



The Effect of Principals' Instructional Leadership and Digital Literacy on Teachers' Performance

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ABSTRACT

This study aims to explore the impact of two factors – principals' instructional leadership and digital literacy – on teachers' effectiveness. A quantitative approach was employed, involving 133 teachers from Vocational High Schools in Padang City. This study utilized three instruments to collect data: the principals' instructional leadership instrument, the digital literacy instrument, and the teachers' performance instrument. The obtained data were then analysed using descriptive and inferential statistics. In addition, digital literacy was proven to have a positive and significant influence on teachers' performance. Multiple linear regression analysis showed that the combination of instructional leadership and digital literacy had a positive but moderate relationship with teachers' performance, with an R value of 0.231 and an R-squared value of 0.219. This indicates that about 21.9% of the variability in teachers' performance can be explained by these two variables. Moreover, the statistical significance of this model is confirmed by a significant F value (1.480) and a Sig. F close to zero (0.000), indicating that the combination of these two variables had a significant effect on teachers' performance, albeit to a moderate degree. To enhance teacher effectiveness in the digital era, both robust instructional leadership and high digital literacy are crucial, highlighting the necessity for a comprehensive educational strategy.

Keywords: Digital Literacy, Instructional Leadership, Teachers' Performance

Introduction

Education plays a central role in building a strong foundation for the progress of a nation. In Indonesia, the education system faces complex and diverse challenges. Although it has experienced significant development in recent decades, a number of issues still need to be addressed to improve the overall quality of education. The key areas of focus include equitable accessibility of education, consistent quality of teaching, and the development of high-quality human resources.

Educational leadership serve as a vital part in directing and influencing the course of the educational system. Effective leadership can be a key driver in improving the overall quality of education. According to transformational theory, an effective leader is able to inspire and motivate subordinates to achieve higher goals (Bojovic and Jovanovic 2020). On the other hand, path-goal theory emphasises the importance of leaders in providing support and direction that is appropriate to individual needs to achieve organisational goals (Bans-Akutey 2021). Good leadership in an educational context includes qualities such as clear vision, the ability to inspire, the courage to take difficult decisions, and the ability to motivate and guide academic and administrative staffs (Hallinger and Murphy 1985).

A school administrator who exhibits exemplary leadership skills prioritises the development of curriculum standards, the assessment of students' progress, and the efficient use of learning time, this reflects a strong instructional leadership (McTighe and Ferrara 2021). The instructional leadership paradigm is a leadership method that can guide students towards greater success (Cansoy & Parlar, 2018; Hardianto et al., 2021). There are five key elements of instructional leadership, comprising: (1) making learning the top priority; (2)

fostering collaboration; (3) evaluating student achievement results; (4) supporting teachers' growth and development; and (5) adapting the curriculum, teaching methods, and assessment approaches as needed (Cansoy & Parlar, 2017; Chen & Guo, 2020).

The quality of teaching is strongly linked to the emphasis placed on instructional leadership. However, this specific leadership style does not inherently provide a conducive atmosphere for good teaching (Bendikson, Robinson, and Hattie 2012).

Prior studies have identified a multitude of instructional leadership strategies that are very likely to lead to significant enhancements in performance. Al-Ghanabousi & Idris, (2010) revealed that instructional leadership has a big impact on performance. The results of their study indicate that the exercise of instructional leadership has a beneficial influence on individual's performance under one's supervision. Furthermore, instructional leadership has both direct and indirect influences on the professional development of teachers (Bendikson et al., 2012; Liu & Hallinger, 2018). The present circumstances might be advantageous for educators, as they enable them to harness their particular expertise and abilities to their maximum capacity (Bendikson et al. 2012). The influence of instructional leadership on learning is unquestionably beneficial. However, according to Nasib Tua Lumban Gaol, (2018), school administrators in Indonesia are failing to meet their responsibilities as educational leaders, resulting in below-average performance by instructors.

The repercussions of school leaders' ineptitude in leadership are not solely confined to educators but also encompass children (Nasib Tua Lumban Gaol 2018). Statistics from the Organisation for Economic Cooperation and Development (OECD) suggest that school administrators have not successfully carried out their duties, resulting in a detrimental influence on teachers' performance. To maintain the quality of education, addressing the issue of digital literacy's influence on enhancing teachers' performance must be a strategic concern (Basri 2008). By utilising digital resources, educators have the ability to enhance the learning experience and make it more engaging. This can be accomplished by implementing an active learning process that improves the effectiveness of teaching methods (Coffin Murray and Pérez 2014).

The influence of the school principal on the school environment, especially on the teaching and teaching staffs, is insignificant (Afifullah Nizary and Hamami 2020; Tjabolo and Herwin 2020). The performance of underperforming teachers is affected by a variety of factors, one of which is undoubtedly the leadership of the school principal (Rosmawati, Ahyani, and Missriani 2020). Teachers performance is invariably influenced by the policies that are implemented by their principals. Survey data has revealed that the leadership policies put in place by school principals are lacking in strength (Fitria 2018).

In the twenty-first century, the field of education is confronted with the task of enhancing learning quality and teacher competency through the implementation of digital media. Therefore, the policies of a principal must align with the current era to ensure success in this endeavour (Misfeldt et al. 2019). The utilisation of digital resources can improve one's digital literacy by expanding their understanding, mindset, and ability to attain knowledge (Martín-Alonso, Sierra, and Blanco 2021; Ogbonnaya, Awoniyi, and Matabane 2020; Widikasih, Widiyana, and Margunayasa 2021). To be a proficient educator, it is crucial to demonstrate proficiency in keeping abreast of technological changes. This can be accomplished by modifying the coursework to integrate the most recent technical advancements (Akyuz 2018; Habibah et al. 2020; (Listiningrum, Wisetsri, and Boussanlegue 2020).

Enhancing digital literacy involves seven essential pillars, which encompass continuing a continuous progression, developing proficiency from novice to expert levels, and establishing a proficient mindset towards technical abilities (Widikasih et al. 2021). A proficient educator demonstrates the capacity to diligently get precise knowledge from reliable sources (Firmawati 2017). Although there are many different digital forms that provide information, some educators still struggle to understand and use them effectively (Kaufman et al. 2020). This specific situation hinders the professional performance of instructors (Narullita, Fitria, and Mulyadi 2022). Several variables affect principals' leadership and instructor's underwhelming performance, including the school's organisational structure, which lacks an adequate division of work. Furthermore, the principals' authoritative leadership style leads to a dearth of work discipline and monitoring, as well as an erosion of trust in school leadership among educators. Trust and direction significantly impact teachers' effectiveness (Choong et al. 2020). In order to provide successful education, instructors must have the capacity to arrange meaningful learning opportunities, which may be maximised through digital literacy (Ogbonnaya et al. 2020). To fully utilize the potential of digital literacy and enhance the efficiency of educators, it is crucial to have excellent principle leadership (Al-Ghanabousi and Idris 2010). Furthermore, Karadag (2020) conducted research that examined the effects of instructional leadership in cross-cultural educational settings. Their findings revealed a positive association between principals' instructional leadership practices and teacher performance in various countries, thus confirming the universal impact of instructional leadership on teacher performance. This study highlights the significance of instructional leadership on a worldwide scale. It shows that successful leadership concepts are applicable across different countries and cultures, enhancing the quality of teaching.

Esteve-Mon, Llopis-Nebot, and Adell-Segura (2020) study emphasizes the progression of digital literacy over the past ten years and the imperative for educators to consistently enhance their digital competencies to remain current with the newest technology advancements. This study highlights the need for ongoing learning and professional development for teachers, enabling them to incorporate efficient digital tools and

resources into their teaching. This demonstrates that digital literacy encompasses more than technical abilities; it also involves the capacity to analyze, adjust, and utilize technology in evolving educational environments.

In addition, Boeve-de Pauw et al. (2022) conducted longitudinal research to investigate the impact of leadership support and the professional environment in schools on the development and long-term effectiveness of teacher performance. Their research indicates that maintaining consistency in high-quality instructional leadership and providing continuing professional support is crucial for improving teacher effectiveness. This research supports the claim that continuous, continuing professional development initiatives are more effective than short-term treatments.

The research conducted by Basma and Savage (2023) comprehensively analyzes how successful professional development impacts teachers' teaching practice. The researchers determined that the most impactful professional development programs are those specifically created to assist instructors in deliberately and thoughtfully using technology in their teaching rather than merely using it as an additional or substitute approach. The study highlights the significance of critical thinking and reflective methods in fostering digital literacy. It emphasizes the need for instructional leadership to assist instructors in their learning journey.

Improving teachers' effectiveness is crucial as it directly impacts the overall functioning of schools (Özgenel 2019). The principals' instructional leadership and digital literacy expertise significantly impact teachers' performance. The authors want to research to examine how a principal's leadership and digital literacy affect teachers' performance. The results of this investigation will serve as a comprehensive strategy for enhancing the leadership abilities of school administrators and providing meaningful feedback to instructors (Dekawati 2020; Fikri et al. 2018).

Methods

The study used both descriptive and quantitative approaches. Descriptive studies aim to provide a comprehensive and precise depiction of facts and features impacting specific groups of people or events (Arya Wiradnyana, Ardiawan, and Km. Agus Budhi A.P. 2020; Lito, Mallillin, and Mallillin 2020).. The study may be classified as descriptive research examining how a principal's leadership style and digital literacy affect teachers' performance (Prasertsith, Kanthawongs, and Limpachote 2016).

The survey included 133 instructors from Padang City Vocational High Schools. The study utilized fundamental instructional leadership techniques in addition to digital literacy and teacher performance imbalance. Each participant was asked to provide specific feedback using research instruments specifically created to record their distinct experiences. After obtaining the data for the study, the author proceeded to appropriately filter it. Subsequently, the researcher conducted a comprehensive study of the data, including both inferential and descriptive statistics, to derive conclusions.

Results and Discussion

Results

The data examination results regarding the elements of principal leadership (X1) and digital talent (X2) on educators' effectiveness are described as follows:

Hypothesis 1: Effect of Instructional Leadership (X1) on Teachers' performance (Y)

Table 1. Results of Simple Linear Regression Analysis: Principals' Instructional Leadership on Teachers' Performance.

Model Summary

Model	R	R-squared	Adjusted squared	R-Std. Deviation	Statistical Change				
					R-squared Change	F Change	df1	df2	Sig. F Change
1	0.279 ^a	0.078	0.071	19.940		11.048	1	131	0.001

a. Predictor: (Constant), Instructional Leadership (X1)

The linear regression analysis presented above displayed a significant finding, albeit with a weak relationship. The correlation coefficient (R) of 0.279 indicates that despite the correlation not being particularly strong, a positive relationship between instructional leadership and teachers' performance was observed. Furthermore, the coefficient of determination (R square) shows that only 7.8% of the variability in teachers' performance can be explained by instructional leadership, reinforced by an adjusted R-squared value of 0.071. This suggests that although instructional leadership contributes to teachers' performance, other factors also play an important role. The standard deviation from the residual was 19.940, illustrating the spread of residual data. Most importantly, an F score of 11.048 with a significance level (Sig. F Change) of 0.001 statistically confirms that Instructional Leadership has a significant influence on teachers' performance. However, given the low percentage of variability described, more research is needed in order to

identify and understand other factors that contribute to teachers' performance in addition to instructional leadership.

Table 2. The significance of the regression analysis results which focused on the impact of principals' instructional leadership on the performance of teachers

Sum of

ANOVA Model	Squares	Df	Mean Square	F	Sig.
1 Regression	4392.555	1	4392.555	11.048	.001 ^b
Residual	52084.152	131	397.589		
Sum	56476.707	132			

a. Dependent Variable: Teachers' Performance (Y)

b. Predictor: (Constant), Instructional Leadership (X₁)

According to Table 3, the significance level observed was 0.001, with a result of 11.048, which is less than 0.05. This suggests that instructional leadership significantly influences teachers' performance. Moreover, Table 4 provides guidance on locating the fundamental regression equation. The impact of learning leadership on teachers' performance was investigated using a simple regression coefficient test. For additional details, Table 4 serves as a valuable resource.

Table 3. Results of Simple Regression Coefficient Analysis of Principals' Instructional Leadership on Teachers' Performance

Teachers' Coefficient

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
1 (Constant)	151.374	13.321		11.363.000			
Instructional Leadership (X ₁)	0.285	0.086	.279	3.324	0.001	1.000	1.000

a. Dependent Variable: Teachers' Performance (Y)

In a linear regression analysis examining the effect of instructional leadership on teachers' performance, it was observed that as instructional leadership improved, there was a significant increase in teachers' performance, as indicated by the instructional leadership coefficient of 0.285 with a standard error of 0.086. This is supported by a t-value of 3.324 and a very high statistical significance (Sig. 0.001), demonstrating that the influence is significant even though its magnitude is not particularly large. The absence of collinearity problems, indicated by tolerance and VIF values both at 1.000 each, adds credence to these findings. These results underscore the importance of instructional leadership as a factor influencing teacher performance. Although the extent of its influence may not be substantial, it remains statistically significant.

Hypothesis 2: The Effect of Digital Literacy (X₂) on Teachers' Performance (Y)

Table 4. The Effects of Digital Literacy on Teachers' Performance: A Simple Linear Regression Analysis Model Summary

Model	R	R-squared	Adjusted R-squared	Std Error of the Estimate	Change Statistics				
					R-squared Change	F Change	df1	df2	Change
1	0.474 ^a	0.225	0.219	18.280	0.225	38.014	1	131	0.000

Predictors: (Constant), Digital Literacy (X₂)

Table 4 presents a linear regression analysis showing a moderate but significant relationship between digital literacy (X₂) and teacher performance (Y), with a correlation coefficient (R) of 0.474 and a coefficient of determination (R-squared) of 0.225. This indicates that around 22.5% of the variability in teachers' performance can be explained by digital literacy. A remarkably high F score, which was 38.014, with a significance level nearly approaching zero (0.000), confirms statistically that digital literacy has a strong enough influence on teachers' performance. These results highlight the importance of digital capabilities in improving performance in the educational sector.

Table 5 Significance Test Results of Digital Literacy Regression on Teachers' Performance

Sum of

ANOVA Model	Squares	df	Mean Square	F	Sig.
1 Regression	12702.415	1	12702.415	38.014	.000 ^b
Residual	43774.292	131	334.155		
Total	56476.707	132			

a. Dependent Variable: Teachers' Performance (Y)

b. Predictor: (Constant), Digital Literacy (X2)

As can be seen in Table 5, ANOVA's analysis regarding the effect of Digital Literacy (X2) on Teachers' Performance (Y) exhibits that Digital Literacy significantly affects teachers' performance. Of the total variability in teachers' performance (56476.707), 12702.415 were explained by Digital Literacy, as indicated by a significant F score (38.014) and a significance level close to zero (0.000). Although most of the variability (43774.292) is not explained by Digital Literacy, these findings emphasize the importance of digital competence in influencing teacher performance.

Table 6. Results of a Simple Regression Coefficient Analysis on Digital Literacy

Teachers' Coefficient

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
1 (Constant)	89.129	17.289		5.155	.000		
Digital Literacy (X2)		621.101		6.166	.000	1.000	1.000

a. Dependent Variable: Teachers' Performance (Y)

The coefficient analysis of regression models evaluating the impact of digital literacy (X2) on teachers' performance (Y) shows that digital literacy significantly enhances teachers' performance. With a constant of 89.129 and a digital literacy coefficient of 0.621, each one-unit increase in digital literacy corresponds to a 0.621-unit increase in teachers' performance, reinforced by a beta value of 0.474. The significance of this relationship is confirmed by a high T value (6.166) and a very low level of significance (0.000). Additionally, tolerance and VIF values of 1.000 each suggest the absence of collinearity problems. These results confirm the importance of digital literacy in improving teachers' performance.

Hypothesis 3: The Effect of the Combination of Instructional Leadership (X1) and Digital Literacy (X2) on Teachers' Performance (Y)

Table 7. The results of multiple linear regression analysis concerning the combination of principal learning leadership and digital literacy on teachers' performance

Model Summary

Model	R	R Square	Adjusted Square	Std. Deviation	Statistical Change				
					R Square Change	F Change	df1	df2	Sig. F
1	.231	.219	.231	1.480	19.491	130.000	2	a	.

Predictor: (Constant), Digital Literacy (X2), Instructional Leadership (X1)

The data presented in Table 7 from the multiple linear regression analysis revealed that the combination of instructional leadership (X1) and digital literacy (X2) had a positive yet moderate relationship with teachers' performance (Y), with an R of 0.231 and an R-squared of 0.219. Approximately 21.9% of the variation in instructors' performance may be accounted for by these two variables. The model's statistical significance is supported by a substantial F value of 1.480 and a Sig. F value near zero (0.000) indicates that both factors considerably influence instructors' performance, although moderately.

Table 9: Multiple linear regression analysis of principle learning leadership and digital literacy characteristics on teacher effectiveness. This investigation shows that these variables affect instructors' performance.

Sum of

ANOVA Model	Squares	df	Mean Square	F	Sig.
1 Regression	13028.464	2	6514.232	19.491.000	b ^{43448.243}
Residual	334.217	130	56476.707		
Total	a	132			

- a. Dependent Variable: Teachers' Performance (Y)
 b. Predictor: (Constant), Digital Literacy (X2), Instructional Leadership (X1)

The information presented in Table 9 shows that the content value obtained was 19.491, with statistical significance at the level of 0.000. Furthermore, the ANOVA analysis for regression models assessing the combined effect of instructional leadership (X1) and digital literacy (X2) on teacher performance (Y) demonstrated a high level of significance. This model explains that 13028.464 of the total variability was observed in teachers' performance (56476.707), with an F value of 19.491 and very low significance (0.000), confirming the significant influence of these two variables. However, there is still a significant amount of variability that the model cannot account for, indicating the existence of additional significant factors.

Table 10. The analysis results of multiple linear regression coefficients regarding principals' learning leadership and the impact of digital literacy on teachers' performance

Coefficient

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Statistical Collinearity	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	84.215	17.992		4.681	0.000		
	Instructional Leadership (X1)	0.087	0.088	0.085	0.988	0.325	0.802	1.246
	Digital Literacy (X2)	0.572	0.112	0.437	5.083	0.000	0.802	1.246

- a. Dependent Variable: Teachers' Performance (Y)

The results of a simple regression analysis are presented in Table 10. In a regression model assessing the effect of instructional leadership (X1) and digital literacy (X2) on teachers' performance, the model constant observed was 84.215 with a very high level of significance ($t = 4.681$, $p = 0.000$). This implies a significant starting point for the prediction of teachers' performance. Meanwhile, the coefficient for instructional leadership stood at 0.087 with a standard error of 0.088 and did not demonstrate statistical significance ($t = 0.988$, $p = 0.325$). This suggests that its effect on teachers' performance was not significant in this model. In contrast, digital literacy (X2) had a higher coefficient of 0.572 with a standard error of 0.112 and was statistically significant ($t = 5.083$, $p = 0.000$), indicating a strong and significant influence on teachers' performance. A beta score for digital literacy of 0.437 confirms a greater relative contribution compared to that of instructional leadership. The collinearity statistics for both variables (Tolerance ~ 0.802 , VIF ~ 1.246) were within acceptable ranges, which means that the model does not have any major multicollinearity problems. These results suggest that digital literacy is a stronger predictor of teachers' performance compared to instructional leadership in the context of this model.

Discussion

This debate seeks to uncover the impact of instructional leadership (X1) and digital literacy (X2) on teachers' performance (Y) by examining three hypotheses that have been tested. This study is grounded in the philosophy of instructional leadership (Hallinger and Murphy 1985) and highlights the significance of digital literacy in the contemporary educational age (Gilster and Glistner 1997). Studies show that instructional leadership significantly, although restricted, influences instructors' efficacy. This discovery aligns with Hallinger and Heck (1998) research, which determined that instructional leadership impacts school performance by enhancing the development of staff members' skills and resources. Leithwood and Jantzi (2000) stated that the low coefficient of determination indicates that several factors impact instructors' effectiveness. Research suggests that leadership traits, work environment, and individual competence are all factors that influence instructors' success.

The results showed a stronger relationship between digital literacy and teacher effectiveness. As to Eshet-Alkalai and Chajut (2010), digital literacy is an essential ability that improves educators' performance. Digital literacy is understanding and effectively using information from digital sources in various formats. Falloon (2020) found a clear relationship between teachers' digital literacy and their effectiveness in teaching.

When considering instructional leadership and digital literacy together, they have a combined effect on instructors' performance, with digital literacy playing a more significant influence. Baporikar (2018) stated that integrating digital capabilities into instructional leadership can improve teacher effectiveness. Colpitts, Smith, and McCurrach (2021) emphasize the importance of the cohesive relationship between leadership and technology in the education sector.

This discussion highlights the importance of the school environment and learning context in promoting instructional leadership and digital literacy. Huang et al. (2021) emphasizes the need to establish a supportive environment that encourages teacher cooperation and knowledge exchange to drive

transformation and creativity in education. This promotes a collaborative and innovative educational setting, which helps instructors develop and improves the integration of digital literacy. Continuous professional development for educators in the context of digital literacy is equally essential. Darling-Hammond, Hyler, and Gardner (2017) show that continuous training and professional development are crucial for improving teachers' skills in digital literacy. The courses should be adaptable to meet the individual needs and particular situations of each person and the educational setting.

Day, Gu, and Sammons (2016) propose that instructional leadership emphasizing learning significantly impacts educational outcomes. Principals and educational leaders who actively participate in the learning process and curriculum development can significantly impact the effectiveness of teachers' instruction. When integrating digital literacy into education, it is essential to understand that technology is a tool and a vital part of the learning process. Bereczki and Kárpáti (2021) highlight the importance of technology in enhancing creativity, teamwork, and critical thinking skills. Educators with solid digital literacy skills can adapt their teaching strategies to meet the requirements of modern education in the 21st century.

Conclusion

Instructional leadership significantly influences teacher performance, although its relationship is weaker than that of digital literacy, which shows a stronger connection. It emphasizes the need to integrate effective leadership, continuous professional growth, and expertise in digital skills to create a learning setting that can adjust and meet the requirements of modern education. Improving teachers' efficacy in the digital age requires solid instructional leadership and advanced digital literacy skills, emphasizing the need for a holistic approach to education.

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Conflict of Interest Statement

The authors assert that they do not have any personal or financial connections with third parties that may be influenced by the conclusions of this inquiry, either favorably or negatively.

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