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The Influence of a Principal's Transformational Leadership Style on Teacher Performance in the Digital Era: A Case Study

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ABSTRACT

Transformational leadership is believed to enhance motivation and performance; however, it is essential to evaluate the efficacy of the high school principal's leadership style in motivating teachers, particularly in the integration of technology and the resolution of digital learning challenges. This study analyzes and empirically tests the principal's transformational leadership style on teacher performance at High School 2 Takalar, especially in the digital age when technology adaptation and learning innovation are crucial. This study uses a quantitative approach with an associative explanatory survey design. The total number of teachers at High School 2 Takalar is 78, with 21 men and 57 women. The research sample was determined using the Slovin Formula with a tolerance level of error of 10% (e = 0.10), resulting in a minimum of 44 respondents. Data was collected through a closed questionnaire and analyzed using simple linear regression statistical techniques. The study found a positive and significant relationship between principal transformational leadership and teacher performance. Teacher performance in technology adaptation, learning innovation, and main task implementation improved significantly with increased transformational leadership dimensions like idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration. This research endorses the transformational leadership model within the context of 21st-century education characterized by digital predominance. This case study offers practical advice for High School 2 Takalar's principal and other educators on how to use transformational leadership to boost teacher professionalism and performance in the digital age.

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1. INTRODUCTION

Indonesian national education is currently in the midst of the Industrial Revolution 4.0 and the Digital Era (Akrim, 2022; Marzuki & Samsuri, 2022). Indonesian national education is currently in the context of the Industrial Revolution 4.0 and the Digital Era,

which are driving significant changes in teaching and learning methods (Fitrianti & Annur, 2024; Triantoro et al., 2025). With the rapid development of technology, education must adapt to new methods that integrate information technology into every aspect of learning. In this regard, the ability of schools, especially teachers, to adapt and innovate is crucial for the quality and competitiveness of graduates. Therefore, principals must not only perform managerial duties but also possess transformational and inspirational leadership to ensure schools can face the challenges of this fast-paced era (Day et al., 2016; Flores et al., 2025; Mincu et al., 2024). The quality of leadership at the school level significantly influences the creation of an environment that supports teachers' professional development and their readiness to face the digitalization of learning (Rasdiana et al., 2024; Timotheou et al., 2023).

The focus of this research is the transformational leadership style, which is believed to be the most appropriate for encouraging innovation and adaptation in schools (Yuda et al., 2023). This leadership style focuses on the principal's efforts to raise teachers' awareness of the importance of school values, encourage them to prioritize the school's interests over their own, and promote a long-term vision that provides direction. Transformational leadership is formed through four main dimensions: idealized influence, inspirational motivation, intellectual stimulation, and individual consideration (Khan et al., 2022; Rodriguez et al., 2017). All of these dimensions are crucial in motivating teachers to step out of their comfort zones and adopt more innovative teaching methods, particularly in the use of technology (Hai et al., 2022). Principals with a transformational leadership style will inspire teachers to view digital challenges as opportunities for growth (Ruloff & Petko, 2025; Yakob et al., 2025).

The primary variable in this study is transformational leadership style (TLS), which is theorized to increase teacher commitment to school goals. Previous research has shown that transformational leadership has a positive impact on creating a supportive work environment focused on continuous quality improvement (Andersen et al., 2018; Labrague, 2024; Ystaas et al., 2023). When principals demonstrate optimism and confidence, teachers tend to respond with greater enthusiasm to new initiatives, including the implementation of ICT in teaching (Kołodziejczyk, 2025). Therefore, the TLS variable will be measured based on teachers' perceptions of the extent to which their principals implement these transformational practices.

As a dependent variable, Teacher Performance in the Digital Age (TPDA) needs to be understood in a broader context. Teacher performance is not solely related to completing administrative tasks but rather to teachers' ability to integrate ICT into every aspect of their learning (Ali & Susilawati, 2025). Some indicators of teacher performance in the Digital Age include the ability to design lessons using a Learning Management System (LMS), operate digital devices in interactive teaching, and use ICT-based assessment tools and interpret the results. Outstanding teacher performance in these areas is crucial for producing graduates with high digital literacy and preparedness for global competition (Damanik & Widodo, 2024; Falloon, 2020).

The phenomenon that prompted this research is the gap between government policies on integrating ICT in education and existing implementation capabilities in the field.

Although schools may have technological facilities, many teachers are reluctant or unskilled in utilizing these technologies to their full potential, resulting in suboptimal digital outcomes (Ahmed, 2024; Darmawan et al., 2025; Hulu, 2023). This gap indicates that in addition to facilities, support from internal factors, particularly the principal's leadership, is essential to ensuring that teachers are able to utilize technology effectively (Esisuarni et al., 2024; Karakose et al., 2021; Tołwińska, 2021). At High School 2 Takalar, the principal needs to ensure that the leadership style he implements is able to encourage teachers to achieve high digital performance standards.

Theoretically, the influence of transformational leadership on teacher performance has been proven strong, but its implementation in individual schools is often uneven (Saifullah et al., 2024; Variani et al., 2024; Wijaya et al., 2025). Research by Wulaningrum et al. (2025) shows that principal management plays a significant role in determining teacher performance, reinforcing the importance of active leadership. Research by Pardosi and Utari (2022) shows that a transformational leadership style plays a significant role in improving the quality of education, particularly through the adoption of technology in schools. Furthermore, Hudson (2025) states that developing good leadership requires a collective approach involving all parties, and this has been shown to have a positive impact on teacher professional development.

However, there are differences in focus in the existing literature. For example, research by Abbasi et al. (2025) emphasizes transactional leadership and the sustainability of change, while this study deliberately chooses a transformational style, which focuses more on innovation. Studies such as Shen and Wu (2024); Li and Liu (2022) have also examined the relationship between leadership and student outcomes or gender, but none have examined the effect of transformational leadership on teacher performance, focusing more on ICT integration. This gap highlights the need for more specific research.

This research addresses the existing research gap: the lack of quantitative research directly examining the causal relationship between a principal's transformational leadership style and teacher performance, as measured by ICT indicators, in the context of the digital age. While most previous research has been correlational or qualitative, this study uses a simple linear regression approach to provide stronger evidence. Using primary data from High School 2 Takalar, this study aims to provide a deeper understanding of the effectiveness of leadership styles in encouraging digital adaptation in secondary schools.

The primary objective of this study is to empirically test and prove the influence of the principal's transformational leadership style on teacher performance in the digital age at High School 2 Takalar. Specifically, this study aims to (1) describe the levels of TLS and TPDA, (2) analyze and prove the significant influence of TLS on TPDA, and (3) measure the extent of TLS's contribution to TPDA.

2. METHOD

This study used a quantitative approach with an associative explanatory survey design to analyze the causal relationship between transformational leadership style (X)

as a predictor of teacher performance in the digital age (Y). Data was collected cross-sectionally, at a specific point in time, at High School 2 Takalar. This location was selected based on the urgency of digital adaptation required at the school. Data collection took place in August 2025. The population in this study was all 78 teachers at High School 2 Takalar, consisting of 21 males and 57 females. The research sample was determined using the Slovin Formula with a 10% tolerance for error (e=0.10), resulting in a minimum of 44 respondents. Respondents were selected using a simple random sampling technique. The following shows an associative explanatory survey design flowchart in Figure 1.

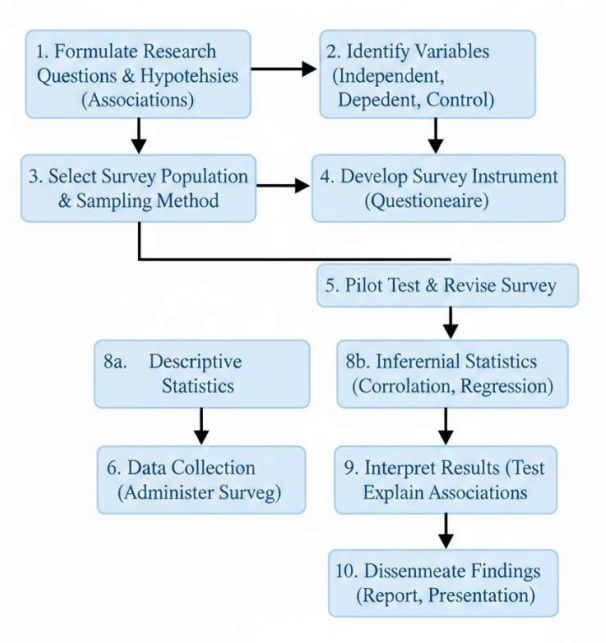

Figure 1. Associative Explanatory Survey Design Flowchart

Both variables in this study were measured using a 5-point Likert scale questionnaire. The Transformational Leadership Style (X) instrument was adapted from Bass and Avolio (Ahmad & Saad, 2020) through the Multifactor Leadership Questionnaire (MLQ), which measures four main dimensions: idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration. Meanwhile, the Teacher Performance in the Digital Age (Y) instrument was modified from the Teacher Competency Standards, focusing on four ICT domains: planning, implementation, evaluation, and digital self-development. Data collection was conducted online using a Google Form distributed to 44 teacher respondents.

The quality of the instruments used in this study was tested through validity and reliability tests. For validity, the Gregory Content Validity Index was used, involving two experts (Retnawati, 2016). The results showed that all items on the instrument obtained an average score of 0.85, exceeding the minimum validity threshold of ≥0.60, thus declaring the instrument valid. For reliability testing, Cronbach's Alpha was used, yielding a value of 0.912 for variable X (transformational leadership style) and 0.905 for variable Y (teacher performance in the digital age). These values exceed the

minimum required threshold of ≥0.75, indicating that the instrument used has high and consistent reliability.

Data analysis was conducted in two stages. The first stage was a test of analysis requirements (classical assumptions), which included a normality test and a linearity test. The second stage was a simple linear regression analysis with model Y = a + bX + e, which was used to test the research hypothesis. Hypothesis testing was conducted using a t-test to determine the significance of the effect (with $\alpha = 0.05$) and a Coefficient of Determination (R^2) to measure the percentage contribution of variable X to Y.

3. RESULTS AND DISCUSSION

Results

Descriptive Analysis of Variable X (transformational leadership style)

The findings of this analysis present central values, such as the mean, median, mode, and standard deviation, which describe the overall distribution of the data. To provide a clearer understanding of the level of implementation of the Transformational Leadership Style (TLS), the raw scores obtained were then grouped into categories based on a predetermined ideal score range.

Table 1. Descriptive Statistics of Transformational Leadership Style (X)

Statistics	Results
Minimum Value	48
Maximum Value	79
Mean	64.50
Median	65.00
Mode	67
Standard Deviation (SD)	5.80

Table 2. Categorization of Transformational Leadership Style Levels (X)

Interpretation Category	Score Range	Frequency (f)	Percentage (%)
Very High	68 – 80	11	25.0%
High	56 – 67	28	63.6%
Medium	44 – 55	5	11.4%
Low	32 – 43	0	0.0%
Very Low	16 – 31	0	0.0%

The analysis results indicate that teachers' Transformational Leadership Style (TLS) scores range from 48 to 79. The mean TLS score was 64.50, with a mode score of 67, indicating that most scores tended to fall within this range. This finding is further clarified by the fact that 63.6% of respondents rated their principal's TLS as high, and 25.0% rated their principal's TLS as very high. These high scores indicate that teachers at High School 2 Takalar have a very positive and consistent view of their principal's leadership, which is inspiring, provides intellectual encouragement, and serves as a role model in the application of technology. The low standard deviation (5.80) also confirms a high degree of consensus among respondents regarding the principal's leadership style.

Descriptive analysis of variable Y (teacher performance in the digital era)

Table 3 summarizes the findings of this analysis, which include summary statistics of the central value and data distribution. Then, to visualize the level of performance achievement qualitatively, these scores were converted into interpretive categories, which are detailed in Table 4.

Table 3. Descriptive Statistics of Teacher Performance in the Digital Era (Y)

Statistics	Results
Minimum Value	50
Maximum Value	80
Mean	66.15
Median	66.50
Mode	68
Standard Deviation (SD)	5.35

Table 4. Categorization of Teacher Performance Levels in the Digital Era (Y)

Interpretation Category	Score Range	Frequency (f)	Percentage (%)
Very High	68 – 80	15	34.1%
High	56 – 67	25	56.8%
Medium	44 – 55	4	9.1%
Low	32 – 43	0	0.0%
Very Low	16 – 31	0	0.0%

The Teacher Performance Analysis in the Digital Era showed an average score of 66.15, slightly higher than that of the Transformational Leadership Style (TLS). The maximum recorded score was 80, indicating the highest achievement. The data distribution shows that 56.8% of teachers fall into the High category and 34.1% fall into the Very High category, reflecting that the majority of teachers at High School 2 Takalar have demonstrated exceptional adaptability and innovation in the use of ICT in planning, implementing, and evaluating learning. The low standard deviation (5.35) indicates high consistency in digital performance achievement among teachers, indicating that digital performance demands have been met equally by all teachers.

Inferential Analysis: Simple Linear Regression

Before conducting the simple linear regression analysis, it is necessary to test the classical assumptions to ensure the regression model used is the best (Best Linear Unbiased Estimator). The classical assumption tests conducted in this study include the Normality Test and the Linearity Test.

1. Normality Test

The normality test aims to determine whether the residual data (the difference between observed Y and predicted Y) is normally distributed. In this study, the non-parametric Kolmogorov-Smirnov test was used.

Table 5. Results of the Kolmogorov-Smirnov Normality Test

Variable	Kolmogorov-Smirnov Statistics	Sig. (p-value)	Information
Unstandardized Residual	0.852	0.467	Normal

The results of the Kolmogorov-Smirnov Normality Test on the residual data showed a significance value (Asymp. Sig.) of 0.467. Since the p-value of 0.467 is greater than the established significance level (α=0.05), it can be concluded that the residual data are normally distributed. The assumption of normality has been satisfied, constituting a prerequisite for inferential regression analysis.

2. Linearity Test

The linearity test aims to determine whether the relationship between the independent variable (transformational leadership style, X) and the dependent variable (teacher performance in the digital age, Y) is linear. This test is performed by comparing the Sig. Deviation from Linearity value with α=0.05.

Table 6. Linearity Test Results (Deviation from Linearity)

Variable	F	Sig. (p-value)	Information
TLS against TPDA	1.150	0.321	Linear

The results of the linearity test indicate a significance value (deviation from linearity) of 0.321. Since the p-value of 0.321 is greater than the established significance level (α=0.05), it can be concluded that the relationship between Transformational Leadership Style (X) and Teacher Performance in the Digital Age (Y) is linear. The linearity assumption has been met.

Building upon the results of the classical assumption test analysis, a regression test can be conducted. Simple linear regression analysis aims to test the significant influence of X on Y and determine the magnitude of that influence. The following presents the regression results (Table 7) and the coefficient of determination table (Table 8).

Table 7. Regression Coefficients

Model	Koefisien Regresi (B)	Std. Error	t	Sig. (p)
(Constant)	10.200	4.350	2.345	0.024
Transformational Leadership Style (X)	0.867	0.091	9.527	0.000

Table 8. Coefficient of Determination (R^2)

Model	R (Korelasi)	R Square (R2)	Adjusted R Square	Std. Error of the Estimate
1	0.827	0.684	0.676	3.500

Table 7 shows that the significance value (Sig.) for the TLS variable is 0.000. Because the p-value is much smaller than the established significance level (α=0.05), the hypothesis is accepted. This proves that the principal's transformational leadership

style has a significant effect on teacher performance in the digital era. The regression coefficient of +0.867 indicates that any increase in TLS effectiveness will be followed by an increase in TPDA. The resulting regression equation is Y = 10.200 + 0.867X.

Furthermore, the Coefficient of Determination (R^2) value of 0.684 indicates that 68.4% of the variation in teacher performance in the digital era at High School 2 Takalar can be explained by transformational leadership style. This significant contribution confirms that TLS is a major factor influencing teachers' success in adapting and innovating with technology. The remaining 31.6% of the variation is influenced by other factors not explained in this research model.

Discussion

The descriptive analysis results indicate that the principal's Transformational Leadership Style (TLS) is in the high category, with an average score of 64.50 out of an ideal score of 80. Likewise, Teacher Performance in the Digital Era (TPDA) is recorded in the high category, with an average score of 66.15 out of an ideal score of 80. These findings indicate that principals who adopt a supportive leadership style can encourage teachers to better adapt to the use of technology in learning. In other words, a positive TLS is strongly associated with the level of teacher adaptation to ICT demands.

Regression tests indicate that TLS has a significant effect on TPDA, with a p-value of 0.000. This means that the principal's leadership style plays a significant role in improving teacher performance in adopting technology. The positive regression coefficient (B=0.867) indicates that every increase in the principal's transformational leadership style, such as motivating teachers and being a role model in the use of ICT, directly improves teachers' ability to apply technology in teaching. These results align with the findings of Alzoraiki et al. (2023) and Hai et al. (2022), who revealed that transformational leadership builds teachers' professional commitment, leading to faster adaptation.

The most significant finding in this study is the Coefficient of Determination (R^2) of 0.684, indicating that 68.4% of the variation in teacher performance in the digital age can be explained by transformational leadership style. This suggests that principals significantly influence digital change and adaptation in schools. This predictive power confirms that leadership qualities that inspire and empower teachers are more effective in addressing digital change than simply providing ICT infrastructure (Shen & Wu, 2024; Vermeulen et al., 2017). The remaining 31.6% of the variation may be influenced by other factors, such as teacher intrinsic motivation or peer support, which could be topics for further research.

Specific dimensions of transformational leadership enable TLS to influence TPDA. One of these is intellectual stimulation, which encourages principals to transform teachers from passive users of ICT into active innovators. Principals who promote critical thinking and the exploration of innovative methodologies empower educators to create digital learning resources and utilize online assessment tools (Tołwińska, 2021), which are significant indicators of TPDA (Awaludin & Fatmawati, 2025). Another dimension, idealized influence, indicates that principals who act as ICT role models with

integrity can instill trust and commitment in teachers to adhere to the high standards set by their leaders (Siahaan et al., 2023; Tschannen-Moran & Gareis, 2017).

Theoretically, the results of this study strengthen the existing literature on the importance of TLS in managing change in challenging educational environments, particularly those influenced by technological advancements. This study provides specific empirical evidence and confirms that an empowering leadership style is more effective than a more transactional leadership style (Lee & Ding, 2020; Young et al., 2021). This study also contributes by measuring the direct relationship between TLS and teacher performance, particularly in the context of ICT implementation, a finding that has not been widely explored in previous research.

The practical implications of these findings are clear. To maintain and improve TPDA, the principal of High School 2 Takalar needs to continue prioritizing TLS practices. One highly recommended step is strengthening the Individual Consideration dimension by providing a more personalized ICT coaching system. In this system, teachers who are already competent in ICT can mentor other teachers who are still struggling, ensuring that no teacher is left behind in technology implementation (Muchabaiwa et al., 2024). Effective TLS ensures that teachers feel valued and supported, which in turn increases their confidence in teaching with technology.

Furthermore, sustaining this performance also requires attention to school culture. As Şahin and Bilir (2024) noted, transformational leadership creates an organizational culture that is flexible and open to change. Therefore, principals need to continue maintaining a work environment that supports learning innovation, where mistakes in ICT implementation are viewed as learning opportunities rather than failures.

The findings of this study indicate the substantial impact of TLS on TPDA; however, several limitations must be acknowledged. The 31.6% variation in TPDA unexplained by TLS indicates that other factors, such as organizational commitment or teacher job satisfaction, may influence their performance in using ICT. Therefore, future research is recommended to include these variables in a multiple regression model to provide a more comprehensive picture and suggest more holistic policies.

4. CONCLUSION

The principals' level of implementation of the Transformational Leadership Style (TLS) was in the high category, with an average score of 64.50 out of an ideal score of 80. Similarly, Teacher Performance in the Digital Age (TPDA) was also in the high category, with an average score of 66.15 out of an ideal score of 80. Transformational leadership style was proven to have a significant effect on teacher performance in the digital age, as evidenced by a p-value of 0.000, which is less than 0.05. This indicates that TLS has a very strong influence on improving teacher performance, particularly in terms of adapting to technology and innovation in learning. Transformational leadership style contributed predominantly to the variation in teacher performance in the digital age. The coefficient of determination (R^2) of 0.684 indicates that 68.4% of the variation in TPDA can be explained by TLS. The remaining 31.6% of the variation could be influenced by factors outside this research model.

As a suggestion, principals are advised to continue strengthening the Individual Consideration dimension of TLS. This can be done by initiating personalized and structured ICT mentoring or coaching programs. These programs can involve teachers who are already proficient in technology to guide colleagues who are still struggling so that all teachers are on an equal footing in adopting technology. Principals need to create a school culture that encourages teachers to boldly experiment with digital teaching methods and new technologies. Failures in technology experiments should be viewed as opportunities for learning and growth, not as failures, to ensure innovation continues. Further research could use qualitative approaches, such as in-depth interviews, to delve deeper into how GKT mechanisms (e.g., the principal's ICT coaching) are interpreted and internalized by teachers.

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