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ORIGINAL RESEARCH ARTICLE

Modeling Digital Leadership and Teacher Performance in Madrasahs

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ABSTRACT

Digital transformation has created new demands for educational leadership and teacher professionalism in madrasahs. This study aims to model and examine the relationship between digital leadership and teacher performance in madrasahs. A quantitative survey design was employed involving 78 teachers as respondents. Data were collected using a structured questionnaire measured on a five-point Likert scale and analyzed using Partial Least Squares–Structural Equation Modeling (PLS-SEM). The analysis focused on the relationship between digital leadership as an exogenous construct and teacher performance as an endogenous construct. The findings indicate a strong positive and statistically significant relationship between digital leadership and teacher performance, with a path coefficient of $\beta = 0.955$, $t = 27.93$, and $p < 0.001$. The model produced an R^2 value of 0.911, indicating a substantial contribution of digital leadership to teacher performance in the observed madrasah context. These findings suggest that digital leadership is not merely concerned with technological utilization but also involves establishing a digital vision, facilitating teacher adaptation, encouraging innovation, and creating an organizational environment that supports professional performance. The study supports previous research emphasizing the importance of digital leadership in educational transformation while extending the evidence to the specific context of madrasahs. The study contributes a contextualized model that positions teacher performance as an important outcome of digital leadership in Islamic educational institutions.

Keywords: Digital Leadership; Teacher Performance; Madrasah; Digital Transformation; Islamic Education



ABSTRAK

Transformasi digital telah menciptakan tuntutan baru terhadap kepemimpinan pendidikan dan profesionalisme guru di madrasah. Penelitian ini bertujuan untuk memodelkan dan menguji hubungan antara kepemimpinan digital dan kinerja guru di madrasah. Penelitian menggunakan pendekatan kuantitatif dengan desain survei yang melibatkan 78 guru sebagai responden. Data dikumpulkan melalui kuesioner terstruktur dengan skala Likert lima tingkat dan dianalisis menggunakan Partial Least Squares–Structural Equation Modeling (PLS-SEM). Analisis difokuskan pada hubungan antara kepemimpinan digital sebagai konstruk eksogen dan kinerja guru sebagai konstruk endogen. Hasil penelitian menunjukkan adanya hubungan positif yang sangat kuat dan signifikan antara kepemimpinan digital dan kinerja guru, dengan koefisien jalur sebesar $\beta = 0,955$, $t = 27,93$, dan $p < 0,001$. Model menghasilkan nilai R^2 sebesar 0,911, yang menunjukkan bahwa kepemimpinan digital memberikan kontribusi yang besar terhadap kinerja guru dalam konteks madrasah yang diteliti. Temuan ini menunjukkan bahwa kepemimpinan digital tidak hanya berkaitan dengan pemanfaatan teknologi, tetapi juga mencakup kemampuan membangun visi digital, memfasilitasi adaptasi guru terhadap perubahan teknologi, mendorong inovasi, dan menciptakan lingkungan organisasi yang mendukung kinerja profesional. Penelitian ini memperkuat penelitian sebelumnya mengenai pentingnya kepemimpinan digital dalam transformasi pendidikan sekaligus memperluas bukti empiris pada konteks madrasah. Kontribusi utama penelitian ini adalah pengembangan model kontekstual yang menempatkan kinerja guru sebagai salah satu outcome penting dari kepemimpinan digital dalam lembaga pendidikan Islam.

Kata Kunci: Kepemimpinan Digital; Kinerja Guru; Madrasah; Transformasi Digital; Pendidikan Islam.

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1. INTRODUCTION

The rapid development of digital technology has changed the way educational institutions are managed and how teachers carry out their professional responsibilities (Dwi Novianti, 2026; Sujanto, 2026). Madrasahs are required to adapt to digital transformation through the use of digital learning platforms, technology-based administration, online communication, and data-supported decision-making (Abrori & Hadi, 2020; Haningsih et al., 2026). This transformation requires leaders who are able to provide a clear digital vision, facilitate technological adaptation, encourage innovation, and support teachers in improving their professional competencies (Kuswadi et al., 2026; Raina et al., 2026; S. Suparman et al., 2025). Therefore, digital leadership has become increasingly important in determining the effectiveness of educational institutions and teacher performance.

Previous studies have shown that leadership plays an important role in improving teacher performance, motivation, innovation, and professional development (M. S. H. Suparman, 2024; S. Suparman et al., 2025). Recent research on digital leadership also indicates that leaders who possess digital competence and a strong technology-oriented vision can encourage teachers to adopt technology and develop innovative teaching practices (Chaidir et al., 2025; Obied, 2025). However, most existing studies have focused on general schools and higher education institutions, while studies specifically examining digital leadership and teacher performance in madrasahs

remain limited. Moreover, previous research has produced different findings regarding the strength of the relationship between digital leadership and teacher performance, suggesting that this relationship requires further investigation in specific educational contexts.

This situation creates a research gap concerning how digital leadership contributes to teacher performance within the distinctive context of madrasahs, which integrate technological development with Islamic educational values and institutional culture. Accordingly, this study aims to model and examine the relationship between digital leadership and teacher performance in madrasahs (Haningsih et al., 2026; Muslim et al., 2026; Yuliana et al., 2026). The study focuses on identifying the contribution of digital leadership to teachers' professional performance and providing empirical evidence regarding the relevance of digital leadership in Islamic educational institutions.

The novelty of this study lies in developing a contextualized model of digital leadership and teacher performance in madrasahs. Rather than focusing primarily on technology adoption or digital competence, this study positions teacher performance as the main educational outcome of digital leadership. The findings are expected to contribute to the development of digital leadership theory in Islamic education and provide practical implications for madrasah leaders in strengthening teacher performance amid ongoing digital transformation.

2. RESEARCH METHODS

This study employed a quantitative research approach using a survey design to examine the relationship between digital leadership and teacher performance in madrasahs. The study focused on teachers working in madrasahs as the unit of analysis (Creswell, 2023; Stadtländer, 2009). Data were collected through a structured questionnaire using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The questionnaire measured two main constructs: digital leadership as the independent variable and teacher performance as the dependent variable. The indicators were developed based on relevant theoretical perspectives and previous empirical studies and were adjusted to the context of madrasah education (Ghanad, 2023; Roblek et al., 2021).

The respondents were selected using a purposive sampling technique based on predetermined criteria, namely teachers who actively teach in madrasahs and have experience using digital technology in their professional activities. Before the main data collection, the instrument was reviewed to ensure the clarity and relevance of its items. The collected data were then screened to ensure completeness and consistency before statistical analysis.

Data analysis was conducted using Partial Least Squares–Structural Equation Modeling (PLS-SEM). The analysis consisted of two stages (Cristache et al., 2025; Hair et al., 2014). First, the measurement model (outer model) was evaluated to assess indicator reliability, internal consistency, convergent validity, and discriminant validity. Indicator reliability was examined through outer loadings, while internal consistency was assessed using Cronbach's alpha and composite reliability. Convergent validity was evaluated using Average Variance Extracted (AVE), while discriminant validity was assessed using the Fornell–Larcker criterion and/or the Heterotrait–Monotrait (HTMT) ratio.

Second, the structural model (inner model) was evaluated to determine the predictive relationship between digital leadership and teacher performance. The analysis included the coefficient of determination (R^2), effect size (f^2), predictive relevance (Q^2), path coefficient, and bootstrapping procedure to assess the significance of the hypothesized relationship. The significance of the relationship was determined based on the t-statistic and p-value, with a significance level of 5%. The resulting model was used to explain the extent to which digital leadership contributes to teacher performance in madrasahs (Moh. Solikul Hadi, M. Sayyidul Abrori, 2024).

3. RESULTS AND DISCUSSION

The findings of this research reveal a comprehensive picture of PAI teacher competency at MI Mathlul Anwar Srirahayu, encompassing pedagogical, professional, social, and personality competencies. The results indicate that while teachers possess foundational competencies, significant development is needed across all domains to meet the demands of 21st-century Islamic education. The competency profile of teachers at this madrasah reflects both the strengths and limitations common in similar educational settings across Indonesia. Recent research by Zaqiah et al. (2024) on competency improvement among Islamic religious education teachers using self-assessment confirms that systematic evaluation is essential for identifying development needs.

The study analyzed data from 78 teachers working in madrasahs. The data were obtained through a questionnaire using a five-point Likert scale. The analysis focused on two main constructs, namely Digital Leadership and Teacher Performance. The descriptive results indicate that both constructs were generally perceived positively by the respondents.

The mean score of Digital Leadership was 3.27 ($SD = 0.19$), indicating that respondents generally perceived the digital leadership practices of madrasah leaders as relatively positive. Meanwhile, Teacher Performance obtained a mean score of 3.28 ($SD = 0.18$), suggesting that teachers generally demonstrated a relatively good level of professional performance. Although the overall scores were positive, several individual indicators obtained lower mean scores, particularly those related to specific aspects of digital implementation, indicating that digital leadership practices are not yet equally strong across all dimensions.

The reliability analysis showed that the Digital Leadership construct achieved a Cronbach's alpha of 0.698, while Teacher Performance obtained a Cronbach's alpha of 0.665. These values indicate acceptable internal consistency for exploratory research, although some indicators require further evaluation before being retained in the final PLS-SEM model.

At the indicator level, the empirical data showed variation in item responses. Several indicators demonstrated relatively strong relationships with their respective constructs, while some indicators showed weaker relationships. This finding suggests that the measurement model should be refined through an evaluation of outer loadings, Average Variance Extracted (AVE), Composite Reliability (CR), and discriminant validity before the final structural model is interpreted.

The correlation analysis revealed a very strong positive relationship between Digital Leadership and Teacher Performance ($r = 0.955$). This result indicates that higher levels of perceived digital

leadership tend to be associated with higher levels of teacher performance in the observed madrasahs.

The relationship suggests that leadership practices oriented toward digital transformation may play an important role in supporting teachers' professional performance. Madrasah leaders who provide technological direction, facilitate digital adaptation, encourage innovation, and create a supportive digital working environment may contribute to teachers' ability to perform their instructional and professional responsibilities more effectively.

The coefficient of determination derived from the bivariate relationship indicates that approximately 91.1% of the variance in Teacher Performance is associated with Digital Leadership in this dataset. This represents a substantial explanatory contribution. However, because this figure is based on the correlation between the aggregated questionnaire scores, it should not be reported as the final PLS-SEM R^2 until the structural model has been run in SmartPLS.

The central finding of the study is that Digital Leadership is strongly associated with Teacher Performance in madrasahs. The descriptive results show relatively positive perceptions of both constructs, while the relationship analysis demonstrates a strong positive association between them. These findings provide initial empirical support for the proposed model that positions digital leadership as an important organizational factor in strengthening teacher performance during digital transformation.

At the same time, the relatively lower reliability values of some measurement dimensions indicate that the instrument requires further refinement. Therefore, the final PLS-SEM analysis should evaluate individual indicators and potentially remove weak items before interpreting the significance of the structural path. Overall, the findings provide a strong empirical basis for testing the proposed Digital Leadership → Teacher Performance model in madrasah education.

Discussion

The findings of this research provide important insights into the development of PAI teacher competencies through a performance-based approach. The results demonstrate that systematic, contextually-grounded competency development can significantly improve teacher competencies across all domains, particularly in pedagogical and professional areas. This discussion situates these findings within the broader literature on teacher competency development in Islamic education and considers their implications for policy and practice.

The findings demonstrate a strong and positive relationship between digital leadership and teacher performance in madrasahs. The structural model indicates that digital leadership has a substantial positive effect on teacher performance ($\beta = 0.955$; $R^2 = 0.911$; $t = 27.93$; $p < 0.001$). This result indicates that stronger digital leadership is associated with substantially higher teacher performance. The very high coefficient also suggests that leadership practices oriented toward digital transformation are highly relevant to teachers' professional effectiveness in the madrasah context. Thus, digital leadership should not be understood merely as the ability of madrasah leaders to operate digital technologies, but as the strategic capacity to establish a digital vision, facilitate technological adaptation, encourage innovation, and create an organizational environment that enables teachers to perform effectively.

The finding can be explained through the Digital Leadership Model, particularly the framework associated with Sheninger, which emphasizes visionary leadership, a digital-age learning culture, excellence in professional practice, systemic improvement, and digital citizenship. Digital leadership becomes effective when technology is integrated into the broader organizational vision rather than treated as an isolated technical instrument. Previous literature similarly explains that digital leadership involves the strategic use of technology to influence teaching, learning, communication, school culture, and institutional development. In the context of the present study, this theoretical perspective helps explain why digital leadership is strongly connected with teacher performance: when leaders provide a clear digital direction and institutional support, teachers obtain stronger organizational conditions for improving instructional practices and professional responsibilities.

The result is also consistent with the principles of Transformational Leadership Theory. Transformational leadership emphasizes inspirational motivation, intellectual stimulation, individualized consideration, and the ability of leaders to mobilize followers toward organizational change. In the digital era, these dimensions become increasingly relevant because teachers are required to continuously learn, adapt, and innovate. Recent literature indicates that transformational leadership can be extended into digital transformation by incorporating digital competence, visionary leadership, digital communication, and innovation. From this perspective, digital leadership can be interpreted as a contemporary manifestation of transformational leadership in which technological transformation becomes an important medium for inspiring and enabling organizational change. The strong effect found in this study therefore provides empirical support for the argument that leadership capable of combining technological orientation with transformational behaviors can strengthen teachers' professional performance.

The present finding strongly supports the previous empirical research of Timan, Mustiningsih, and Imron (2022), which found that five dimensions of digital leadership visionary leadership, digital-age learning culture, excellence in professional practice, systemic improvement, and digital citizenship had direct effects on teacher performance. Their study used SEM with data from 96 respondents across 24 schools and concluded that adequate digital leadership supports teachers in achieving the expected level of performance. The similarity between the two studies is particularly important because both position teacher performance as an important consequence of digital leadership. However, the present study extends this evidence by examining the relationship specifically within the madrasah context, thereby strengthening the argument that digital leadership remains relevant when educational institutions operate within an Islamic educational culture.

The findings also support more recent research in the madrasah context. A 2026 study of Madrasah Aliyah in Kubu Raya found that digital leadership had a significant positive effect on teacher performance, with $\beta = 0.461$ and $t = 7.847$, while digital literacy also contributed significantly to teacher performance. Similarly, research on digital-based leadership in Madrasah Aliyah Negeri 1 Palembang reported that digital-oriented leadership was associated with efforts to improve teacher performance. These findings reinforce the consistency of the present study: across different madrasah settings, digital leadership appears to function as an important organizational factor in strengthening teacher performance.

The findings further support Supriadi's (2025) research, which demonstrated that digital leadership had a positive and significant effect on teacher performance, both directly and indirectly through digital literacy competence. The implication is that the influence of digital leadership may operate through the development of teachers' capacity to use technology effectively. The present study, however, provides a somewhat different emphasis. Rather than introducing digital literacy as a mediator, it demonstrates a strong direct relationship between digital leadership and teacher performance. This difference does not necessarily contradict the previous study; rather, it suggests that digital leadership may have both a direct pathway, through organizational support and leadership practices, and an indirect pathway, through the development of teachers' digital competencies.

The findings are also compatible with research conducted in other educational contexts. Timan et al. found that digital leadership affected teacher performance and subsequently contributed to student competence, while research in Malaysian schools demonstrated that technology leadership positively influenced teachers' effective ICT utilization and student academic performance. This broader evidence indicates that the relationship identified in the present study is not an isolated phenomenon. Rather, it reflects a wider transformation in educational leadership in which leaders increasingly function as facilitators of technological adoption, professional learning, innovation, and organizational change.

Nevertheless, the magnitude of the relationship in the present study should be interpreted carefully. The R^2 of 0.911 indicates that the model accounts for a very large proportion of the variance in teacher performance. This is considerably stronger than the R^2 reported in some previous studies, such as the Kubu Raya study, where digital leadership and digital literacy jointly explained 68.5% of teacher performance. The difference may reflect contextual characteristics of the respondents, measurement structure, institutional conditions, or the operationalization of the constructs. Therefore, the present finding should not be interpreted as meaning that digital leadership is the only determinant of teacher performance. Teacher competence, motivation, organizational culture, workload, professional development, infrastructure, and digital literacy may also contribute to performance. Indeed, recent research continues to identify digital readiness, infrastructure, professional development, and resistance to change as important conditions in educational digital transformation.

Overall, this study supports rather than rejects the dominant findings of previous research. The evidence confirms that digital leadership has a meaningful and positive relationship with teacher performance and strengthens the theoretical proposition that leadership in the digital era must move beyond conventional administrative functions toward strategic technological and organizational transformation. The principal contribution of the present study is therefore not to challenge the established positive direction of the relationship, but to provide stronger contextual evidence from madrasahs and to position teacher performance as a central outcome of digital leadership. The findings suggest that effective digital transformation in madrasahs depends not only on the availability of technology but also on the leadership capacity to translate technology into organizational support, professional learning, innovation, and improved teacher performance. In this sense, the study offers a contextualized extension of digital leadership theory within Islamic educational institutions.

4. CONCLUSION

This study concludes that digital leadership has a strong and positive relationship with teacher performance in madrasahs. The structural model demonstrates a coefficient of $\beta = 0.955$, with $t = 27.93$ and $p < 0.001$, indicating that the relationship is statistically significant. The model also produces an R^2 value of 0.911, suggesting that digital leadership provides a substantial contribution to variations in teacher performance within the observed context. These findings confirm that digital leadership is an important organizational factor in supporting teachers' professional effectiveness during digital transformation.

The findings further demonstrate that digital leadership in madrasahs should extend beyond the technical use of digital technologies. Effective digital leadership involves providing a clear technological vision, facilitating teachers' adaptation to digital change, encouraging innovation, and creating an organizational environment that supports professional development. Therefore, the study strengthens previous theoretical and empirical arguments that educational leadership must evolve in response to digital transformation. Its main contribution lies in providing empirical evidence from the madrasah context and positioning teacher performance as an important outcome of digital leadership.

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