



MADRASAH HEAD'S STRATEGY IN IMPROVING THE DIGITAL COMPETENCE OF MADRASAH ALIYAH TEACHERS IN BONDOWOSO STATE

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Abstract

The digital competency gap among senior teachers (over 41 years old) is a serious challenge in supporting the implementation of the Merdeka Curriculum, especially at the State Islamic Senior High School (MAN) Bondowoso. This study aims to identify and analyze the strategies of madrasah principals in improving the digital competency of senior teachers so that they are able to adapt to technology-based learning. This study uses a qualitative approach with data collection techniques in the form of in-depth interviews, participatory observation, and document analysis. Data were analyzed using the Miles and Huberman interactive model, which includes three stages: (1) data condensation through the process of selecting, focusing, simplifying, abstracting, and transforming data; (2) presenting data in the form of narratives and thematic matrices; and (3) drawing conclusions and verifying them repeatedly. Data validity is strengthened through the use of source triangulation and member checking techniques to ensure the reliability, consistency, and accuracy of the data obtained. The results of the study show three main strategies: (1) mapping digital competency needs through collaborative assessments with universities to develop context-appropriate training modules; (2) implementation of routine training (in-service training) and independent learning based on the Pintar Kemenag platform; and (3) digital-based teacher performance monitoring through the e-Jurnal application that allows real-time monitoring and feedback. These findings indicate that responsive and data-based leadership can accelerate the transformation of digital competence among senior teachers. This study recommends replication of similar strategies in other madrasas as part of strengthening the implementation of the Merdeka Curriculum.

Keywords : *digital competence, madrasah principal strategy, madrasah management*

A. Introduction

The digital era has brought significant changes to traditional teaching methods. The use of technology has driven a shift from conventional learning to more interactive and collaborative models, utilizing digital media such as presentation tools and online learning platforms. (Li & Wang, 2023). Teachers

are now required to adapt their teaching strategies to better suit the needs and characteristics of digital learning, as well as to reassess their approach to instructional design (Kidd & Murray, 2020).

Assessment methods have also evolved in the digital era, shifting from merely testing memorization to process- and competency-based evaluation (Chen, 2024). Although it offers many opportunities, digital transformation also presents challenges, such as the risk of reduced personal connection between teachers and students (Kotlyarova et al., 2021), as well as the need to continuously enhance educators' technological skills through ongoing training (Xu, 2024). Therefore, institutional support is key to ensuring that teaching in the digital era remains effective and meaningful. However, many educational institutions still face several significant challenges in adopting technology.

The implementation of digital technology in educational institutions faces various challenges that can hinder its effective integration into the learning process. These obstacles include limited infrastructure, (Okoye et al., 2022), Resistance to change by educators (Malešević et al., 2021), Lack of training and professional development (Okoye et al., 2021), and low self-regulation skills of teachers in the use of technology (Börnert-Ringleb et al., 2021). In addition, inadequate digital literacy among teachers and students is also the main inhibiting factor (Lytvyn, 2024). Inequality of access to technology also raises concerns about equity in education, especially for students from underprivileged backgrounds who do not have adequate devices or internet connections (Yanwei, 2023). In addition, the use of technology in schools is also not always easy to manage. Rapid technological changes make schools need to have a flexible system and be ready to adapt in order to still be able to provide quality education (Nkomo & Matli, 2022).

Previous studies have extensively discussed the digitalization of education and the challenges faced in the process of technology adoption and integration in the educational environment. Research on the digitalization of education shows that the integration of technology in learning requires readiness in various aspects. Nadifa and Ambarwati (2024) emphasize the importance of building a digital culture in schools, especially in Islamic school environments, through institutional support and teacher competency improvement (Nadifa & Ambarwati, 2024). Belovitskaya et al. (2021) and Yehya (2021) both highlight the need for professional development and teachers' digital skills to create interactive and relevant learning for the digital generation (Belovitskaya et al., 2021; Yehya, 2021). Aditya (2021) added that the infrastructure gap, especially between schools in urban and rural areas, is a challenge in equitable access to

technology (Aditya, 2021). Meanwhile, Singh et al. (2022) emphasizing the importance of continuous training so that teachers are able to integrate digital media effectively and encourage students to think critically in a digital environment (Singh et al., 2022).

Although various studies have discussed the digitalization of education, there are still some gaps that need to be considered. One of them is the lack of research that specifically highlights the role of Madrasah Heads in encouraging teachers' digital literacy. In addition, the approach that considers the diversity of teachers' ages is still minimal, even though this demographic factor greatly affects the readiness of human resources. As the spearhead of education, teachers' ability to utilize technology varies greatly, and this is a challenge in efforts to integrate digital in the madrasah environment.

This research at MAN Bondowoso, MAN Bondowoso is the only state aliyah madrasah in the center of Bondowoso city that organizes secondary education with Islamic characteristics, combines general knowledge and religion, and is committed to producing a generation that is accomplished, moral, and ready to compete in the global era. The selection of the research location was based on two main reasons: first, MAN Bondowoso already has adequate digital infrastructure, including 30 classrooms equipped with Smart TVs; Second, this madrasah is dominated by senior teachers (73.61%) who are still facing challenges in mastering and utilizing digital technology in learning.

Tabel 1 : Rekapitulasi Usia Guru MAN Bondowoso

Age	Frequency	Presentase
<30	4	4,92%
31-40	15	21,31%
> 41	53	73,61%
Sum	72	100%

Data source: Processed from the MAN Bondowoso document for 2024-2025

This research focuses on the challenge of improving teachers' digital competence at MAN Bondowoso, where 73.61% of teachers are over 41 years old. Although this madrasah is equipped with supporting infrastructure such as *Smart TVs* in all classes, its utilization is not optimal due to the low digital literacy among senior teachers (over 41 years old). This raises a fundamental question: How can the leadership strategy of the Head of Madrasah improve the digital competence of teachers, especially in the context of generational diversity at MAN Bondowoso?

With this background, the main purpose of this research is to analyze the strategies of the Head of Madrasah in improving the digital competence of teachers at MAN Bondowoso, as well as answering the challenges of technology integration in an age-heterogeneous educational environment.

This research has important practical, theoretical, and social value. Practically, this study provides strategic recommendations for Madrasah Heads and policy makers to improve teachers' digital literacy. Theoretically, this study enriches the literature on digital education leadership, especially in the Indonesian context. From a social perspective, this research encourages the empowerment of senior teachers to remain relevant in the digital era, while optimizing intergenerational collaboration to create more inclusive and adaptive learning.

B. Research Methods

This study uses a descriptive qualitative approach with the type of intrinsic case study (Stake, 1995), which aims to deeply understand the strategy of the Head of Madrasah in improving the digital competence of senior teachers at MAN Bondowoso. This approach was chosen because it is able to explore phenomena contextually through the perspective of participants. The subjects of the study include the Head of the Madrasah, senior teachers over 41 years old, and young teachers. The research location was purposively chosen at MAN Bondowoso, because this madrasah already has adequate digital infrastructure (30 Smart TV-based classes) and is dominated by senior teachers (73.61%) who face challenges in digital literacy.

Data collection was carried out through in-depth interviews, participatory observations, and document analysis. Semi-structured interviews were conducted with 7 informants to explore leadership strategies, technology adoption experiences, and obstacles and solutions faced. Observations were carried out for 4 weeks on digital training activities, the use of Smart TVs, and interaction between generations of teachers. Meanwhile, the documents analyzed include madrasah policies, training reports, technology-based lesson plans, and teacher competency evaluation records.

The data were analyzed using the interactive model of Miles, Huberman & Saldaña (2014) which includes the stages of data condensation, data presentation, and conclusion drawn. The validity of the data is strengthened through triangulation of sources and member checking techniques to ensure the reliability, consistency, and correctness of the data obtained.

C. Results and Discussion

The digital age has had a major impact on the adoption of technology in educational institutions, by changing teaching methods, increasing student engagement, and driving institutional change. The shift from traditional teaching to student-centered learning is a hallmark of this transformation. Technologies such as artificial intelligence (AI), learning analytics, and the Internet of Things (IoT) enable more inclusive, flexible, and collaborative education (Awodiji & Katjiteo, 2023; Faloye & Faniran, 2023). This technology not only supports a variety of learning styles, but also creates a more immersive and engaging learning experience (Truong & Diep, 2023; Vishnevskaya et al., 2019). In order to remain relevant and able to meet the expectations of today's students, educational institutions need to adopt and utilize this technology effectively.

Technological changes also demand an update of the pedagogical approach. The trend of student-centered learning is now increasingly prominent, with an emphasis on active learning, critical thinking skills development, and career readiness (Cheng et al., 2021; Nasution, 2022). For this reason, educators need to understand the characteristics of digitally literate students and create a learning environment that is holistic, inclusive, and responsive to the needs of the times (Bouzayenne, 2023; E. R. Walker et al., 2020). Although the acceleration of technology adoption was triggered by the pandemic, its use is now widespread as a strategy to improve the quality of learning and educational leadership in a sustainable manner (Chomunorwa & Mugobo, 2023; Okunlola, 2024). However, this process is not free from challenges. Infrastructure problems, training limitations, teacher resistance, and data privacy and security issues are obstacles that must be overcome (Goldhaber, 2021; K. Walker et al., 2023).

In this case, institutional leadership plays an important role. Adaptive and forward-looking leaders can create an innovative culture and drive effective technology integration (Ibrahim et al., 2022; Walimbwa et al., 2021). (Yang et al., 2025) (Yang et al., 2025) (Arnold & Sangrà, 2018; Yu & Ismail, 2024). Leadership that is responsive to change will determine the success of the transition to a more advanced digital learning paradigm. Madrasah heads who have a far-sighted vision, are adaptive to technological developments, and are able to read the dynamics of teacher and student needs, will be more effective in directing their institutions towards sustainable digital transformation.

The Head of the Madrasah plays a central role as the driving force in the digital transformation process at Madrasah Aliyah Negeri (MAN) Bondowoso. The results of the research on the Madrasah Head's strategy in improving teachers' digital competence show that Madrasah Heads implement various

strategies to encourage the improvement of teachers' digital skills. These strategies include:

Strategi Kepala Madrasah dalam Meningkatkan Kompetensi Digital Guru



Figure 1: Conceptual Framework of Madrasah Heads' Strategies in Improving Teachers' Digital Competence

1. Collaborative Digital Competency Mapping

In an effort to improve teachers' digital competence, the Head of Madrasah Aliyah Negeri (MAN) Bondowoso implemented a competency mapping strategy collaboratively. One of the strategic steps taken is to collaborate with the State University of Malang to conduct a comprehensive mapping of teachers' abilities in digital-based learning. The results of this mapping are manifested in the form of "Digital Report Cards", an evaluation instrument that describes the level of teacher mastery in four main aspects, namely mastery of basic technology, use of digital platforms, interactive learning design, and the use of digital media. The data from the Digital Report is then used as a reference to design a training program that is more focused and in accordance with the needs of each teacher, so that the interventions provided are really relevant and have a direct impact on improving their digital competence.

The collaborative approach applied by MAN Bondowoso, especially through a partnership with the State University of Malang, reflects the strategy of strengthening teacher professionalism based on inter-institutional synergy. This collaboration not only strengthens the validity of the process of mapping teachers' digital competencies, but is also in line with the spirit of *Freedom of Learning* launched by the Ministry of Education and Culture, where schools and universities work together in developing the capacity of educators. This is

reinforced by findings that confirm that partnerships between schools and universities have proven effective in objectively identifying teacher competency gaps.

Collaboration between schools and universities is a strategy that has proven effective in overcoming teacher competency gaps and improving the quality of learning. Previous studies have confirmed that these partnerships not only strengthen teachers' pedagogical skills, but also play an important role in bridging the gap between theory and practice in the educational environment. Sin (2020) shows that this collaboration forms an innovative professional learning community (Sin, 2020). Casale & Thomas (2018) added that *the co-teaching* model in partnership creates a collaborative "third space" that generates new knowledge (Casale & Thomas, 2018). In addition, Melnyk (2022) and Kalogirou et al. (2020) emphasizing the importance of the direct involvement of teachers and school leaders in designing curriculum and learning strategies (Kalogirou et al., 2020; Melnyk, 2022). Weerakoon & Careemdeen (2023) also underlined that this collaborative approach encourages teacher efficacy through contextual and innovative strategies (Weerakoon & Careemdeen, 2023). Thus, the collaborative approach carried out by MAN Bondowoso shows a relevant and effective institutional synergy model in improving teacher competence in the digital era.

One of the important innovations in this process is the use of Digital Report Cards as a diagnostic instrument. By visualizing the achievement of teacher competencies, this report card allows madrasas to map training needs more specifically—for example, teachers who are weak in interactive learning design but have a good command of basic technology. This data-driven approach helps reduce bias in the preparation of training programs, as intervention decisions are based on empirical evidence, not assumptions. These findings are in line with the theory of Dias-Trindade et al. (2023) (Dias-Trindade et al., 2023)(Shahzadi & Ducasse, 2022) (Suastra, 2017) (Dias-Trindade et al., 2023)(Shahzadi & Ducasse, 2022)(Suastra, 2017)

Practically, the implementation of the Digital Report Card has two main implications. First, it allows for personalization of training so that training can be designed differently according to the needs of each teacher. This helps in the efficiency of resource utilization such as time, budget, and effort. Second, this report card can be used periodically as a continuous evaluation tool to monitor the development of teacher competencies and assess the impact of the training that has been provided.

2. Tiered Training

The next strategy implemented by the Head of MAN Bondowoso in improving teachers' digital competence is the implementation of training that is multi-level and easily accessible. Regular training is held at least once a year with a focus on improving practical skills relevant to digital learning needs. In addition to structured training at the madrasah level, teachers are also encouraged to take part in independent training through the Ministry of Religion's Smart platform (<https://pintar.kemenag.go.id/>). The platform provides a variety of integrated features such as learning materials, modules, and assessment tools that support the overall online learning process. The advantage of this platform lies in its flexibility of access which allows teachers to learn at any time as needed (on-demand). The training materials include the operation of devices such as Smart TVs and mastery of various digital learning platforms, so that teachers can apply technology effectively in the teaching and learning process.

The results of the study show that the training strategies applied at MAN Bondowoso are divided into two main approaches, namely routine training and platform-based self-training. Regular training, which is held at least once a year, plays an important role in updating teachers' knowledge and helping them adapt to the latest technological developments.

This approach is in line with the views of Belovitskaya et al. (2021), who emphasize that teacher professional development is key in facing the challenges and opportunities of digitalization (Belovitskaya et al., 2021). Meanwhile, self-training through digital platforms provides flexibility for teachers to learn according to their needs and pace. This is in line with the findings of Singh et al. (2022) who emphasized the importance of continuous training so that teachers are able to integrate digital media effectively and equip students with critical literacy in the digital era (Singh et al., 2022).

The training's focus on practical skills, such as the operation of Smart TVs and the use of digital platforms, strengthens the hands-on application aspect of learning, while also bridging the gap between theory and practice in the classroom. In addition, madrasahs also encourage independent training through digital platforms such as the Ministry of Religion's Pintar. This learning model provides the flexibility of on-demand learning, allowing teachers to adapt the learning process to their needs and rhythms. This approach makes it easier for teachers to apply training materials directly, thereby accelerating the learning cycle, implementation, and evaluation of learning (Malik et al., 2024; Timalisina, 2024) (Malik et al., 2024; Timalisina, 2024).

3. Digital-Based Supervision

In order to increase the effectiveness of supervision and the development of teachers' digital competencies, the Head of MAN Bondowoso initiated the development of the e-Journal application that can be installed directly on teachers' mobile phones. This application functions as a digital supervision tool that makes it easier for Madrasah Heads to monitor teacher performance in real-time. Through e-Journal, the implementation of teaching and learning activities (KBM) can be directly supervised, while teacher performance data (GTK) is automatically recapitulated and presented in an informative form. In addition, this application also allows the Head of Madrasah to provide feedback quickly and in a timely manner, as well as develop an accurate and actual data-based human resource development program. This digital supervision model supports the creation of a cycle of continuous improvement in improving the quality of learning and teacher professionalism in the madrasah environment.

The digital-based supervision strategy through *the e-Jurnal application* at MAN Bondowoso is an important innovation in efficient, adaptive, and data-based academic supervision. This application allows Madrasah Heads to monitor the implementation of teaching and learning activities (KBM) in real-time, overcoming conventional supervision constraints that are often limited by time and distance. The GTK data auto-recap feature accelerates performance analysis, so that interventions can be carried out precisely based on actual data, supporting *the data-driven decision-making* approach as suggested by Mandinach & Gummer (2016).

In addition to supervision, *e-Jurnal* also supports a quick feedback mechanism, which allows teachers to receive input directly without having to wait for formal supervision. This creates a continuous improvement cycle according to the principle of *continuous improvement* (Deming, 1986), through *plan-do-check-act* stages that are integrated in one platform. Thus, teachers are encouraged to continue to evaluate and improve their learning practices (Lahidji & Tucker, 2016).

D. Conclusion

The Head of Madrasah MAN Bondowoso implements a three-pillar structured strategy, namely: Competency mapping, tiered training, and digital supervision—to improve teachers' digital competence, especially to overcome gaps in senior teachers. This approach is not only technical (tool training), but

also systemic through data-based monitoring (*e-Journal*) and needs-based development of mapping results. The use of the national platform (*Pintar Kemenag*) expands access and sustainability of learning. The success of this strategy is strengthened by encouraging synergistic collaboration between generations of teachers, where the pedagogical experience of senior teachers is combined with the digital skills of young teachers. The sustainable implementation of this strategy is crucial to ensure that MAN Bondowoso can adapt to the demands of digitizing education and the Independent Curriculum effectively.

E. Research Implications

This research provides important implications for the digital transformation process of madrasas, especially in the context of the diversity of teachers' ages. The results and strategies offered can be used as a reference in formulating policies to improve teacher competence, designing training according to needs, and building a data-based supervision system. In addition, this research also opens up a space for collaboration between madrasas and universities in creating contextual, adaptive, and sustainable educational solutions in the digital era.

F. Suggestion

1. For Other Madrasas

Other madrasas that are or will carry out digital transformation are advised to start by mapping teachers' digital competencies in a systematic and structured manner. This step is important to know accurately the level of technological ability that teachers have, so that the training designed can be more targeted and in accordance with the needs of each individual. Training should be structured in stages—from basic to advanced—and tailored to teachers' level of technology proficiency, especially for senior teachers who may require a more participatory and supportive approach to specific skills. In addition to training, madrasas are also advised to implement a digital-based supervision system such as the use of *e-Jurnal*, which allows real-time and data-based monitoring of the learning process. With this system, madrasah heads can provide faster, more accurate, and constructive feedback to teachers.

2. Bagi Perguruan Tinggi di Bondowoso

It is hoped that universities in Bondowoso can take a more active role through the allocation of community service programs to assist schools and madrassas that face challenges in digital transformation. So far, digitization solutions have been facilitated by many campuses outside the region, such as the State University of Malang. Therefore, the involvement of local campuses will be a strategic contribution in strengthening the technology-based education ecosystem in the Bondowoso area.

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