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The Effect of Principal Instructional Leadership on Elementary School Teacher Teaching Performance through the Digitalization of Learning

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ABSTRACT

This study aims to analyze the influence of principal instructional leadership on the teaching performance of elementary school teachers through the digitalization of learning as a mediating variable in Purwakarta District. This research was conducted to address the phenomenal gap regarding teachers' low adaptation to digital technology in the learning process, as well as to fill the theoretical gap related to the integration of instructional leadership and the utilization of digital technology in improving teaching quality. The research employs a quantitative approach with a survey method and a correlational design. The population consists of 237 teachers, with a sample of 150 respondents selected using the proportional random sampling technique. Data were collected via a Likert scale questionnaire (1–5) and analyzed using Structural Equation Modeling (SEM) assisted by SmartPLS through measurement model and structural model testing. The results indicate that teacher teaching performance is in the "good" category. Instructional leadership has a significant positive effect on teaching performance by 31.2%, while the digitalization of learning contributes an indirect influence of 28.4%. Simultaneously, both variables explain 42.5% of the variation in teacher teaching performance, with a model fit level that meets the SRMR requirements. These findings offer novelty in the form of a teaching performance reinforcement model through the mediation of learning digitalization, which connects the principal's instructional leadership with teacher teaching practices. The limitation of this research lies in its narrow geographical scope, which is limited to a single district; therefore, it is recommended that future research expand the research locus to allow for broader generalization of the results.

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1. INTRODUCTION

Teacher teaching performance is the primary determining factor in creating sustainable educational quality that is relevant to the needs of the times. In the context of elementary education, teachers have a strategic responsibility as agents shaping the initial quality of human resources, not only teaching content but also instilling values, building character, and nurturing critical thinking skills from an early age (Nurhasyim et al., 2021). Teaching performance encompasses a combination of pedagogical skills, mastery of content, classroom management ability, and the use of innovative learning media (Sijabat et al., 2022). Among all these aspects, the ability to integrate digital technology has become the primary foundation in facing the era of educational transformation (Arifin & Hanif, 2024). However, there is a significant phenomenal gap in the field. Results from a preliminary study of elementary schools in Purwakarta District indicate that a number of teachers still encounter obstacles in utilizing digital platforms, developing interactive content, and adjusting technology-based teaching strategies to the characteristics of their students (Hasanah et al., 2021). Teachers' understanding of learning digitalization and their ability to adopt technology-based teaching techniques remain low, causing teaching practices to tend to be dominated by traditional methods (Usman et al., 2024). These limitations in teaching performance directly impact low student engagement in learning and the decline of student motivation and achievement in the classroom (Pratama et al., 2023).

Theoretically, the development of teaching performance can be examined through the instructional leadership approach proposed by Hallinger & Murphy (1985), in which the principal serves as the primary director of curriculum development, academic supervision, and learning evaluation. A theoretical gap emerges because although instructional leadership is believed to be capable of building a supportive academic culture, many principals have not been able to translate their pedagogical vision into concrete digitalization strategies (Alimuddin, 2019; Poniman et al., 2023). Hallinger & Gümüş (2020) explain that instructional leadership encompasses three main dimensions: defining the school's mission, managing the instructional program, and creating a positive academic climate.

On the other hand, learning digitalization—which encompasses the use of e-learning platforms, multimedia content, and digital assessment—has become a crucial element with a direct influence on the strengthening of teaching performance (Dewi & Wiarta, 2021; Ladica & Osias, 2024). Teachers who are able to integrate digital technology tend to continuously enhance their professional capacity through continuous learning (Mustika et al., 2021). A research gap exists in that the mediating role of learning digitalization in the relationship between principal instructional leadership and teacher teaching performance has rarely been examined at the elementary school level.

The novelty of this research lies in the testing of a model of the mediating effect of learning digitalization in the relationship between instructional leadership and teacher teaching performance in the context of elementary schools in the Purwakarta region, supported by a systematic literature review (SLR) of 30 reputable journals. The primary objective of this research is to produce strategies for improving the quality of elementary

education through the strengthening of instructional leadership and the acceleration of learning digitalization. The main findings indicate that instructional leadership contributes directly by 31.2%, while the indirect effect through learning digitalization reaches 28.4% of teacher teaching performance. This paper will subsequently describe the research methodology, data analysis, and an in-depth discussion of the practical implications of these findings.

2. RESEARCH METHODOLOGY

This study employed a quantitative approach with a correlational survey design to analyze the effect of instructional leadership on teacher teaching performance through learning digitalization as a mediating variable in Purwakarta District. The study was conducted in the Purwakarta District area, Purwakarta Regency. The target population comprised 237 elementary school teachers; the sample was selected using the proportional random sampling technique, yielding 150 respondents who completed the data (n = 150). Data were collected through a closed-ended Likert scale questionnaire (1–5) covering indicators of instructional leadership, learning digitalization, and teacher teaching performance. Prior to distribution, the research instrument underwent validity and reliability testing to ensure measurement accuracy and consistency. Data analysis was carried out computationally using SPSS version 24 and SmartPLS, encompassing descriptive analysis, regression prerequisite tests (normality, linearity, multicollinearity), and path analysis to examine direct and indirect effects.

3. RESULTS AND DISCUSSION

3.1. Research Results

This section presents the field findings processed statistically to examine the effect of instructional leadership and learning digitalization on the teaching performance of elementary school teachers in Purwakarta District.

3.1.1 Respondent Profile and Learning Digitalization Activities

This study involved 150 elementary school teachers in Purwakarta District. The respondent profile was compiled not only based on demographic data, but also their involvement in digitalization activities that support teaching performance.

Table 1. Respondent Profile and Learning Digitalization Activities (n = 150)

Indicator	Kategori	n	Percentage
Demographic Profile			
Gender	Male	52	34,7%
	Female	98	65,3%
Last Education	S1 Pendidikan	138	92,0%
	S2 Pendidikan	12	8,0%
Digitalization Activities			
Use of LMS/Digital Platform	Rutin	118	78,7%
	Irregular	32	21,3%

Multimedia Content Development	Pernah	72	48,0%
	Never	78	52,0%
Use of Digital Assessment	Ya	108	72,0%
	Tidak	42	28,0%
Digitalization Training	Rutin	126	84,0%
	Rarely/Never	24	16,0%

Table 1 shows that the respondent base in Purwakarta District is dominated by teachers with an undergraduate education background (92.0%) who have openness to technology. This is reflected in the high rate of LMS/digital platform use (78.7%) and participation in digitalization training (84.0%). Although experience in multimedia content development remains below 50%, the dominant use of digital assessment (72.0%) indicates a readiness in teaching performance to face the challenges of the digital era. This data provides a strong foundation for understanding why teacher teaching performance scores collectively fall into the "Good" category.

3.1.2. Instrument Description and Measurement Model Analysis

Research variables were measured using instruments developed from established theories. Through Confirmatory Factor Analysis (CFA) in the SEM measurement model, the validity and reliability of the instruments were confirmed to meet academic requirements.

Table 2. Instrument Description and Construct Reliability

Variabel	Main Dimensions	Number of Items	Kategori	α
Instructional Leadership (X_1)	Defining the mission, Managing the instructional program, Academic climate	20	Baik	0,890
Learning Digitalization (Z)	Platform use, Digital content, Digital assessment	20	Baik	0,912
Teaching Performance (Y)	Planning, implementation, digital-based evaluation	10	Baik	0,878

The test results in Table 2 show that all variables fall into the "Good" category. Cronbach's Alpha (α) values above 0.7 confirm that the instruments have very high reliability for use in structural model testing.

3.3.3. Structural Model Analysis and Hypothesis Testing

Hypothesis testing was carried out through the bootstrapping method with a 95% confidence interval. This analysis aimed to examine the direct contribution of instructional leadership as well as the indirect contribution through learning digitalization.

Table 3. Hypothesis Testing Results (Structural Model)

Path Relationship	Coefficient (β)	t-Statistics	p-Values	Contribution

Instructional Leadership → Teaching Performance (Direct)	0,312	3,45	0,001	31,2%
Instructional Leadership → Learning Digitalization	0,415	4,12	0,000	41,5%
Learning Digitalization → Teaching Performance	0,284	3,02	0,002	28,4%
Indirect Effect	0,118	2,89	0,004	11,8%

Based on Table 3, it was found that instructional leadership has a significant positive direct effect on teaching performance of 31.2%. Learning digitalization also has a significant effect on teaching performance of 28.4%. The indirect effect of instructional leadership on teaching performance through learning digitalization reaches 11.8%. Simultaneously, this model yields an R^2 value of 0.425 with an F-calculated value of 41.23, indicating that both variables together explain 42.5% of the variation in teacher teaching performance in Purwakarta District. An SRMR value of 0.068 (< 0.10) confirms that this structural model has a good fit with the field data.

3.2. Discussion

The findings of this study confirm that the working hypotheses proposed in this study are empirically proven. The finding that instructional leadership has a significant effect on teaching performance supports the theory of Hallinger & Murphy (1985), which states that principals who focus on curriculum development and academic supervision create a work environment conducive to teachers' professional growth. In Purwakarta District, the principal's ability to define the academic mission and manage the instructional program has been proven to encourage teachers to more regularly participate in digitalization training (84%) as part of improving their teaching performance.

However, the most prominent finding is the mediating role of learning digitalization, which significantly reinforces the effect of instructional leadership on teaching performance (indirect effect 11.8%). This is consistent with Fullan's (2014) perspective on the importance of technology as an accelerator of pedagogical change. The high utilization of digital assessment (72%) shows that teachers do not merely accept directives from the principal, but also actively integrate technology into everyday teaching practices.

More broadly, these findings have important implications for elementary education management. Improving teaching performance cannot rely solely on technical training of a *top-down*, but must be supported by visionary instructional leadership alongside the acceleration of learning digitalization. The synergy between managerial support (principals) and the use of technology (digitalization) creates a more adaptive and sustainable model of teaching performance development. For policymakers in Purwakarta Regency, these results emphasize the need for coaching programs that integrate instructional leadership and digital literacy in school management in order to meet the challenges of education in the digital era.

Although providing strong theoretical and practical contributions, this study has a limitation in its research locus, which covers only one district in Purwakarta; therefore, generalization of its results must be carried out with caution. In addition, the rate of multimedia content development by teachers, which is still below 50%, indicates a gap between the use of digital platforms and the creativity of producing digital teaching materials.

Future research is expected to expand the research locus coverage to the regency or provincial level to obtain a more comprehensive picture. The use of*mixed-methods*is also highly recommended to qualitatively explore why certain digitalization dimensions exert a stronger influence than others in the educational culture context of West Java.

4. CONCLUSION

This study presents empirical evidence to inform the development of elementary school teacher teaching performance in Purwakarta District through an analysis of the effect of principal instructional leadership with the mediation of learning digitalization. The findings indicate that the majority of respondents (n = 150) held positive perceptions of their work ecosystem, with a participation rate in digitalization training reaching 84% and the use of digital assessment at 72%. The direct contribution of instructional leadership was found to be 31.2%, while the indirect effect through learning digitalization reached 11.8%, bringing the total effective influence to 42.5%. Collectively, these results support the argument that strengthening teaching performance at the elementary level is more effective when driven by the integration of strong instructional leadership and the acceleration of learning digitalization, rather than relying solely on formal technical training.

These findings should be understood as preliminary implications for the development of school managerial policy, not as a final implementation framework. At this stage, the study supports the specification of teacher professional development that focuses more on strengthening principal instructional leadership and increasing learning digitalization capacity. A critical note is found in the low level of multimedia content development, which reached only 48%, indicating an obstacle in the aspect of applied digital creativity. Therefore, further research is needed to validate this model across a wider region, conduct pilot projects for coaching programs based on instructional leadership and digitalization, and evaluate their effectiveness in the long term before broader practical claims can be generalized.

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