



Digital-Based Teacher Human Resource Management for Educational Transformation Readiness

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Abstract :

This study aims to analyze and develop a digital-based teacher human resource (HR) management model to strengthen teachers' readiness for educational transformation. This study employed a qualitative case study design to examine the implementation of digital-based HR management in a madrasah. Data were collected through in-depth interviews, participatory observations, and document review with the madrasah principal, curriculum representative, and teachers. We ensured data credibility through source and method triangulation. Data analysis involved condensing, displaying, and verifying data, supported by thematic analysis. The findings indicate that teacher HR management has begun integrating digital technology into professional development, work processes, and educational management, but implementation remains only partially institutionalized. Teachers' readiness for transformation depends on digital literacy, ongoing professional development, leadership support, and the availability of institutional systems. The findings further reveal that a shared digital organizational culture has not yet fully formed, so technology use and innovation remain partly dependent on individual initiatives. The study suggests that sustainable educational transformation requires an integrated, digital-based HR management model supported by continuous professional development, structured digital systems, visionary leadership, and a collaborative, adaptive organizational culture. Such integration can strengthen teachers' capacity and institutional readiness to respond effectively to ongoing digital transformation.

INTRODUCTION

Digital transformation in education has become a broad social reality that affects how educational institutions organize learning, work, and human resources (Fahriansyah et al., 2025; Yoeliyanto et al., 2025). Integrating digital technology creates opportunities to improve educational services, organizational efficiency, and teacher professional development. However, these opportunities depend not only on technological infrastructure but also on institutional capacity to prepare human resources for continuous change. The expansion of information technology has accelerated changes in learning systems and increased demands on teachers' competencies (Amelia, 2023; Timotheou et al., 2023; Anapah et al., 2026). Therefore, strengthening teacher human resource management is important for ensuring that digital transformation produces sustainable improvements rather than fragmented technological adoption. In this context, examining digital-based teacher human resource management is socially relevant because teachers remain central to the successful implementation of educational transformation in schools across changing educational contexts.

A major problem is the persistent gap between the increasing demands of educational digitalization and teachers' actual readiness to respond to technological, pedagogical, and organizational changes. Teachers differ in digital literacy, platform adaptation, and willingness to adopt technology-based work practices (Chiu et al., 2024; Arifani & Zhou, 2026; Imamiyah et al., 2026). At the institutional level, teacher human resource management may also remain predominantly conventional and may not systematically support continuous digital competency development (Rohayati, 2024; Fikriyah & Prahasti, 2026). Consequently, technology adoption can occur without corresponding improvements in teacher preparedness, collaboration, or organizational adaptability. This problem is important because uneven readiness can limit the sustainability of digital transformation and create competency disparities within educational institutions and schools today. An integrated human resource management approach is therefore required to connect technological development with teacher capacity and organizational change.

This problem is evident in Madrasah, where digital technology has increasingly been incorporated into learning, administration, and teacher management practices. Field conditions indicate that teachers' readiness for digital transformation remains diverse. Some teachers integrate technology effectively, while others struggle with digital literacy, learning platforms, and technology-based work cultures (Kirinić et al., 2023; Maimunah et al., 2025; Ratulangi et al., 2026). At the same time, existing human resource management has not fully accommodated sustainable digital competency development activities. This creates a transitional condition in which digital practices have emerged but have not yet been comprehensively institutionalized. This situation shows the need to examine how teacher human resource management can address competency gaps, strengthen institutional support, and effectively facilitate a more consistent digital transformation process within the madrasah.

Previous studies have established the strategic importance of technology-supported teacher human resource management for educational transformation. Rohayati (2024) emphasizes integrating human resource management and digital competencies as a strategic approach, while Purwanto et al. (2023) examine the role of digital transformation and human resource management in organizational performance. Research on teacher digital competence indicates that educational transformation requires teacher competency development alongside supportive institutional practices (Fernández-Batanero et al., 2022; Rohmatillah & Jannah, 2024). Timotheou et al. (2023) similarly highlight school digital capacity and transformation as multidimensional processes. These studies show that digital transformation requires more than infrastructure alone. However, much of the existing literature discusses teacher digital competence, technological adoption, or organizational change separately. This limited integration leaves a gap in how digital-based teacher HR management can connect teacher development with institutional transformation.

Studies in Indonesia also indicate a continuing gap between educational digitalization policies and their implementation at the educational-unit level, particularly regarding teacher training (Tobondo, 2025; Surur et al., 2026; Wahyudin et al., 2024). Other research has examined technology utilization but has paid less attention to an integrated teacher HR management model specifically designed to strengthen transformation readiness in madrasahs (Yahya, 2025; Ihsan et al., 2025). This limitation matters because institutions operate in different contexts. Consequently, models

developed from general technological perspectives may not adequately explain the interaction among teacher competency, leadership, professional development, performance management, and organizational culture. The present study addresses this gap by examining digital-based teacher HR management specifically within madrasah, thereby contributing contextual evidence on how these dimensions can be effectively integrated to support sustained educational transformation at the institutional level.

The state of the art in this study lies in developing a contextual, integrated understanding of digital-based teacher human resource management as a mechanism for strengthening educational transformation readiness. Rather than treating digital competence as an isolated technical skill, the study conceptualizes readiness through the interaction of teacher development, managerial planning, performance evaluation, institutional support, leadership, collaboration, and digital organizational culture. Its novelty is also reflected in its practice-based focus at the madrasah level, where digital transformation is examined as an organizational process moving from partial adoption toward institutionalization. This perspective is important because sustainable digital transformation requires alignment between individual teacher capabilities and the systems in which those capabilities are developed and applied. Addressing this issue can provide a more applicable framework for madrasahs seeking to manage digital transformation systematically.

The research problem concerns how digital-based teacher human resource management can be developed and implemented to strengthen teachers' readiness for educational transformation at MTsN 1 Banyuwangi. This study argues that transformation readiness is unlikely to emerge from technology adoption or technical training alone; it requires an integrated management process that continuously develops teacher competencies while strengthening organizational support and digital culture. The proposed approach therefore connects human resource planning, professional development, performance evaluation, leadership, collaboration, and adaptation to technological change within one framework. The study contributes by providing an empirically grounded understanding of how these components interact in a madrasah context. By developing a contextual, applicable model, the research seeks to help educational institutions manage teacher resources more systematically and strengthen their capacity to respond to ongoing digital transformation.

RESEARCH METHODS

This study employed a qualitative approach with a case study design to examine the implementation of digital-based teacher human resource management (HRM) and its role in strengthening teachers' readiness for educational transformation at MTsN 1 Banyuwangi. A qualitative case study was selected because it enables researchers to investigate a contemporary phenomenon in its real-life context and develop a contextual understanding of interactions among organizational practices, actors, and institutional conditions (Miller et al., 2023; Viera, 2023). The design was appropriate for examining how digital HRM practices interact with teacher competencies, institutional support, leadership, and organizational culture during educational transformation.

The study was conducted at MTsN 1 Banyuwangi. The location was purposively selected because the madrasah had begun integrating digital technology into teacher management, learning platforms, and administrative practices, while the process was still developing toward more systematic institutional implementation. This transitional context provided a relevant setting for examining both the implementation of digital-

based teacher HRM and the institutional conditions that shape teachers' readiness for educational transformation. Participants were selected purposively based on their direct involvement and experience with digital technology in teacher management, teaching, and administrative activities. Purposive sampling was considered appropriate because qualitative case studies require participants who can provide information-rich accounts relevant to the phenomenon under investigation (Nyimbili & Nyimbili, 2024; Ahmad & Wilkins, 2025). Participants included the madrasah head, deputy head of curriculum, and teachers involved in implementing and using digital technologies.

Data were collected through in-depth interviews, participatory observations, and documentation. Interviews explored digital HRM practices, teachers' readiness for educational transformation, institutional support, leadership practices, and challenges associated with digitalization. Participatory observations were undertaken to examine how digital HRM and technology-supported practices were implemented in daily organizational and educational activities. Documentation was used to obtain supporting evidence from relevant policies, programs, administrative records, and teacher digital competency development activities. The combination of interviews, observations, and document analysis enabled the researchers to obtain complementary perspectives and strengthen the contextual understanding of the case (Chand, 2025; Da Costa et al., 2024).

Data analysis followed an interactive process involving data condensation, data display, and verification. Data condensation was conducted by selecting, reducing, focusing, simplifying, and organizing information from interviews, observations, and documents according to the research objectives and emerging themes related to digital-based teacher HRM and educational transformation readiness. The researchers then displayed the condensed data systematically in thematic categories to identify patterns, relationships, strategies, and challenges within the case. The researchers continuously verified findings by comparing information across participants and data collection methods to assess consistency and develop credible interpretations. The analysis process was iterative, allowing emerging findings to be reviewed against the available evidence until a coherent contextual understanding of digital-based teacher HRM and its contribution to teachers' readiness for educational transformation was established (Alam, 2021; Chand, 2025).

RESULTS AND DISCUSSION

Results

Digital Integration in Teacher Human Resource Management.

The findings show that teacher human resource (HR) management at madrasah has begun to integrate digital tools, especially through online learning platforms and technology-based administrative systems. However, the field analysis indicates that implementation remains partial and has not yet been integrated into a systematic and sustainable management model. This is evident in the absence of strategic planning that specifically regulates the development of teachers' digital competencies, as well as the lack of optimal synchronization between madrasah policies and classroom practices. Some digitalization programs run as individual or needs-based initiatives rather than as part of a structured HR management system. As a result, despite advances in technology adoption, the impact on overall transformation readiness remains limited.

Interviews with one key informant, the deputy head of the madrasah for curriculum, strengthened the findings. It states that: "We have actually used various digital platforms for learning and administration, but there is no system that really

regulates how teachers should be developed in the digital context. So it is still run individually, depending on the teacher's initiative."

This statement shows that digital integration in teacher human resource management is still in its early stages and has not been formally institutionalized. In addition, interviews with several teachers revealed variation in technology use, with some teachers developing digital learning. In contrast, others are still limited to basic use. Overall, these findings emphasize the need to develop a more comprehensive, directed, and sustainable digital-based human resource management model to support the readiness for educational transformation in madrasahs.

Previous findings show that teacher human resource management at madrasah has led to digital integration. However, to strengthen the validity of these findings, this study uses an instrument that is systematically designed to measure the level of digital integration in teacher human resource management. This instrument is developed based on key indicators such as digital-based HR planning, training implementation, use of learning platforms, and technology-based performance evaluation. The following is a table of the research instruments used:

Table 1. Table of Research Instruments

Yes	Aspects of HR Management	Indicator	Description
1	HR Planning	Digital-based planning	The existence of a structured program for the development of teachers' digital competencies
2	Human resource development	Digital training	Availability of technology-based training and workshops
3	Implementation	Utilization of digital platforms	Use of LMS, learning apps, and digital administration
4	Evaluation	Digital performance assessment	Technology-based teacher evaluation system
5	Organizational Culture	Digital adaptation	Acceptance rate and digital collaboration between teachers

These findings relate to Michael Fullan's concept of change management, which argues that educational transformation requires a systemic approach, not just sporadic technology adoption. From a modern HR management perspective, digital-based management should include a complete cycle from planning to data-driven evaluation. The disintegration found in this study shows a gap between field practice and the ideal concept. Thus, the results confirm that without a structured digital-based human resource management model, it will be difficult to achieve optimal readiness for educational transformation.

Teachers' Digital Transformation Readiness

This study shows that teachers' digital transformation readiness in madrasah depends heavily on a structured and sustainable digital-based professional development system. This narrative reflects field realities: improving teachers' digital competence is not enough through one-off training; it requires a professional learning ecosystem that includes programmatic training, mentoring, and technology-based performance evaluation. In practice, some teachers in structured development programs show higher readiness to integrate technology into learning, both in pedagogy and administration. In contrast, teachers without systematic support tend to struggle to adapt to the demands

of digitalization. This shows a strong relationship between the quality of the professional development system and teachers' readiness for overall digital transformation.

Interviews with several informants reinforced these findings. One of the teachers stated that: "If you only participate in the training once or twice, it is usually quickly forgotten or not immediately applied. However, when there is regular mentoring and evaluation, we become more accustomed to and confident in using technology in learning." This statement affirms the importance of sustainability in teacher professional development. In addition, interviews with madrasah management revealed that training programs accompanied by digital-based monitoring and evaluation have a greater impact on improving teacher performance. Overall, the interview results show that a structured professional development system including technology-based training, mentoring, and evaluation is a key factor in improving digital transformation readiness. Thus, these findings indicate that the success of digital transformation in the madrasah environment depends not only on the availability of technology, but also on how institutions systematically and sustainably design and manage the development of teachers' human resources.

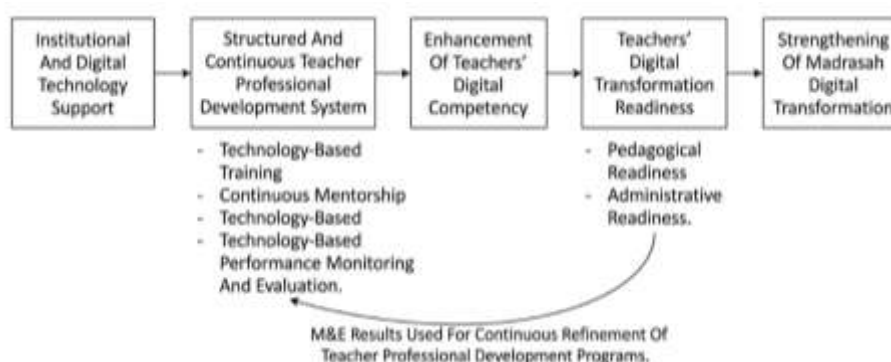


Figure 1. Teachers' Digital Transformation Readiness Framework in Madrasah

Figure 1 suggests that teachers' digital transformation readiness in madrasah is shaped not merely by access to digital technologies but, more fundamentally, by the institutional capacity to establish a structured and sustainable professional development system. Systematic training, continuous mentoring, and technology-based monitoring and evaluation constitute interconnected mechanisms that strengthen teachers' digital competence, pedagogical confidence, and ability to integrate technology into instructional and administrative practices. The findings further indicate that professional development is more effective when it extends beyond short-term training toward continuous learning and reflective improvement. Accordingly, institutional support functions as a critical enabling condition for translating digital competence into practical readiness for transformation. This highlights that sustainable digital transformation in madrasah requires a shift from technology-centered initiatives to a human resource development approach that prioritizes continuous capacity building, institutional accountability, and aligning teachers' professional growth with the broader digital transformation agenda.

Underdeveloped Digital Culture and Individual-Driven Technology Use

The study's findings show that madrasah heads' digital leadership plays a central role in building a technology-based work ecosystem that can drive organizational culture

change in madrasah. This narrative departs from the reality that digital transformation is not only a technical process, but also a process of cultural change that requires strong leadership direction, vision, and influence. Madrasah heads with a digital orientation tend to be more active in encouraging technology use, facilitating training, and creating a work climate that adapts to change. However, the study also found resistance among some teachers due to limited digital literacy, lack of confidence, and concerns about changes in work patterns. In addition, the integration of digital systems in teacher performance management is still not optimal, so technology has not fully supported the evaluation process and data-based decision-making.

Interviews with several informants reinforced these findings. One teacher stated: "When the head of the madrasah actively encourages the use of technology and sets a direct example, we are more motivated to change. However, there are still friends who find it difficult because they are not used to technology." This statement shows that leadership directly influences teachers' acceptance of change. Meanwhile, an interview with management revealed that efforts to digitize teacher performance are still in development and have not been fully integrated into a comprehensive system. Overall, the interview results confirm that the success of digital transformation is strongly influenced by the quality of digital leadership and the organization's ability to manage resistance to change.



Figure 2. Digital Culture Transformation in Madrasah

These findings align with Michael Fullan's concept of educational change, which emphasizes leadership as the key to driving organizational culture change. From a change management perspective, resistance is natural and must be managed through effective communication, training, and mentoring strategies. Thus, these findings reinforce that visionary and responsive digital leadership is a determining factor in creating readiness for sustainable digital transformation.

Discussion

The findings indicate that teacher human resource management at madrasah is moving from conventional practices toward digital-based management, although institutionalization remains incomplete. This aligns with Samosir et al. (2026), who examine digital transformation in human resource management within Islamic educational institutions. It also reflects Gkrimpizi et al. (2023), who identify organizational barriers when structures are insufficiently prepared for change, and Timotheou et al.

(2023), who emphasize that school digital transformation extends beyond technology. However, this study adds contextual evidence that partial adoption persists when digital initiatives lack a managerial framework linking planning, teacher development, performance evaluation, and organizational practice. Theoretically, this finding positions institutional readiness and organizational alignment as key conditions linking technology adoption to sustained organizational transformation. Practically, madrasah leaders need coordinated policies, clear responsibilities, and monitoring to make digital practices institutional routines rather than isolated initiatives.

The findings show that educational innovation must be embedded in organizational systems rather than remain an individual practice. This interpretation is consistent with research on digital leadership and educational transformation, which highlights leadership, structures, and coordinated processes (Ghamrawi & Tamim, 2023; Fernández et al., 2023; Widad & Suliyanto, 2025). This aligns with human resource management perspectives that emphasize systematic development and organizational capability (Rohayati, 2024; Purwanto et al., 2023; Islamiyah, 2025). Nevertheless, this case reveals that these dimensions have not progressed together: technology use has expanded, while planning, professional development, performance management, and cultural change remain unevenly connected. This extends prior perspectives by illustrating how digital leadership needs operational support from integrated HR processes. Practically, madrasahs should connect competency goals to planning, professional learning, performance feedback, and data-informed decisions. Such alignment may improve accountability, coordination, and the sustainability of digital management.

Teachers' readiness for digital transformation varies with digital literacy and institutional support. This finding is consistent with Chiu et al. (2024), who emphasize processes that develop teacher digital competence, motivation, and capability, and with Amemasor et al. (2025), who highlight professional development for digital instructional integration. Continuous professional development requires structured learning opportunities (Adekamwa et al., 2024). Research on teacher digital competence emphasizes professional knowledge rather than isolated technical skills (Fernández-Batanero et al., 2022; Zulkifli & Purnama, 2026). The present study adds that readiness is not simply an individual attribute: it is shaped by whether institutions provide learning, mentoring, and evaluation linked to teachers' work. Theoretically, this frames digital readiness as an organizationally supported capability. Practically, one-off training should be complemented by mentoring, peer learning, pedagogical application, and feedback to reduce competency gaps and strengthen teachers' confidence in using technology.

Digital culture at the madrasah remains underdeveloped because technology use still depends partly on individual initiatives. This is consistent with Mahsusi et al. (2024), who examine digital transformation in madrasah management, and with Ghamrawi and Tamim (2023), who address leadership in digital transformation. Yet the case nuances this literature: leadership can stimulate adoption, but does not automatically institutionalize shared norms, routines, or collective ownership. Resistance among some teachers demonstrates that transformation involves cultural and organizational adjustment, not merely technical adaptation. This corresponds with organizational barriers discussed by Gkrimpizi et al. (2023) and reinforces the value of technology-supported professional development and collaborative learning (Sekano et al., 2023; Wijaksono & Affan, 2026). The theoretical contribution is distinguishing digital leadership from digital cultural institutionalization. In practice, leaders should combine

communication, collaboration, mentoring, and institutional reinforcement to support individual experimentation.

Taken together, digital-based teacher HR management at madrasah depends on technology integration, teacher readiness, institutional support, leadership, professional development, and organizational culture. This supports scholarship on school digital transformation, professional development, digital competence, and leadership (Timotheou et al., 2023; Amemasor et al., 2025; Chiu et al., 2024; Ghamrawi & Tamim, 2023). The study's novelty lies in integrating these dimensions in one madrasah case and framing the shift from partial adoption to institutionalization as an organizational HR process, not merely a technological intervention. This framework clarifies how individual capabilities connect with managerial systems and collective practices. Practically, it helps madrasahs design integrated digital HR strategies, support staff, and improve evidence-informed performance management. Because the research focuses on one madrasah, the findings are contextually grounded; comparisons across institutions and longitudinal studies are needed to assess transferability and longer-term effects.

CONCLUSION

This study concludes that teacher human resource management has begun to integrate digital technology but remains in a transitional stage, where digital practices are not yet fully structured or institutionally embedded. The main lesson is that educational transformation cannot be sustained through technology adoption alone; it requires aligned teacher digital literacy, continuous professional development, institutional support, leadership, and organizational culture. The findings imply that educational institutions need to establish an integrated digital HR management system that connects competency development, mentoring, performance evaluation, and collaborative organizational practices to strengthen teachers' transformation readiness. This study's scientific contribution lies in developing a contextual understanding of digital transformation as an organizational HR process rather than merely a technological intervention, connecting teacher competency, institutional support, and digital organizational culture within an integrated framework. However, this study is limited by its qualitative case study design and focus on a single madrasah, which limits contextual transferability. Future research should examine the proposed model across multiple madrasahs and educational settings, incorporate comparative or longitudinal designs, and investigate how digital HR management affects teachers' transformation readiness over time.

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CONFLICTS OF INTEREST

The authors declare that they have no conflict of interest related to the research, authorship, or publication of this article.

USE OF ARTIFICIAL INTELLIGENCE (AI)-ASSISTED TECHNOLOGY

The authors used an AI-assisted tool (Gemini & Grammarly) solely to support English translation and grammar refinement. The tool was not used to generate research data, conduct data analysis, or determine the research findings. The authors reviewed and edited the final text and take full responsibility for the content's accuracy, interpretation, and integrity.

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