

The Influence of Principal Transformational Leadership and Organizational Culture on Teacher Performance in Deep Learning

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ABSTRACT

Teachers' performance in deep learning at elementary schools still faces various challenges. Factors that may influence this include the principal's leadership and organizational culture. This study aims to analyze the influence of the principal's transformational leadership and organizational culture on teachers' performance in deep learning. The study employed a quantitative approach using an ex post facto design. The study population consisted of public elementary school teachers in Petarukan Subdistrict, Pemalang Regency, with a sample of 117 teachers selected using proportionate random sampling. Data collection was conducted via a Likert-scale questionnaire that had been tested for validity and reliability, and the data were analyzed using simple linear regression and multiple linear regression with the aid of SPSS. The results of the study indicate that the principal's transformational leadership and organizational culture, both individually and simultaneously, have a significant effect on teacher performance in deep learning. Thus, strengthening transformational leadership and a positive organizational culture are important factors in improving teacher performance and the quality of learning in elementary schools

Keywords: Transformational Leadership; School Principals; Organizational Culture; Teacher Performance; Deep Learning

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INTRODUCTION

Education is the most important and fundamental aspect of life for developing high-quality human resources (Sultana et al., 2022). Education can serve as the key to building a developed and high-quality nation (Trinh, 2023). The role of education is growing increasingly significant amid today's rapid technological advancements. Education must be able to address various aspects including academics, skills, and character tailored to the evolving times and technological developments (Ma & Ismail, 2025). This rapid technological advancement also poses a serious challenge for the education sector to adapt to technological transformations within every educational system it operates. Appropriate adaptation and adjustment will produce human resources capable of competing both nationally and internationally. Various other efforts such as curriculum improvements, enhancing teacher competencies, implementing quality educational management, and adapting to technology can be utilized to improve the quality of education. Thus, the primary educational goals related to learning outcomes can be optimally achieved.

The success of learning outcomes in schools is determined by many indicators. Learning outcomes are not limited to mastery of the subject matter but are also related to meaningful and deep learning. Deep learning seeks to shift the paradigm of traditional learning, which often focuses on memorization and repetition of information, toward a more constructive and reflective approach (Ambarita et al., 2025; Suwandi et al., 2024; Syaifulloh,

2026). Deep learning requires teachers not only to master the subject matter but also to possess the skills to create deep and meaningful learning experiences for students (Gao, 2025; Sliwka et al., 2024). Thus, deep learning focuses on deep conceptual understanding and the active engagement of students in the learning process (Jauharah et al., 2025). Deep learning helps accelerate improvements in the quality of education to address the challenges of global development (Yuni et al., 2025).

The success of deep learning implementation is greatly influenced by various factors, one of which is teacher performance in the learning process. Teachers play a highly complex and strategic role in designing lessons, implementing instruction, and evaluating the process (Ideus et al., 2024). This is done to foster deep student understanding, promote critical thinking skills, and connect theoretical concepts to real-life situations. Deep learning will not achieve optimal results if it is carried out solely through conventional methods of presenting material. Deep learning can be achieved when teachers are able to create learning experiences that are active, collaborative, reflective, and meaningful (Andayanie et al., 2025; Taqiyya et al., 2025). Teachers capable of fostering deep learning will employ a variety of innovative teaching methods and learning media tailored to their students' needs. This approach also serves as a barrier against superficial learning that relies solely on rote memorization. Consequently, students are actively and collaboratively engaged in every learning process. Therefore, the quality of a teacher's performance is a key factor in determining the success of implementing deep learning and achieving educational goals focused on the holistic development of students' competencies.

Nevertheless, preliminary observations by researchers in Petarukan, Pematang Regency, indicate that teachers' performance in deep learning still varies. This is due to several factors related to the implementation of teaching and learning activities in schools. Nevertheless, the teaching practices implemented have resulted in more engaging learning experiences that actively involve students through the use of visual aids and active learning activities. This certainly has implications for the quality of learning and is capable of creating an active and collaborative learning process in the school environment. However, the implementation of truly meaningful and deep learning has not been entirely consistent, especially in upper-grade classes, which are still dominated by the lecture method. Lesson planning also tends to be administrative in nature and does not yet fully reflect strategies that foster deep conceptual understanding.

These preliminary findings are consistent with (Nabila & Septiani, 2025), who state that deep learning can be effectively implemented in science education; however, the implementation of deep learning is not without challenges, particularly regarding teachers' pedagogical readiness, resource limitations, and resistance to change. (Dwijantie, 2025) adds that teacher readiness is the primary challenge in implementing deep learning. Many teachers are still accustomed to traditional teaching patterns focused on content delivery and memorization, so they are not yet fully capable of designing reflective, contextual, and student-centered learning experiences. The implementation of deep learning can encourage students to think critically, reflectively, and engage actively in the learning process; however, its effectiveness remains suboptimal as it still depends on teacher readiness (Maulana et al., 2025).

Various factors influence the success of deep learning and teacher performance, one of which is the principal's transformational leadership. The principal's transformational leadership plays a positive role in fostering a work environment that supports professional development, collaboration, and innovation (Heenan et al., 2023). The principal's transformational leadership has been shown to strengthen teachers' work ethic and professional responsibility in conducting classroom instruction (Selfati et al., 2021). When leadership is exercised through an approach that values and builds trust, fostering collaboration among all school community members, teachers tend to demonstrate high loyalty to the institution and are committed to improving the quality of the teaching and learning process (Ruyani et al., 2021).

Furthermore, another factor influencing teacher performance is organizational culture. An organizational culture that is systematically developed and well-managed has a significant

impact on improving teacher performance (Ruyani et al., 2021). This is because such a culture fosters a supportive, comfortable, and trusting work environment. Organizational culture that involves collaboration and partnership with the school community, including committees, parents, and students, still needs to be improved. Thus, it is necessary to strengthen the principal's transformational leadership style and improve the organizational culture so that teacher performance can improve comprehensively. A strong organizational culture within the school environment also serves as a driving force behind the commitment to achieving educational goals (Nassir & Benoliel, 2025; Skaalvik & Skaalvik, 2023). This can also enhance teachers' professionalism in carrying out their duties and responsibilities. The presence of positively developing organizational values encourages teachers to enhance collaboration in the learning process, share best practices and experiences from each learning process, and develop effective and innovative teaching practices. Thus, organizational culture influences teachers' work behavior and contributes directly to improving the quality of learning and achieving educational goals at school (Boudouaia et al., 2024; Wang & Huang, 2025).

Various studies have indicated that school principal leadership and organizational culture both collectively and individually have a significant impact on teacher performance. However, research specifically conducting systematic studies and reviews linking these two variables to teacher performance within the context of deep learning in schools remains limited, and further study is needed. Previous research has focused on examining and analyzing teacher performance in schools in general and has not yet been linked to the current demands of implementing deep learning. Deep learning is currently the main focus of the educational transformation process in Indonesia. In addition, the diversity of schools with their varying characteristics, organizational environments, and leadership styles contributes to variations in teacher performance across schools. Therefore, this study, specifically designed to provide empirical evidence on the influence of the principal's transformational leadership and organizational culture, directly contributes to understanding how these factors impact teacher performance in deep learning. The research findings are expected to provide empirical insights and enrich theoretical discussions, serving as a foundation for policy-making aimed at improving the quality of learning in elementary schools.

Based on the above discussion, this study examines in greater depth the influence of the principal's transformational leadership and organizational culture on teacher performance in deep learning at public elementary schools, specifically in Petarukan Subdistrict, Pemalang Regency. This study is expected to provide an empirical overview and contribute to improving the performance of public elementary school teachers. This study has three objectives, namely (1). To determine the influence of the principal's transformational leadership on teacher performance in deep learning at public elementary schools in Petarukan Subdistrict, (2). To determine the influence of organizational culture on teacher performance in deep learning at public elementary schools in Petarukan Subdistrict, and (3) To determine the simultaneous influence of the principal's transformational leadership and organizational culture on teacher performance in deep learning at public elementary schools in Petarukan Subdistrict.

METHOD

This study employs a quantitative approach using an ex post facto research design. The ex post facto design examines causal relationships that are not manipulated by the researcher; the existence of such relationships is based on theoretical analysis, which posits that a specific variable causes another specific variable (Syahrizal & Jailani, 2023). The quantitative approach was chosen because this study aims to determine the influence between variables that can be measured numerically, namely the influence of the principal's transformational leadership (X_1) and the school's organizational culture (X_2) on teachers' performance in deep learning (Y) at public elementary schools throughout Petarukan Subdistrict. Therefore, this study is relevant in using this approach and type of research to examine how the principal's transformational leadership and organizational culture influence teacher performance in the elementary school setting.

This study was conducted at public elementary schools in Zones I and VII of Petarukan Subdistrict, Pemalang Regency, which consists of a total of 20 public elementary schools. These locations were selected based on the research needs within those school districts. The research period was scheduled to run from February 2026 to March 2026. During this period, research data were collected from each sample used in the study. The sampling technique used in this study was probability sampling with a proportional random sampling method. This sampling method allowed for an even distribution of samples across each school included in the study population. Based on the sampling method used, a total of 116 teachers were selected from public elementary schools throughout Petarukan Subdistrict. The sample size for each school was determined through proportional allocation. Research data was then collected from the sample using a previously developed instrument.

The research instruments used measurement tools for three variables: teacher performance in deep learning, the principal's transformational leadership, and the school's organizational culture. These instruments were developed in the form of Likert scales. Each variable was divided into dimensions aligned with the indicators analyzed in the study. The instruments were previously subjected to validity testing and were found to meet the criteria for validity and reliability, making them suitable for use as measurement tools in this study. Thus, the instruments used can serve as valid measurement tools with high measurement capability, ultimately yielding reliable research data.

Table 1. Instrument Indicators

Variabel	Dimensi	Indikator	Jumlah	No. Soal
Kinerja Guru dalam Pembelajaran Mendalam (Y)	Perencanaan Pembelajaran	Perencanaan tujuan	4	1, 2, 3, 4
		pembelajaran bermakna		
	Pelaksanaan Pembelajaran	Perencanaan aktivitas pembelajaran aktif	3	5, 6, 7
		Perencanaan penilaian pembelajaran mendalam	3	8, 9, 10
		Fasilitasi berpikir kritis dan reflektif	3	11, 12, 13
		Pengelolaan kelas yang mendukung pembelajaran aktif	3	14, 15, 16
		Interaksi bermakna guru dan siswa	4	17, 18, 19, 20
		Penilaian proses belajar	4	21, 22, 23, 24
		Pemanfaatan hasil penilaian	3	25, 26, 27
		Pemberian umpan balik bermakna	3	28, 29, 30
		Pembimbingan dan pendampingan siswa	3	31, 32, 33
		Pelaksanaan tugas tambahan	3	34, 35, 36
		Partisipasi dalam peningkatan kompetensi	4	37, 38, 39, 40
Kepemimpinan Transformasional Kepala Sekolah (X1)	Karisma	Keteladanan dalam pembelajaran	4	1, 2, 3, 4
		Integritas dalam pengambilan keputusan	3	5, 6, 7
		Konsistensi terhadap nilai mutu pembelajaran.	3	8, 9, 10
		Komunikasi visi pembelajaran mendalam	4	11, 12, 13, 14
	Motivasi Inspirasional	Pemberian motivasi kepada	3	15, 16, 17

Variabel	Dimensi	Indikator	Jumlah	No. Soal
Budaya Organisasi (X2)	Stimulasi Intelektual	guru		
		Penumbuhan komitmen terhadap 3 tujuan sekolah	3	18, 19, 20
		Dukungan terhadap inovasi pembelajaran	3	21, 22, 23
		Fasilitasi pengembangan profesional	4	24, 25, 26, 27
	Pertimbangan Individual	Pendampingan akademik	3	28, 29, 30
		Pemahaman kebutuhan pengembangan guru	4	31, 32, 33, 34
		Pendampingan profesional pembelajaran	3	35, 36, 37
		Apresiasi terhadap praktik pembelajaran mendalam	3	38, 39, 40
	Kerja sama	Kerja sama antar guru	4	1, 2, 3, 4
		Diskusi akademik	3	5, 6, 7
		Dukungan tim terhadap pembelajaran	3	8, 9, 10
		Hubungan kerja harmonis	4	11, 12, 13, 14
	Kepedulian	Praktik kolaboratif pembelajaran	3	15, 16, 17
		Komunikasi reflektif dan terbuka	3	18, 19, 20
		Refleksi praktik pembelajaran	3	21, 22, 23
		Perbaikan berkelanjutan	4	24, 25, 26, 27
	Tanggung jawab	Pembelajaran dari pengalaman	3	28, 29, 30
		Keterbukaan terhadap ide baru	3	31, 32, 33
		Dukungan terhadap eksperimen pembelajaran	4	34, 35, 36, 37
		Apresiasi terhadap inovasi	3	38, 39, 40

Table 1 provides a complete breakdown of the research instrument—a questionnaire—used in this study. The Teacher Performance in Deep Learning Questionnaire is divided into four dimensions: lesson planning, lesson delivery, assessment, and the performance of additional tasks. The Principal's Transformational Leadership Questionnaire is divided into four dimensions: charisma, inspirational motivation, intellectual stimulation, and individual consideration. Additionally, the Organizational Culture Questionnaire is also divided into four dimensions: cooperation, care, responsibility, and innovation and appreciation. Each dimension in the respective questionnaires is further subdivided into several indicators. This subdivision is derived from the questions or statements in the questionnaires. Each questionnaire consists of 40 items tailored to the analysis to be conducted in this study.

Research data collection was conducted through structured observation using a questionnaire as the research instrument. The data are presented in the form of written responses from respondents to a series of statements included in the questionnaire. The indicators, which are elaborations of the variables of the principal's transformational leadership (X1), organizational culture (X2), and teacher performance in deep learning (Y), were translated into statements in the questionnaire. Data analysis was conducted using descriptive analysis to provide an overview of the conditions of each variable. Descriptive data analysis was

performed using SPSS version 26. The results of this descriptive analysis were used to describe the level of teacher performance in deep learning, the level of the principal's transformational leadership, and the state of the organizational culture at the school where the research was conducted. Statistical analysis was conducted by performing tests for the assumptions of normality and homogeneity. Hypothesis testing was performed using simple regression analysis to determine the effect of the principal's transformational leadership (X1) on teacher performance in deep learning and to determine the effect of organizational culture (X2) on teacher performance in deep learning. The second analysis was conducted using multiple linear regression to determine the extent of the influence of the principal's transformational leadership (X1) and organizational culture (X2) on teacher performance in deep learning (Y) at public elementary schools in Petarukan Subdistrict, Pemalang Regency. The analysis stages in this study were performed using IBM SPSS software.

RESULTS AND DISCUSSION

Descriptive Statistics

Teacher performance in deep learning

The results of the descriptive statistical analysis provide an overview of the performance of each research variable. These results can provide a general picture of the conditions of the research variables under study. The focus of this analysis lies in explaining the average scores obtained based on the variables under study. First, the average scores obtained for the variable of teacher performance in deep learning have been analyzed and categorized based on the criteria presented in Table 2.

Table 2. Teacher performance in deep learning

Category	Frequency	Percent
Very low	10	8.5
Low	18	15.4
Enough	24	20.5
Good	22	18.8
Very good	43	36.8
Total	117	100.0

The results of the analysis in Table 2 show that teachers' performance in deep learning varies. The highest percentage indicates that teachers' performance in deep learning falls into the "very good" category. This category indicates that teachers demonstrate outstanding and high-quality performance in implementing deep learning. This certainly has a very significant impact in various areas, such as increased teacher professionalism, improved learning quality, and enhanced student understanding at school. Furthermore, the "enough" and "good" categories follow next with similarly high percentages. In this case, teachers have demonstrated good performance in deep learning but still require some improvements for refinement. Additionally, the results of the descriptive analysis also show that only a small proportion of teachers have deep learning performance in the low and very low categories. This certainly warrants special attention and immediate resolution so that teachers' understanding and performance in deep learning can continue to improve, thereby contributing to enhanced educational quality. These results clearly indicate that, overall, teachers' performance falls into the "good" category.

Principal's Transformational Leadership

The results of the analysis of the principal's transformational leadership provide an overview of the data obtained from the questionnaire. The questionnaire data are presented as percentages for each category to illustrate the principal's transformational leadership. The complete results of the descriptive analysis are presented in Table 3.

Table 3. Principal's transformational leadership

Category	Frequency	Percent
Very low	4	3.4
Low	2	1.7
Enough	23	19.7
Good	22	18.8
Very good	66	56.4
Total	117	100.0

Table 3 shows a trend similar to previous findings. Based on the analysis of the distributed questionnaire data, the majority of respondents stated that the principal's transformational leadership falls into the "very good" category. The percentage in this category was the highest at 56.4%. This is further supported by the percentages for "good" and "fair," indicating that the principal's transformational leadership is functioning effectively within the school. Nevertheless, the "low" and "very low" categories in the analysis were also reported to have relatively low frequencies. These results clearly demonstrate that principals generally possess the ability to lead their institutions in a transformational manner.

Organizational Culture

Organizational culture refers to teachers' abilities and practices in instilling organizational values to implement deep learning. These abilities emphasize and require a comprehensive, structured, holistic, and student-centered understanding. Organizational culture has a direct influence on efforts to instill organizational values and is a crucial component of organizational success. The analysis was conducted by grouping responses into categories and mapping them against specific criteria. The results of the organizational culture questionnaire analysis are presented in Table 4.

Table 4. Organizational culture

Category	Frequency	Percent
Very low	4	3.4
Low	25	21.4
Enough	18	15.4
Good	30	25.6
Very good	40	34.2
Total	117	100.0

The analysis results indicate that teachers possess a strong organizational culture. The research data show that the highest percentage of students falls into the "good" and "very good" categories. These two categories account for more than 50% of all respondents. Nevertheless, the research results in Table 4 also indicate that the percentage of teachers with an organizational culture in the "low" category remains quite high. These two categories account for nearly 25% of all respondents who participated in this study. These findings certainly indicate that teachers' conditions are diverse and heterogeneous. Thus, the organizational culture among teachers indicates a need for further improvement to maximize outcomes and optimize a strong organizational culture among teachers.

Furthermore, these findings clearly indicate that while a positive organizational culture has taken root among teachers, there are still significant differences and diversity in the values, norms, and organizational practices implemented within each teacher's school environment. These differences can certainly have a direct impact on the level of commitment, collaboration, and effectiveness in completing every task and responsibility assigned within the organization. Therefore, the principal, as the highest leader in the school environment, needs to implement effective and sustainable strategies and methods to strengthen the organizational culture. Strengthening organizational culture can be achieved by applying effective leadership values,

fostering teachers' professionalism, implementing various collaborative activities, and reinforcing values related to unity within the organization. These efforts must be carried out consistently, prioritizing initiatives to enhance teacher performance so that a conducive learning environment and high-quality learning outcomes are achieved.

3.2 Hypothesis Analysis

The hypothesis testing analysis began with an assessment of the prerequisites for analysis. The results of the normality test indicated that the research data were normally distributed. The linearity test showed that the variables of the principal's transformational leadership (X1) and organizational culture (X2) had a linear relationship with teacher performance in deep learning (Y). The multicollinearity test showed that there was no multicollinearity. Additionally, the heteroscedasticity test indicated that both variables were not heteroscedastic. Thus, the research data analysis could be conducted using regression analysis.

Simple Linear Regression Test

The Principal's Transformational Leadership (X1) on Teacher Performance in Deep Learning (Y)

Linear regression analysis was conducted to examine the effect of independent variables on the dependent variable in this study. The results of the simple linear regression analysis of the independent variable "Principal's Transformational Leadership" (X1) on the dependent variable "Teacher Performance in Deep Learning" (Y) are explained based on the significance values obtained from the analysis. The analysis results were obtained after data processing using IBM SPSS. The complete results of the analysis are described and detailed in Figure 1.

Correlations

		Kinerja Guru dalam Pembelajaran Mendalam (Y)	Kepemimpinan Transformasional Kepala Sekolah (X1)
Kinerja Guru dalam Pembelajaran Mendalam (Y)	Pearson Correlation	1	.755**
	Sig. (2-tailed)		.000
	N	117	117
Kepemimpinan Transformasional Kepala Sekolah (X1)	Pearson Correlation	.755**	1
	Sig. (2-tailed)	.000	
	N	117	117

** . Correlation is significant at the 0.01 level (2-tailed).

Figure 1. Correlation analysis results between the Principal's Transformational Leadership (X1) and teacher performance in deep learning (Y)

The results of the analysis using Pearson's correlation method, as shown in Table 2, indicate that the correlation coefficient between the transformational leadership of the school principal variable (X1) and teacher performance in deep learning (Y) is strong, with a score of 0.755. This result is also supported by a significance value (Sig., 2-tailed) of 0.000. This value is less than 0.05, indicating a significant effect of the analyzed variable. These results also suggest a strong relationship between the two variables, which is statistically significant. Furthermore, the correlation coefficient of 0.755 indicates a strong correlation with a positive direction of the relationship. The implications of these research findings suggest that as the transformational leadership of the school principal within the school environment becomes more widespread and effective, teachers' performance in implementing deep learning will also show an upward trend. Conversely, insufficient implementation of transformational leadership by the school principal within the school environment leads to suboptimal teacher performance and may even result in a decline in teachers' performance.

The results of this study clearly reveal that transformational leadership of the school principal is one of the key factors that directly influences improvements in teacher performance

at schools. Teachers are able to create active, collaborative, and meaningful learning experiences, thereby fostering a deep and well-rooted understanding. Teachers are also able to facilitate learning oriented toward students' deep understanding through innovative instructional models and methods. Thus, strengthening transformational leadership of the school principal must be a priority for schools to support the optimization of teacher performance in deep learning. Strong transformational leadership of the school principal will foster optimal teacher performance by addressing every component of the learning process in order to improve the quality of learning in schools.

The Organizational Culture Variable (X2) and Teacher Performance in Deep Learning (Y)

The cultural variable, as an independent variable, was tested for its relationship with the dependent variable, namely Teacher Performance in Deep Learning (Y), in Petarukan Subdistrict. This test was conducted using correlation analysis with the IBM SPSS 27 software. The results of the analysis provide an overview of whether cultural variables are related to teacher performance in deep learning. The complete results of the correlation test are presented in Figure 2.

Correlations			
		Kinerja Guru dalam Pembelajaran Mendalam (Y)	Budaya Organisasi (X2)
Kinerja Guru dalam Pembelajaran Mendalam (Y)	Pearson Correlation	1	.841**
	Sig. (2-tailed)		.000
	N	117	117
Budaya Organisasi (X2)	Pearson Correlation	.841**	1
	Sig. (2-tailed)	.000	
	N	117	117
**. Correlation is significant at the 0.01 level (2-tailed).			

Figure 2. Correlation analysis results between the organizational culture variable (X2) and teacher performance in deep learning (Y)

The results of the analysis using Pearson's correlation method, as shown in Table 2, indicate that the correlation coefficient between the organizational culture variable (X2) and teacher performance in deep learning (Y) is very strong, with a score of 0.841. This result is also supported by a significance value (Sig., 2-tailed) of 0.000. This value is less than 0.05, indicating a significant effect of the analyzed variable. These results also suggest a strong relationship between the two variables, which is statistically significant. Furthermore, the correlation coefficient of 0.841 indicates a very strong correlation with a positive direction of the relationship. The implications of these research findings suggest that as the organizational culture within the school environment becomes more widespread and diverse, teachers' performance in implementing deep learning will also show an upward trend. Conversely, insufficient development of organizational culture within the school environment leads to suboptimal teacher performance and may even result in a decline in teachers' performance.

The results of this study clearly reveal that organizational culture is one of the key factors that directly influences improvements in teacher performance at schools. Teachers are able to create active, collaborative, and meaningful learning experiences, thereby fostering a deep and well-rooted understanding. Teachers are also able to facilitate learning oriented toward students' deep understanding through innovative instructional models and methods. Thus, strengthening a positive organizational culture must be a priority for schools to support

the optimization of teacher performance in deep learning. A strong organizational culture will foster optimal teacher performance by addressing every component of the learning process in order to improve the quality of learning in schools.

Multiple Linear Regression Test

The multiple linear regression test was used to analyze the relationship between the independent variables of the Principal's Transformational Leadership (X1) and Organizational Culture (X2) on Teacher Performance in Deep Learning (Y) simultaneously and in conjunction. The results of the analysis are presented in Figure 3.

Coefficients^a

		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
Model		B	Std. Error	Beta		
1	(Constant)	30.302	8.725		3.473	.001
	Kepemimpinan Transformasional Kepala Sekolah (X1)	.210	.075	.229	2.804	.006
	Budaya Organisasi (X2)	.618	.077	.658	8.063	.000

a. Dependent Variable: Kinerja Guru dalam Pembelajaran Mendalam (Y)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.852 ^a	.727	.722	7.829

a. Predictors: (Constant), Budaya Organisasi (X2), Kepemimpinan Transformasional Kepala Sekolah (X1)

Figure 3. Results of the multiple linear regression analysis, showing the multiple correlation coefficient

Figure 3 shows the results of a multiple linear regression analysis examining the simultaneous effects of the Principal's Transformational Leadership (X1) and Organizational Culture (X2) on Teacher Performance in Deep Learning (Y). The results of the analysis conducted using IBM SPSS 27 show that the multiple correlation coefficient (R) was 0.852. This result indicates that the principal's transformational leadership and organizational culture simultaneously demonstrate a very strong relationship in supporting teacher performance in deep learning. The test results also showed a coefficient of determination (R-squared) of 0.727. This result indicates that 72.7% of the variation in teacher performance in deep learning can be clearly explained by the two independent variables: the principal's transformational leadership and organizational culture. Apart from this percentage, 27.3% of the variation in teacher performance is influenced by various other factors outside the scope of the variables under study. The test results also show a regression coefficient of 0.210 with a significance level of 0.006 (<0.05). The test results for the organizational culture variable yielded a regression coefficient of 0.618 with a significance level of 0.000 (<0.05). Overall, these results clearly show that the two variables the Principal's Transformational Leadership (X1) and Organizational Culture have a positive and significant effect on teacher performance in deep learning.

The findings of this study certainly also indicate that improving the quality of transformational leadership among school principals and strengthening the school's organizational culture have a direct impact on enhancing teacher performance in implementing deep learning at the school level. As leaders within their schools, principals must provide clarity regarding vision, motivation, inspiration, and positive examples, as well as offer support to enhance teachers' professionalism. These various efforts will certainly facilitate and help create a conducive work environment that directly influences the improvement of learning

quality. On the other hand, a strong, positive organizational culture that supports collaboration has been shown to have a greater influence than the principal's transformational leadership, as indicated by higher regression coefficients and beta coefficients. These findings indicate that the successful implementation of deep learning is not only determined by individual teachers' abilities but is also significantly influenced by the conditions of the school's organizational environment—one that fosters innovation, cooperation, and the commitment of the entire school community to improving the quality of learning.

Discussion

The research findings indicate that the variables of the Principal's Transformational Leadership (X1) and Organizational Culture (X2) have a significant effect on Teacher Performance in Deep Learning (Y). This is evidenced by a simple linear regression test, which shows that each independent variable influences the dependent variable. The test results are further supported by a multiple linear regression analysis, which indicates that both independent variables collectively influence the dependent variable. These findings clearly suggest that both independent variables can serve as predictors of the dependent variable. Thus, efforts to improve the quality of principals' transformational leadership, coupled with strong support from a positive organizational culture within the school environment, have great potential to enhance teacher performance. Teachers are well-equipped and qualified to design and implement deep learning in schools. Furthermore, the synergy between the two variables the Principal's Transformational Leadership (X1) and Organizational Culture (X2) is a crucial aspect that schools must consider in their efforts to improve the quality of the learning process and achieve educational goals.

This study confirms that the principal's transformational leadership (X1) can serve as a determining variable for teacher performance in deep learning (Y). This aligns with previous research (Lase et al., 2024; Mizanna et al., 2021) indicating that the principal's leadership directly influences improvements in the quality of instruction delivered by teachers. Other studies also add that transformational leadership is capable of creating a collaborative learning environment that aligns with the concept of deep learning (Bendriyanti et al., 2025; Mu'imamah & Setiadi, 2026). Transformational leadership can also enhance teachers' motivation and professionalism (El Achi et al., 2025). Thus, our research findings provide similar insights that reinforce previous studies on the influence of principals' transformational leadership on teachers' performance in deep learning.

Another finding is that Organizational Culture (X2) also has a significant influence on Teacher Performance in Deep Learning (Y). This finding aligns with previous research indicating that organizational culture shapes work habits, responsibility, motivation, satisfaction, and inter-member relationships, all of which directly influence teacher performance (Ahmad & Emanuel, 2021; Syaputra & Santosa, 2022). This is because organizational culture serves as a key determinant of teacher professionalism (Ariani et al., 2024). Undoubtedly, habits and organizational culture will impact teachers' performance outcomes (Wahyuni et al., 2026). Thus, the findings of this study provide similar insights and offer new confirmation of previous research.

The implications of these research findings are that the new information obtained regarding the study's independent variables influences the dependent variable. School principals can use these findings to improve the implementation of a transformational leadership culture in their respective schools. Principals can also conduct further studies on existing leadership programs to evaluate and enhance teachers' performance in implementing deep learning. Teachers can also use these findings to enhance their competencies and professionalism through various activities and participation in professional organizations. Through these organizations, members can share teaching experiences among themselves, fostering communication aimed at improving the learning process.

This study makes a direct and tangible contribution, both theoretically and practically, to the overall development of education. Theoretically, this study contributes to the development of theory and research in the field of educational management. The theoretical review in this

study also directly contributes to the theories of transformational leadership and organizational culture in schools. Information regarding teacher competencies and teacher performance in implementing deep learning also constitutes a theoretical benefit gained from this study. The findings obtained in this study can further expand and enrich the body of evidence based on empirical research that analyzes the influence of various independent variables related to the dependent variable. These findings can be used by the general public particularly for future research as a reference in the process of designing and developing conceptual models as well as conducting follow-up studies. Future research could focus on understanding the factors that influence teacher performance. Additionally, the results of this study can strengthen the theoretical foundation regarding the importance of leadership and teacher professional development in improving the quality of the learning process in schools.

In addition to its theoretical benefits, this study also offers practical contributions and benefits that can be utilized in the implementation of deep learning in educational institutions. In practical terms, this study can serve as a reference and guide for improvement that school principals can use to optimize the application of transformational leadership and create a school culture that supports improved teacher performance. The findings of this study can also serve as a foundation for designing instruction, evaluating the learning process, and developing various transformational leadership programs and professional development initiatives aimed at enhancing teachers' ability to implement deep learning. For teachers, the results of this study can serve as a guide for continuously improving their competencies and professionalism through self-development activities, training, and active participation in professional organizations. Students can also utilize the findings of this study to increase their participation in learning activities implemented in relation to deep learning. Through interaction and the exchange of experiences within professional organizations, teachers can broaden their perspectives, strengthen collaboration, and improve the quality of the learning process so that educational goals can be achieved more effectively.

Although the research findings provide information consistent with the objectives, the study's implementation still encountered unavoidable challenges. First, this study was conducted only among public elementary school teachers in Petarukan Subdistrict, Pematang Rejang Regency, which may limit the generalizability of the results to other regions, educational levels, or school contexts. Second, this study employed an *ex post facto* quantitative design using self-reported questionnaire data; thus, the findings depend on respondents' perceptions and are potentially subject to response bias. Third, this study examined only two independent variables the principal's transformational leadership and organizational culture while other factors that might influence teacher performance in deep learning were not included in the analysis. As indicated by the coefficient of determination, some of the variance in teacher performance remains unexplained by the variables examined in this study.

Future research is recommended to involve a larger and more diverse sample from various geographic regions and educational settings to enhance the generalizability of the findings. Researchers may also use mixed-methods or qualitative approaches, such as interviews, observations, and document analysis, to gain a deeper understanding of how transformational leadership and organizational culture influence teacher performance in deep learning. In addition, future studies should consider including additional variables, such as teacher motivation, pedagogical competence, professional development, job satisfaction, school climate, and instructional supervision, to develop a more comprehensive model of the factors that influence teacher performance in deep learning. Longitudinal studies are also needed to examine the consistency and long-term impact of these factors on the implementation of deep learning in schools.

CONCLUSION

The study's findings indicate that the principal's transformational leadership and organizational culture have a significant influence on teacher performance in deep learning at public elementary schools in Petarukan Subdistrict. The principal's transformational leadership was found to have a positive impact on improving teacher performance, particularly in

encouraging teachers to implement more reflective, innovative, and student-centered instruction. Furthermore, an organizational culture characterized by cooperation, open communication, accountability, and support for learning innovations also makes a significant contribution to improving teacher performance. Simultaneously, the principal's transformational leadership and organizational culture have a significant influence in predicting teacher performance in deep learning; thus, both are critical factors that need to be strengthened to enhance the quality of the learning process in elementary schools.

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