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Principal leadership as a moderator: Enhancing the impact of work environment and motivation on teacher performance

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Abstract: This study aims to examine the effect of principal leadership as a moderating variable in the relationship between work environment, teachers' motivation, and teacher performance in Economics at high schools in Yogyakarta City. The method used is a quantitative approach with data analysis employing Structural Equation Modelling (SEM) through SmartPLS 4. The subjects of the study consist of 54 Economics teachers selected using purposive sampling. The instrument used is a structured questionnaire measuring four main constructs: teacher performance, principal leadership, work environment, and teacher motivation. Data were collected from February to November 2024. Data analysis was conducted using SEM with the Partial Least Squares (PLS) approach. The results show that work environment and teachers' motivation positively affect teacher performance, with principal leadership acting as a moderator, although the moderating effect was not statistically significant at the 95% confidence level on some variables. These findings emphasise the importance of a supportive work environment, high teachers' motivation, and effective leadership in improving teacher performance.

Keywords: principal leadership; teacher performance; teacher's motivation; work environment.

Introduction

Education plays a crucial role in national development, aiming to nurture the nation's intellect and build a dignified civilisation and character. In Indonesia, this is regulated through the National Education Standards (SNP), which emphasise not only knowledge acquisition but also the holistic development of students' skills and character. In this context, the quality of teachers becomes a pivotal factor, especially in the era of Industrial Revolution 4.0, which has brought transformative changes across various sectors, including education (Munawir & Erindha, 2023; Turiman et al., 2019; Younes & Al-Zoubi, 2015).

As part of the secondary school curriculum, economic education plays a vital role in equipping students with knowledge about economic systems and the ability to make sound financial decisions in daily life. Professional teachers hold a strategic position in realising students' potential through effective teaching. Hence, continuous improvement in teacher quality is essential, covering academic mastery, pedagogical skills, and innovative teaching practices (Octavia, 2019). Achieving high-quality education also requires support from various factors, such as effective principal leadership, a conducive work environment, and high teacher motivation (Minarti, 2022; Normawati et al., 2019).

In practice, although factors like workplace quality, motivation, and principal leadership are known to affect teacher performance, challenges remain in optimising teacher effectiveness (M. S. P. Hasibuan, 2018). Research has highlighted the crucial role of principals' leadership in creating a supportive environment and motivating teachers to enhance their performance (Darmansah, 2022; Suyanto, 2018). However, empirical findings reveal that leadership management in some schools has not yet fully optimised its role in supporting teacher performance, particularly in terms of workplace motivation and quality (Muthia, 2024).

Ideally, optimal teacher performance is achieved through the synergy of effective principal leadership, a supportive work environment, and high motivation (Asterina & Sukoco, 2019; Kelvin, 2016). Leadership and motivation theories, as elaborated by Darmansah (2022) and Safitri et al (2022)suggested that effective leaders can affect workplace quality and motivation, ultimately enhancing teacher performance (Gafur, 2020; S. M. Hasibuan & Bahri, 2018; Safitri et al., 2022). However, many schools still face gaps in implementing effective leadership practices and fostering a supportive work environment (Rorimpandey, 2020; Susanto, 2016).

To date, no specific research has examined the effect of these variables on the performance of Economics teachers in high schools in Yogyakarta City. This phenomenon underscores a gap between expectations and reality, warranting further investigation.

As an example, in Yogyakarta City, despite the presence of prestigious high schools with a good reputation, no empirical studies have measured how factors such as principal leadership, work environment, and teachers' motivation affect the performance of Economics teachers in high schools. The researcher collected data using a questionnaire in a preliminary study, distributed via *Google Forms* to 10 Economics teachers in Yogyakarta City. The findings of the preliminary study are revealed in Table 1.

Table 1. Distribution of Instrument Practicality Categories

No	Statement	Yes (%)	No (%)
1	Teachers' perception of their job performance is good	100	0
2	Is there empirical data showing that your performance is good or not?	0	100
3	Do you think the principal's leadership affects your performance as a teacher?	80	20
4	Do you think the work environment affects your performance as a teacher?	90	10

No	Statement	Yes (%)	No (%)
5	Do you think teachers' motivation affects your performance as a teacher?	100	0
6	Do you agree if research is conducted on teacher performance?	90	10
7	In the past 3 years, have you ever been involved as a respondent in a research study with a similar title?	0	100

This study is expected to contribute to bridging the gap in existing research, particularly in clarifying the role of principal leadership as a moderating variable between the work environment, teachers' motivation, and the performance of Economics teachers in high schools in Yogyakarta City. The findings from this research could serve as a foundation for formulating more effective policies aimed at improving the quality of education in Yogyakarta, with a special emphasis on strengthening principal leadership, creating a supportive work environment, and enhancing teacher motivation.

Furthermore, the results of this study are anticipated to provide deeper insights into the factors influencing the performance of Economics teachers, as well as offer practical recommendations for principals, education supervisors, and other relevant stakeholders to enhance teacher performance and the overall quality of education. Therefore, this research is not only significant for the educational sector in Yogyakarta but also holds the potential to contribute valuable perspectives for the broader development of education in Indonesia.

In line with the issues outlined in the background, the author is interested in conducting research titled "Principal leadership as a Moderating Variable in the Effect of Teacher Work Environment and Teacher's Motivation on Economics Teacher's Performance in High Schools in Yogyakarta City." The aim of this study is to examine the effect of principal leadership as a moderating variable in the relationship between the teacher work environment, teachers' motivation, and Teacher Performance in high schools in Yogyakarta City.

Method

This study uses a quantitative approach within the framework of positivist philosophy, as the data collected are in numerical form and analysed using statistical techniques (Emzir, 2019). The research method employed is a survey, while data analysis is performed using Structural Equation Modelling (SEM) with the Partial Least Squares (PLS) technique. Sugiyono (2019) said that SEM is an analytical approach that integrates factor analysis, structural models, and path analysis, enabling a comprehensive understanding of the relationships between variables. The study involved 63 economics teachers from public and private high schools in Yogyakarta as the research population, selected for their relevance to the research objectives. A purposive sample of 54 teachers was chosen based on criteria such as civil servant status or a minimum of two years of teaching experience, and willingness to participate. Conducted from February to November 2024, the research utilised a structured questionnaire to measure teacher performance, principal leadership, work environment, and teacher motivation, with all procedures adhering to ethical standards, including informed consent and data confidentiality.

The questionnaire employed a four-point Likert scale and was developed based on established theoretical frameworks: teacher performance was assessed across six roles (educator, instructor, counsellor, coach, program developer, and professional), principal leadership through innovation, motivation, and supervision, work environment through physical and psychological conditions, and teacher motivation based on Maslow's hierarchy of needs. Instrument validation and reliability testing were conducted to ensure data accuracy. Data were analyzed using SEM-PLS with SmartPLS 3, integrating factor and path analysis to evaluate the measurement model (convergent

and discriminant validity, composite reliability) and structural model (R-square, hypothesis testing via bootstrapping). This comprehensive methodological framework aimed to ensure valid, reliable, and replicable findings on the factors affecting teacher performance in Yogyakarta high schools.

Finding and Discussion

Findings

Following the data collection and analysis phases, the findings of this study provide a comprehensive examination of the effect of the work environment and teachers' motivation on the performance of economics teachers in public and private high schools in Yogyakarta. These results will be discussed in relation to relevant theoretical frameworks and previous research to offer a more thorough understanding. Additionally, the discussion will address the role of principal leadership as a moderating variable influencing the relationships among the variables under investigation.

1. Work Environment

To measure the dimensions of the work environment, Confirmatory Factor Analysis (CFA) was conducted with two main dimensions: the physical environment and the psychological environment. This analysis aimed to assess the validity and reliability of the work environment indicators using several metrics, including factor loadings, Cronbach's Alpha, Composite Reliability (CR), and Average Variance Extracted (AVE).

Table 2: Results of CFA Work Environment Testing

No	Construct	Cronbach's Alpha	Composite Reliability	AVE
1	Physical	0.971	0.974	0.699
2	Psychological	0.96	0.965	0.716

As shown in Table 2, the CFA results demonstrate that both dimensions of the work environment physical (Cronbach's Alpha 0.971, CR 0.974, AVE 0.699) and psychological (Cronbach's Alpha 0.960, CR 0.965, AVE 0.716)—exhibit strong reliability and validity, indicating that their indicators are valid and reliable for measurement.

2. Teacher's Motivation

Teachers' motivation is measured based on five dimensions of needs, referring to Maslow's hierarchy of needs theory: physiological needs, safety, belongingness, esteem, and self-actualisation. Confirmatory Factor Analysis (CFA) is conducted to identify the significant indicators representing each dimension and to test the validity and reliability of this construct.

Table 3: Results of CFA for Teacher's motivation

No	Construct	Cronbach's Alpha	Composite Reliability	AVE
1	Physiological Needs	0.929	0.942	0.671
2	Safety Needs	0.933	0.945	0.684
3	Social Needs	0.945	0.957	0.79
4	Esteem Needs	0.945	0.957	0.79
5	Self-Actualization Needs	0.916	0.935	0.707

Based on Table 3, the CFA results for teachers' motivation indicate that all dimensions of needs based on Maslow's theory—physiological, safety, social, esteem, and self-actualisation—demonstrate excellent reliability and validity. All dimensions have Cronbach's Alpha and Composite Reliability values exceeding 0.9, and Average Variance Extracted (AVE) values above 0.5, confirming that the indicators are valid and reliable for measuring teachers' motivation.

3. Principal Leadership

The CFA test for the principal leadership variable is conducted to assess the validity and reliability of the three main dimensions: innovator function, motivator, and supervision. The results of the analysis indicate that all the indicators used to measure these dimensions have a significant contribution.

Based on Table 4, the CFA results indicate that the three dimensions of principal leadership—innovator, motivator, and supervisor functions—demonstrate excellent reliability and validity. The innovator function (Cronbach's Alpha 0.926, CR 0.939, AVE 0.630), motivator function (Cronbach's Alpha 0.968, CR 0.971, AVE 0.678), and supervisor function (Cronbach's Alpha 0.933, CR 0.946, AVE 0.714) exhibit high internal consistency and strong construct validity. These indicators are valid and reliable for assessing principal leadership.

Table 4: Results of CFA Testing for Principal Leadership

No	Construct	Cronbach's Alpha	Composite Reliability	AVE
1	Innovator Function	0.926	0.939	0.63
2	Motivator Function	0.968	0.971	0.678
3	Supervision Function	0.933	0.946	0.714

4. Teacher Performance

CFA for the Teacher Performance variable was conducted using the Partial Least Squares (PLS) method to assess the validity and reliability of its dimensions. These dimensions include the teacher's roles as educator, instructor, counsellor, coach, program developer and manager, and professional practitioner. The results indicate that all indicators exhibit significant factor loadings and strong convergent validity, confirming their suitability for measuring teacher performance.

Direct Effects

The results from the Partial Least Squares (PLS) analysis indicate significant effects of the independent variables Work Environment and Teacher's motivation on the dependent variable Teacher Performance, with Principal leadership functioning as a moderating variable. The summary of these findings is presented in Table 5.

Table 5: Direct Effects Analysis

Variable	Original Sample (O)	t-value	p-value
Work Environment (X ₁) → Teacher Performance (Y)	0.409	2.910	0.004
Teacher's motivation (X ₂) → Teacher Performance (Y)	0.243	2.467	0.014

Based on Table 5 above, several research findings are derived and outlined as follows:

1) Effect of Work Environment on Teacher Performance (X₁ → Y)

The Work Environment (X₁) has a positive and significant effect on Teacher Performance (Y), with a path coefficient of 0.409 and a t-statistic value of 2.910 (p = 0.004). This indicates that a better work environment is associated with higher teacher performance.

2) Effect of Teacher's motivation on Teacher Performance (X₂ → Y)

Teacher's motivation (X₂) has a positive and significant effect on Teacher Performance (Y), with a path coefficient of 0.243 and a t-statistic value of 2.467 (p = 0.014). This finding suggests that higher teachers' motivation contributes to improved teacher performance.

The findings show that a positive Work Environment and high teachers' motivation significantly improve Teacher Performance. Additionally, both factors enhance Principal leadership, which further boosts teacher performance. These results highlight the importance of a supportive work environment, motivated teachers, and effective leadership in improving teacher performance.

Principal Leadership as a Moderating Effect

The analysis of the effect of Principal Leadership (M) as a moderating variable in the relationship between Work Environment (X₁) and Teacher's motivation (X₂) on Teacher Performance (Y). Table 6 presents the moderating effects of the variables Principal Leadership on the effect of "Work Environment" (X₁) and "Teacher's

motivation" (X₂) on "Teacher Performance" (Y). Several research findings are derived and outlined as follows

1) *The Effect of Work Environment on Teacher Performance moderated by Principal Leadership*

The work environment shows an effect on teacher performance moderated by principal leadership. Although this effect is close to being significant, with a p-value of 0.656, the p-value being higher than 0.05 indicates that this relationship is not strong enough to be considered significant at a 95% confidence level. This suggests that an improved work environment tends to enhance the effectiveness of principal leadership, which may ultimately contribute to better teacher performance.

2) *The Effect of Teacher's motivation on Teacher Performance moderated by Principal Leadership*

Teachers' motivation also demonstrates an indirect effect on teacher performance through principal leadership. With a p-value of -0.210, this effect is significant at the 95% confidence level. Nonetheless, this result suggests that teachers' motivation can contribute to improved teacher performance through the moderating role of principal leadership, although the effect is relatively weak.

Table 6: Moderating Effects

Variable	Original Sample (O)	t-value	P Values
Work Environment * Principal Leadership → Teacher Performance (X ₁ * M → Y)	0,067	0,445	0,656
Teacher's motivation * Principal Leadership → Teacher Performance (X ₂ * M → Y)	-0,210	2,329	0,020

Overall, the effects moderated by principal leadership demonstrate a positive and negative trend, though some of them are statistically nonsignificant. A favourable work environment and increased teacher motivation may improve teacher performance through effective leadership, although further enhancement is needed to attain statistical significance.

Total Effects through Principal Leadership

The total effects represent the combined direct and indirect effects of the independent variables (Work Environment and Teacher's motivation) on the dependent variable (Teacher Performance), with Principal Leadership serving as a moderating construct. Partial Least Squares (PLS) analysis reveals that the total effects of both independent variables on Teacher Performance are statistically significant. These findings are detailed in Table 7.

Table 7: Total Effects

Variable	Original Sample (O)	t-value	P Values
Work Environment → Teacher Performance	0.528	5.354	0
Teacher's motivation → Teacher Performance	0.346	2.743	0.006

The results highlight that both Work Environment and Teachers' motivation significantly contribute to improving Teacher Performance, underscoring the critical role of these factors in the educational setting.

1) *Total Effect of Work Environment on Teacher Performance*

The Work Environment (X₁) demonstrates a statistically significant total effect on Teacher Performance (Y), with a path coefficient of 0.528 and a t-statistic of 5.354 ($p < 0.000$). This finding confirms that a conducive work environment—spanning physical, social, and psychological aspects—is critical in enhancing teacher performance. These results are consistent with the findings of Smith et al (2022),

who observed that a positive work environment contributes to improved teacher performance by fostering greater well-being and job satisfaction.

2) *Total Effect of Teacher's Motivation on Teacher Performance*

Teacher's motivation (X₂) demonstrates a statistically significant total effect on Teacher Performance (Y), with a path coefficient of 0.346 and a t-statistic of 2.743 ($p < 0.006$). This finding validates the notion that high teachers' motivation drives teachers to perform more effectively and with greater dedication, ultimately enhancing their overall performance. Johnson (2023), support this conclusion, demonstrating that elevated teacher motivation is strongly associated with improved performance through heightened engagement and commitment to their professional responsibilities.

The total effects of Work Environment and Teacher's motivation on Teacher Performance are statistically significant and substantively impactful. These findings highlight the importance of fostering supportive workplace conditions and enhancing motivation as key strategies to improve educational outcomes.

The analysis shows that the Work Environment and Teacher Motivation significantly affect Teacher Performance, with direct effects being stronger than those moderated by Principal Leadership. Improving work conditions and motivation are essential for enhancing teacher performance, while effective leadership further reinforces this effect.

Discussions

The findings of this study demonstrate that a conducive work environment has a positive and significant effect on teacher performance, particularly in terms of teaching effectiveness and support for students. A supportive work environment has been shown to increase teacher job satisfaction and reduce the risk of burnout, motivating teachers to engage more actively in the teaching and learning process. These findings are in line with the research Khan et al (2020), which emphasises that a positive work environment can enhance teacher commitment and participation, thereby contributing to improved educational quality.

The findings of this study demonstrate that intrinsic motivation has a positive and significant effect on teacher performance, enhancing both commitment and teaching quality. These results are consistent with the research Riyadi & Mulyapradana (2017) (Husna, 2018), Riwukore & Habaora (2021) which underscores the importance of motivation in improving teacher performance. However, Amini et al (2022) extend this perspective by suggesting that work discipline also has a significant effect on teacher performance, thus providing a broader understanding of the factors influencing teacher performance.

The findings of this study demonstrate that a supportive work environment can indirectly enhance teacher performance through the effectiveness of principal leadership. This is consistent with Armstrong (2022), who argue that effective principal leadership in managing the work environment can promote teacher productivity and job satisfaction, although this indirect effect is not as strong as the direct effect of principal leadership on teacher performance.

Conclusion

This study emphasises the critical roles of work environment and teacher motivation in enhancing principal leadership and teacher performance. A positive work environment strengthens principal leadership by fostering intrinsic motivation and creating an optimal atmosphere for managing staff, while high teacher motivation supports leadership initiatives, improving teaching quality and student support. Principal leadership also significantly affects teacher performance, though its moderating effect between work environment, motivation, and teacher performance was not statistically significant. The findings highlight the importance of focusing on a supportive work environment, teacher motivation, and strong leadership to improve teacher performance. Future research should explore further the nuances of these

relationships and consider additional factors, such as work discipline, to deepen understanding and refine strategies for educational improvement.

Several suggestions for future research can be made. First, although this study shows that principal leadership moderates the relationship between the work environment and teachers' motivation on teacher performance, the moderating effect was not statistically significant. Future research could explore other factors that might affect this moderation effect, such as individual characteristics of principals or teachers that could strengthen the relationship. Second, it is recommended that future studies investigate additional variables, such as work discipline, which have been shown in some studies to have a significant effect on teacher performance. Additionally, future research could employ a longitudinal design to examine the long-term effects of the work environment and teachers' motivation on teacher performance. Finally, future studies could explore differences between public and private schools or consider cultural factors that may play a role in the dynamics of leadership and teachers' motivation in educational settings.

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