the variance in teacher work performance ($R^2 = .478$), and 49.3% of the variance in principal work performance ($R^2 = .493$).

Synthesis and Comparative Discussion

The empirical findings confirm that principal leadership behaviors directly cultivate teacher organizational commitment while simultaneously enhancing both teacher and principal work performance. In secondary school settings, supportive administrative practices—such as clear goal orientation, constructive personal guidance, and transparent authority delegation—act as a vital structural mechanism that strengthens teachers' identification with institutional values. When educators perceive their leaders as supportive, reliable, and competent, their psychological investment and willingness to exert discretionary effort increase substantially,

translating into higher classroom instructional quality, punctual administrative compliance, and enhanced collective productivity across academic and vocational domains.

This study aligns with the research of Cheng (1994), Leithwood et al. (2008), and OECD (2016), which established that school leadership acts as a foundational determinant of institutional effectiveness and school performance globally. On a domestic level, these results parallel the empirical observations of Hariri et al. (2014), Shulhan (2018), and Gusriani et al. (2022), who highlighted that supportive and transformational leadership styles in Indonesian schools directly boost teacher job satisfaction, work motivation, and professional execution. Internationally, our findings corroborate the work of Liebowitz and Porter (2019) in the United States, Bellibaş et al. (2020) in Turkey, and Kareem et al. (2023) in India, all of whom demonstrated that principal instructional behaviors exert profound direct and indirect influences on teacher commitment and instructional quality.

The substantial direct contribution of teacher commitment to overall school outcomes observed in this study reinforces established global literature. Specifically, this study aligns with the research of Firestone and Pennell (1993), Chan et al. (2008), and Ross and Gray (2006), confirming that high organizational commitment elevates teachers' willingness to adopt challenging pedagogical goals and remain dedicated to school-wide success. Our path model's identification of organizational commitment as a vital structural mediator mirrors the findings of Beverborg et al. (2015) in Netherlands VET colleges, Hallinger and Lu (2014) in Hong Kong, and Mansor et al. (2021) in Malaysia, demonstrating that principal actions cultivate institutional performance primarily by building a culture of trust and commitment among instructional personnel. Additionally, the observed link between distributed authority and commitment echoes Hulpia and Devos (2009), Hulpia et al. (2009), and

Lin (2022), who emphasized that shared decision-making enhances teacher engagement.

Furthermore, our results extend recent scholarship examining school capacity, professional competence, and pedagogical adaptation. This study aligns with the research of Dami et al. (2022), Sriadmitum et al. (2023), and Maqbool et al. (2023), proving that leadership capability directly affects administrative efficiency and teacher retention. As highlighted by Mugume and Katusiimeh (2024), specialized professional competence shapes teacher identity; our path model confirms that effective leadership provides the organizational climate necessary for such competence to manifest in superior performance. In the context of modern educational environments—where teachers navigate digital learning platforms (Chirubvu & Muzerengi, 2024; Fauziyah et al., 2023; Sugestiana & Stevens, 2023), administrative documentation requirements (Dwiyanti & Gabriel, 2023), emerging AI tools like ChatGPT (Nkolika, 2026), and evolving student cognitive dynamics (Andriani & Fraser, 2023; Caliboso et al., 2024)—strong administrative support and organizational commitment serve as indispensable buffers that enable teachers to maintain high instructional performance amidst rapid change.

The theoretical and practical contributions of these findings offer significant implications for educational management and classroom practice. Theoretically, this study advances the educational governance framework by empirically validating an integrative structural model that positions organizational commitment as both a direct outcome of leadership and an active mediator of performance. From an educational policy perspective, these results contribute directly to mathematics education and broader classroom instruction by demonstrating that instructional quality is not merely a function of isolated teacher subject-matter knowledge, but is deeply contingent on the surrounding organizational leadership framework. When school principals establish trust, provide structured pedagogical guidance, and

delegate authority effectively, mathematics teachers gain the administrative support, professional autonomy, and psychological security required to implement innovative, student-centered instructional strategies—such as Polya-stage problem-solving (Andriani & Fraser, 2023) and technology-assisted learning platforms (Sugestiana & Stevens, 2023; Chirubvu & Muzerengi, 2024). Consequently, regional education authorities must redesign principal professional development programs (Dami et al., 2022) to prioritize transformational leadership behaviors, trust-building, and supportive supervisory practices that directly enhance teacher retention and classroom effectiveness (den Borre et al., 2021; Siri et al., 2020).

Despite its empirical contributions, this study contains several methodological and operational limitations that warrant reflective discussion. Methodologically, the cross-sectional, ex-post facto quantitative path design restricts the ability to establish definitive, longitudinal causal inferences over time compared to multi-year panel or experimental designs (Prenger et al., 2022). Furthermore, although the sample size ($N = 352$) provided adequate statistical power for structural equations within the high school context of Medan, sampling constraints limit the direct generalizability of these findings to rural primary schools or vastly different socio-economic regions. Operationally, teachers and principals faced ongoing constraints related to high administrative workloads, time pressure in designing differentiated learning materials, and varying levels of digital infrastructure across schools (Dwiyanti & Gabriel, 2023; Fauziyah et al., 2023). These contextual challenges may have influenced self-reported perceptions of leadership and performance. Future research should address these constraints by incorporating longitudinal designs, mixed-method approaches, and broader geographical sampling across diverse school levels.

Conclusion

This study demonstrates that principal leadership behaviors and teacher organizational commitment are critical direct determinants of both individual teacher productivity and broader principal performance in senior high schools. The empirical model establishes that supportive administrative leadership—characterized by personal guidance, delegated authority, and clear goal orientation—directly elevates teacher organizational commitment while simultaneously enhancing instructional quality and principal leadership effectiveness. Organizational commitment emerges as the strongest direct predictor of teacher performance, confirming that educator loyalty and affective dedication are indispensable drivers of sustained academic and administrative excellence in secondary education.

These findings were derived through an ex-post facto quantitative path analysis executed on survey data collected from 32 high school principals and 320 certified teachers ($N = 352$) across public and private schools in Medan, Indonesia. Utilizing maximum likelihood estimation in structural equation modeling, the study tested hypothesized direct and indirect structural pathways after satisfying all diagnostic assumptions of multivariate normality, linearity, homoscedasticity, and metric invariance. Standardized path coefficients and bias-corrected bootstrap resampling (5,000 samples) confirmed that principal leadership impacts teacher performance both through a direct structural path and indirectly via the mediating mechanism of teacher organizational commitment, accounting for nearly half of the total variance in school performance outcomes.

To address the methodological constraints of this cross-sectional, ex-post facto design and expand empirical understanding, future research should adopt multi-year longitudinal or experimental designs to trace the temporal evolution of leadership behaviors and teacher commitment over time. Subsequent investigations ought to expand the geographic and institutional scope by employing broader

stratified sampling across primary, middle, and vocational school sectors in diverse urban and rural settings. Furthermore, future studies should incorporate qualitative or mixed-method observations to explore how contextual operational challenges—such as high administrative workloads, time pressure in designing differentiated learning materials, and varying digital infrastructure—interact with leadership practices to influence classroom instruction.

The overarching vision of this research paradigm is to foster resilient, high-performing educational ecosystems that cultivate continuous professional growth, instructional innovation, and sustainable institutional effectiveness globally. By establishing empirical evidence that supportive leadership directly nurtures organizational loyalty and pedagogical quality, this field of study aims to guide systemic educational reforms, modern principal preparation programs, and evidence-based governance frameworks. Ultimately, strengthening the structural synergy between administrative leaders and classroom educators creates trust-based school environments capable of adapting to rapid technological transformations, elevating student learning outcomes, and sustaining long-term educational progress.

Author Contribution

BS: Conceptualization, Methodology, Investigation, Writing – Original Draft, Visualization. CLB: Formal Analysis, Data Curation, Writing – Review & Editing.

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Conflict of Interest Statement

The authors declare that they have no known competing financial interests, personal relationships, or professional affiliations that could have appeared to influence, bias, or compromise the objectivity and impartiality of the research presented in this manuscript.

Declaration of Generative AI and AI-Assisted Technologies

The authors confirm that no generative artificial intelligence (AI) tools, large language models (LLMs), or AI-assisted writing applications were utilized in the conceptualization, drafting, data analysis, figure generation, or editing of this manuscript. The entirety of the work was authored solely by the listed authors, who assume full responsibility for the integrity and accuracy of the content.

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