

Integrating artificial intelligence into thematic learning: The readiness and challenges of teachers at madrasah ibtidaiyah

Nurul Aini*, Khaeruddin Said, Baiq Ida Astini

Universitas Muhammadiyah Mataram, Indonesia

Submitted:
13-12-2025

Accepted:
21-05-2026

Published:
01-06-2026

Abstract: This study aims to explore the readiness and challenges of Madrasah Ibtidaiyah (MI) teachers in integrating Artificial Intelligence (AI) technology into thematic learning in the era of Education 5.0. This study uses a qualitative approach with field research conducted at MIN 1 Kota Mataram in November 2025, involving six informants selected purposively, consisting of the principal and five classroom teachers. Data were obtained through observation, in-depth interviews, and documentation, then analyzed based on the Miles and Huberman model through the processes of data collection, reduction, presentation, and conclusion drawing, with triangulation as a technique to ensure data validity. The research findings show that MIN teachers already have a basic understanding of AI and show interest in its application, but its implementation is still hampered by limitations in technology-based pedagogical competence, lack of infrastructure, and inadequate institutional support. Nevertheless, the independent efforts of teachers and informal guidance from the principal indicate considerable opportunities for development. This study emphasizes the need for structured training, continuous mentoring, and supportive internal policies to strengthen AI integration, while also serving as a basis for developing a more effective AI training model for MI teachers.

Keywords: Artificial intelligence, learning challenges, teacher readiness

Abstrak: Penelitian ini bertujuan mengeksplorasi kesiapan serta tantangan guru Madrasah Ibtidaiyah (MI) dalam mengintegrasikan teknologi Artificial Intelligence (AI) ke dalam pembelajaran tematik pada era Education 5.0. Studi ini menggunakan pendekatan kualitatif dengan jenis penelitian lapangan yang dilakukan di MIN 1 Kota Mataram pada November 2025, melibatkan enam informan yang dipilih secara *purposive*, terdiri atas kepala madrasah dan lima guru kelas. Data diperoleh melalui observasi, wawancara mendalam, dan dokumentasi, kemudian dianalisis berdasarkan model Miles dan Huberman melalui proses pengumpulan, reduksi, penyajian data, serta penarikan kesimpulan, dengan triangulasi sebagai teknik untuk memastikan keabsahan data. Temuan penelitian menunjukkan bahwa guru MI telah memiliki pemahaman awal mengenai AI dan menunjukkan minat dalam penerapannya, tetapi implementasinya masih terhambat oleh keterbatasan kompetensi pedagogis berbasis teknologi, kurangnya sarana prasarana, serta dukungan kelembagaan yang belum memadai. Walaupun demikian, adanya upaya mandiri guru serta arahan informal dari kepala sekolah mengindikasikan peluang pengembangan yang cukup besar. Studi ini menegaskan perlunya pelatihan yang terstruktur, pendampingan berkelanjutan, dan kebijakan internal yang mendukung untuk memperkuat integrasi AI, sekaligus menjadi landasan bagi penyusunan model pelatihan AI yang lebih efektif bagi guru MI.

Kata kunci: Kecerdasan Buatan, tantangan pembelajaran, kesiapan guru

This is an
open access
article under
the CC-BY-SA
license



*Corresponding author: nurulaini08082004@gmail.com

INTRODUCTION

The development of artificial intelligence (AI) technology has changed the paradigm of education globally, including at the primary school level (Abidin, 2023). Teachers' readiness to use AI includes their ability to understand, master, and apply the technology to improve learning effectiveness (Alam et al., 2024). This readiness consists of three main dimensions: technical readiness in operating AI tools, pedagogical readiness in designing

AI-based learning activities, and attitudinal readiness in dealing with the ethical and practical implications of AI use (Manggala et al., 2025). Within the framework of Education 5.0, teachers are expected not only to teach, but also to collaborate with technology to create creative, student-centred learning (Amelia, 2023, Mustofa et al., 2024). At the madrasah ibtidaiyah (MI) level, local values, available facilities, and school support play a significant role in shaping teacher readiness. This gap is clearly evident in thematic learning, where these three dimensions of readiness must be aligned for AI integration to be effective. However, empirical studies exploring how this readiness emerges among MI teachers are still limited, particularly in Indonesia.

Based on the initial observations conducted at MIN 1 Kota Mataram, thematic learning is still dominated by conventional methods such as lectures, question-and-answer sessions, and the use of textbooks. Although teachers have utilised digital devices such as laptops and mobile phones, their use is still limited to administrative activities such as preparing teaching materials, searching for teaching resources, and creating simple media. The use of AI in direct teaching activities, such as personalising materials, automatically evaluating work and providing feedback to students, is still very limited. Initial discussions with several teachers also revealed that while most teachers are familiar with AI, they do not yet understand how to apply it in a pedagogical context. This situation indicates a gap between the potential of AI in Education 5.0 and the current state of teaching and learning in Madrasah Ibtidaiyah, making this research important. Thematic learning integrates various subjects into one theme so that students can understand the material comprehensively (Churiroh et al., 2025, Nasir et al., 2024). AI has the potential to improve the quality of thematic learning by adjusting the material to suit the students' abilities and providing feedback based on learning outcomes. The use of virtual assistants and AI-based applications also makes learning more interactive and engaging. Thus, the collaboration between thematic learning and AI can improve the efficiency and effectiveness of learning (Wicaksono et al., 2025). However, the success of AI-based thematic learning is highly dependent on teachers' pedagogical readiness; without this readiness, the use of AI tools to create interactive and personalised learning will not be optimal.

Teachers' readiness to use AI is significantly influenced by their experience and professional training. Teachers who have undergone technology training tend to be more confident and effective in using AI in the classroom (Huda, 2024). In addition, teachers who are accustomed to using digital technology adapt more quickly to AI-based learning (Maulid et al., 2024). In Indonesia, training combined with mentoring has been proven to improve teachers' skills in integrating AI into thematic learning. These findings emphasise the importance of hands-on training in preparing teachers for technological changes in the Education 5.0 era. However, most studies still focus on public primary schools, with few exploring the MI context, where religious and institutional values influence the impact of training on teacher readiness. This highlights the need for research that specifically focuses on MI teachers in the context of thematic learning.

AI can make thematic learning more engaging and tailored to students' needs. (Suryani et al., 2024). AI tailors learning materials to each student's learning pace, thereby increasing comprehension and participation. AI-based learning can also improve student focus and motivation, and enable teachers to provide quick and accurate feedback (Yanto et al., 2025). These benefits demonstrate that AI has the potential to improve student learning

outcomes and teacher work efficiency (Yulianti et al., 2024). However, most studies emphasise learning outcomes and technological performance, while attention to teacher readiness in madrasah environments remains limited. Therefore, it is important to examine not only the benefits of AI, but also how MI teachers prepare themselves to integrate it into thematic learning.

Despite its great potential, teachers face various challenges in implementing AI, including infrastructure limitations, low understanding of AI, budget constraints, and minimal school support (Aranda, 2024). Many teachers do not yet have a sufficient understanding of how AI works, making them hesitant to use it in learning activities. In Indonesia, budget constraints and a lack of support from schools make it difficult to fully implement AI-based technology. The lack of clear guidelines and continuous professional development further complicates integration (Idawati et al., 2025). This challenge goes beyond technical issues and reflects systemic and organisational readiness problems, highlighting the need for research that explores these inhibiting factors in depth.

Teachers' attitudes and confidence also have a significant influence on AI integration. Confident teachers tend to be more daring in innovating and adapting AI in classroom activities, while teachers with a positive attitude towards technology are better prepared to implement AI effectively (Kisno et al., 2023). Conversely, concerns that AI could replace teachers may reduce motivation and hinder adoption. This emphasises the importance of psychological dimensions and attitudes in teacher readiness; strengthening positive attitudes and self-confidence is key to the effective integration of AI in thematic learning.

Based on the above, training, school support, availability of facilities, and the attitude and self-confidence of MI teachers influence their readiness and the challenges they face in integrating AI into thematic learning. Although AI has great potential, there are still obstacles to its implementation in line with educational values in MI. Therefore, the aim of this study is to explore the technical, pedagogical and attitudinal preparedness of MI teachers, as well as the challenges of implementing AI in thematic learning. This study is novel because it specifically examines these aspects in the context of MI in the era of Education 5.0. The study uses a qualitative approach through interviews and documentation with thematic analysis. The findings of the study are expected to form the basis for the development of teacher training, institutional policies, and innovative teaching practices in the context of MI.

METHOD

This study uses a qualitative approach with fieldwork conducted in November 2025 at Madrasah Ibtidaiyah Negeri (MIN) 1 Kota Mataram. The main objective of this study is to determine the readiness of teachers in integrating artificial intelligence (AI) technology into thematic learning while examining various challenges that arise in the era of Education 5.0. There were six informants consisting of the principal and five teachers from grades one to five, who were selected purposively because they were directly related to the focus of the study. Data were collected through observation, in-depth interviews, and document analysis related to technology utilization policies and learning practices in madrasahs. The selection of informants was based on specific criteria, namely: (1) teachers who actively implement thematic learning at the madrasah ibtidaiyah level, (2) teachers who have

previous experience in using digital-based learning media or technology, and (3) school leaders who are responsible for implementing academic and technology policies.

Observations were conducted in person during thematic learning sessions in the classroom to examine the teaching methods employed by teachers, the use of digital learning resources, the use of technological devices such as laptops, LCD projectors and internet access, and the ways in which AI was applied in learning activities. In addition, the observations focused on teacher-pupil interactions, the readiness of school facilities and infrastructure, and the learning environment conducive to the integration of technology. In-depth interviews were conducted using a semi-structured approach to gather more comprehensive data on teachers' readiness and the challenges they face in integrating AI. Some examples of interview questions included: (1) how teachers understand Artificial Intelligence in an educational context; (2) whether teachers have ever used AI-based applications in the preparation or delivery of thematic learning; (3) what obstacles they face in integrating AI into learning; (4) what kind of support is provided by the school regarding the use of AI technology; and (5) what potential AI has for improving the quality of learning at Madrasah Ibtidaiyah from the teachers' perspective. The head of the madrasah gave official permission for the research to be conducted, and all informants received a thorough explanation before voluntarily agreeing to participate. In addition to institutional permission and informant consent, no additional ethical approval was required because this research did not involve intervention with human subjects. In accordance with qualitative research ethics guidelines, the identities of participants were kept confidential. Data collection procedures, interviews, and observations were conducted in accordance with established qualitative research methodological principles, so no additional protocols beyond existing methodological references were required.

The data analysis process was conducted using the Miles and Huberman model, which includes the stages of data collection, data reduction, data presentation, and conclusion drawing. The validity of the findings was ensured through triangulation of sources and techniques, re-examination of data, and verification of results with informants (member check). Given that the purpose of this study was to gain an in-depth understanding of the phenomenon under review, all analyses were descriptive and did not involve statistical calculations. Figure 1 presents the general research flow, from the data collection stage to the compilation of the final research results.

A systematic qualitative research flow that describes the entire data processing procedure is shown in Figure 1. The first stage involves data collection at MIN 1 Kota Mataram through observation, interviews, and documentation studies. At this stage, researchers collect various field data relevant to teachers' readiness and challenges in integrating AI technology into thematic learning. After the data was collected, the process continued to the data reduction stage, which included selecting, simplifying, and focusing on important information directly related to the research topic. Data reduction aims to identify truly significant information in order to present a comprehensive picture of the phenomenon being studied. The data presentation stage is carried out by organizing and compiling the reduced data into matrices, theme categories, relationship patterns, and comprehensive narratives from the results of interviews and observations. This data presentation makes it easier for researchers to understand the interrelationships between themes, thereby accelerating the further analysis process. Next, the researcher enters the

conclusion drawing stage, which involves a process of interpretation and verification to ensure that the research findings accurately reflect the conditions in the field. At this stage, the researcher interprets the meaning of all the data that has been analyzed.

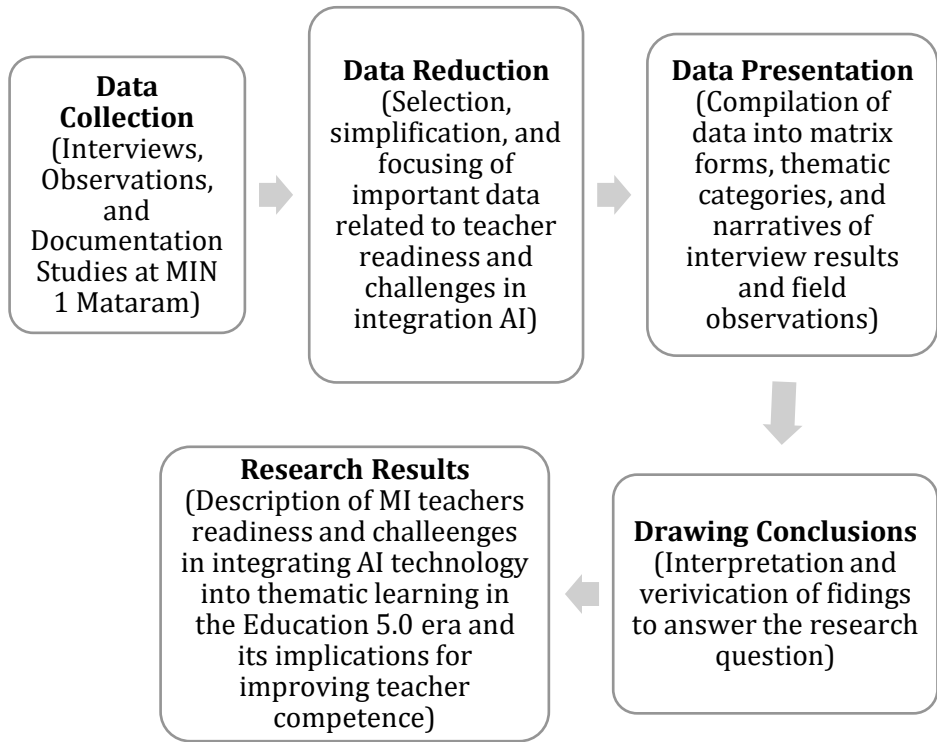


Fig. 1. Research procedure

The final stage of the research process is the research results, which contain a description of the readiness and challenges of MI in integrating AI technology into thematic learning in the Education 5.0 era and its implications for improving teacher competence. The results of this study are a synthesis of the entire process of data collection, processing, and analysis that has been carried out (Rifa'i, 2023). This study does not discuss the evaluation of technological effectiveness or technical aspects of the device because the focus of the study is limited to teachers' readiness and challenges in using AI technology. All research data, including observation notes, interview transcripts, and supporting documents, are internal because they contain institutional information and are not publicly available

RESULTS AND DISCUSSION

Based on study on madrasahs' and instructors' preparedness, difficulties, and efforts to incorporate AI into theme instruction at MI. Three primary focuses teacher knowledge preparedness, implementation hurdles, and initiatives created at the individual and institutional levels were used to examine the results descriptively. To provide a more systematic overview of teachers' readiness and the challenges they face in integrating AI, the research findings are summarised in Table 1.

Table 1. Categories of teachers' readiness and challenges in integrating AI into thematic learning

Aspect	Category	Description of Findings	Evidence
Readiness	Technical Readiness	Teachers are already familiar with the basic uses of AI, such as creating summaries, generating images and preparing teaching materials	G1 Interview
	Pedagogical Readiness	The use of AI for adaptive learning, personalisation, student monitoring and automated feedback remains limited	Observations and interviews
	Attitude and Motivation	Teachers are showing a positive willingness to learn about AI independently through YouTube and online training	G4 Interview
Challenges	Facilities and Infrastructure	Limitations in LCD projectors, computers/laptops and unstable internet connections are hindering the implementation of AI	Observation and G3 interview
	Technological Competence	Teachers are still struggling to choose and use the right AI platform for teaching	G2 Interview
	Institutional Support	Formal training, support and school policies relating to the integration of AI remain limited	Observations and interviews

According to Table 1, teachers' readiness to integrate AI is influenced by their technical competence, pedagogical understanding, and positive attitude towards the use of technology in learning. Meanwhile, the main challenges faced include infrastructure limitations, low levels of technological competence, and the still limited institutional support in the form of training and mentoring. These findings indicate that the success of AI integration in Madrasah Ibtidaiyah depends not only on individual teachers' initiatives but also requires systematic support from the school and the availability of adequate facilities.

Teachers' knowledge and understanding readiness

Based on findings made by researchers at Madrasah Ibtidaiyah Negeri (MIN) 1 Kota Mataram, it seems that there is still very little usage of AI in educational activities. Conventional teaching techniques including lectures, Q&A sessions, and the use of basic visual aids are still widely used by educators. AI platforms and applications are still rarely used directly in the classroom, whether for content delivery, evaluation, or tracking

students' progress. While some teachers do utilize digital devices like computers or mobile phones for material preparation, this use is mainly administrative in nature and occurs outside school hours.

According to the findings of the interview with G1, the majority of instructors have a basic understanding of AI technology, mostly through the usage of features or applications that are frequently used in everyday educational tasks. G1 stated:

“I usually use AI only to create summaries, images, or to help prepare materials. But when it comes to using it directly in teaching, I still don't understand how it works.”

According to the description, AI can be utilized for a number of useful applications, including the ability to efficiently collect instructional materials, produce more captivating visual media, summarize lengthy texts, convert speech to text, and automatically generate sample questions. These elements are thought to be particularly beneficial for lesson planning and time savings. The wider potential of AI is still not fully understood by educators, particularly when it comes to pedagogical support. The use of AI to create individualized instruction based on student requirements is unfamiliar to most educators. Additionally, teachers are still unaware of how AI can continuously track students' learning progress and provide automatic feedback. Some educators still feel uncomfortable and unconfident when experimenting with cutting-edge AI features. This circumstance indicates that teachers' knowledge of AI is still in its infancy. AI is viewed less as a deep learning approach and more as a technical or administrative tool. AI appears to be beginning to be used by educators in the teaching and learning process. Teachers have integrated verbal explanations with a variety of more interactive digital media, so learning activities are no longer only reliant on traditional means. Because it is backed by sufficient infrastructure, the integration of AI can function effectively. The stability of the internet in the classroom allows teachers to use LCD projectors without interfering with other teachers and open AI-based platforms without any problems. This limited understanding highlights the need for structured pedagogical training so that teachers can use AI effectively to support adaptive learning and personalisation for students.

These findings are consistent with previous research Siswanto et al. (2024) argues that in the early stages of AI adoption, teachers tend to use it for administrative tasks rather than pedagogical purposes. Teachers generally possess operational AI literacy, but have not yet mastered the pedagogical literacy that would enable them to design adaptive learning. Thus, this study not only reinforces previous literature, but also emphasises the specific context of MI, where the use of AI is more technical in nature and has not yet been fully integrated into adaptive learning strategies.

Challenges in integrating ai into competencies and infrastructure

It seems that the application of AI in learning has not been perfected, based on observations at MIN 1 Kota Mataram. The state of school infrastructure reveals that there are still some classes without LCD projectors, there aren't many PCs or laptops available, and internet access is frequently erratic. This suggests that there is still little infrastructural support for the application of AI-based technology. Additionally, learning activities in the classroom demonstrate that teachers still rely on conventional techniques and media, but

AI platforms are starting to be used in the process of providing content and assessing learning.

Challenges in integrating AI into competencies

Difficulties in incorporating AI into personal skills. Many educators acknowledge that they don't know enough about the kinds of AI platforms that are appropriate for teaching, and they are concerned about making mistakes or selecting the incorrect program. G2 stated:

“We actually want to try AI, but we are often confused about which application to start with and are afraid of using it incorrectly. The process of adapting to new technology often requires time and guidance, which is currently not adequately available in our location.”

The difficulties teachers encounter with competency are explained in this statement. They still struggle to choose the best AI platform and are concerned about operating it incorrectly. Teachers have not been able to fully develop their digital abilities since the school environment does not yet provide the time and support needed for the process of adjusting to new technology. This situation emphasises the need for ongoing support and guidance from schools so that teachers are more confident and competent in utilising AI for teaching and learning activities.

These findings are consistent with Rahim (2025) who emphasises the importance of ongoing training and support from school management in strengthening teachers' readiness for the integration of technology. Without adequate support, teachers' motivation alone is not enough to ensure the successful implementation of AI in classroom teaching practices.

Challenges in infrastructure

Many educators claim that there is still a shortage of supporting equipment, such as computers, LCD projectors, and internet connectivity. Since many classrooms still lack LCDs, AI cannot be fully utilized in the teaching and learning process. Additionally, the often unreliable internet connection makes it difficult for teachers to employ AI-based platforms, especially those that require a regular and dependable connection. The condition of the inadequate and antiquated school equipment is another significant obstacle. This is corroborated by the following comment from G3:

“The LCD in our classroom is often shared, so it is not always available for use. The internet is also sometimes slow, so it is difficult to even open AI applications.”

This statement highlights the infrastructure limitations that educators face. Because LCDs are not always readily available, their application in educational settings is restricted. This infrastructure condition emphasises the importance of providing adequate facilities and a stable internet network as prerequisites for smooth and effective AI integration. Additionally, instructors' access to AI programs is hampered by the frequently sluggish internet connection, particularly for those who need a reliable network. Teachers find it

more challenging to successfully incorporate AI into the classroom because of this circumstance.

This finding is consistent with Mandalia (2024) who emphasises that infrastructure readiness is a key prerequisite for the successful integration of educational technology. In the context of MI, technological development must also remain aligned with institutional values and local educational culture.

Teacher motivation and institutional support in the integration of AI.

Even though AI technology hasn't yet been used directly in educational activities, observations at MIN 1 Kota Mataram seem to indicate that some teachers are taking the initiative to use it. This is demonstrated by the instructors' propensity to utilize their laptops or cell phones after school hours to look for educational media inspiration, investigate basic AI functions, or view lessons on using digital platforms. However, because teachers rely more on physical media and traditional methods, the use of AI in the learning process is still somewhat limited.

Interviews with G4 show that teachers are highly motivated to learn and try AI technology. Many teachers attend online seminars, short training courses, and tutorials that they find independently on the internet. Some teachers even try various AI-based learning applications to create teaching media, learning videos, and student worksheets. G4 said that:

“We taught ourselves from YouTube or online training because we wanted to know how AI could be used to create more engaging teaching materials.”

Teachers' autonomous efforts to improve their digital skills are exemplified by this statement. In order to provide more interesting instructional materials, they took the initiative to learn about the application of AI using YouTube and online training. This action shows self-motivation and highlights the absence of formal school-based mentoring and training programs. Formal AI training is still infrequent, though. Schools typically only send one or two teachers as representatives when outside training is provided. Because of this need, the majority of educators must learn on their own, despite the fact that they understand how crucial technological proficiency is to learning in the digital age. These autonomous initiatives demonstrate an understanding of how crucial technology is to learning in the digital age.

This finding is consistent with that of Mukhlis et al. (2025) who state that self-motivation is a key factor in teachers' readiness in the education 5.0 era. However, self-directed learning alone is not sufficient without formal institutional support. Figure 2 illustrates how educators use AI Canva.



Fig. 2. Training on the use of AI Canva for learning media

Figure 2 shows how educators search social media, teacher community platforms, and colleagues for examples of AI utilization strategies, like AI Canva. These independent efforts by teachers demonstrate high motivation, but to ensure the sustainability of AI integration, schools need to provide formal training programmes, internal mentoring, and systematic institutional support. They put a lot of effort into changing these patterns, even if they are still in the trial-and-error stage. Teachers who were chosen as delegates to attend training outside of the classroom also shared with their classmates the knowledge and abilities they gained, such as how to use AI Canva. This effort to share knowledge is a form of internal collaboration that helps broaden other instructors' understanding of the use of AI, even when the usage of AI in the classroom is currently rudimentary and unguided.

CONCLUSION

The results of the study indicate that the application of artificial intelligence (AI) in thematic learning at Madrasah Ibtidaiyah (MI) is still in its early stages. Teachers generally use AI for technical and administrative needs, while its use to support adaptive learning and student personalisation is still very limited. The success of AI integration is influenced by four main factors, namely teacher competence and pedagogical readiness, infrastructure readiness, institutional support, and teacher motivation and attitude. These findings confirm that individual teacher initiatives are not enough without structured training and institutional support. Therefore, the recommended strategies include systematic AI training, the development of guidelines for AI use that are in line with religious and cultural values, the provision of adequate technological facilities, and active collaboration between teachers and school management to ensure that AI can support adaptive, personalised, and sustainable learning, in line with the Pancasila Student Profile.

For future research, it is recommended to explore the implementation of AI in project-based thematic learning models or more personalised learning, including measuring the impact of AI on student achievement and learning motivation. Subsequent research could also focus on more effective teacher training strategies and the development of school policies that support the sustainable use of AI. In addition, comparative studies between madrasahs with different levels of infrastructure readiness could provide additional

insights into the influence of institutional support and learning environments on the effectiveness of AI integration.

REFERENCES

- Abidin, M. A. (2023). Implementasi Teknologi Artificial Intelligence (AI) Untuk Mendukung Pembelajaran Siswa di Madrasah Ibtidaiyah Kecamatan Krembung Sidoarjo. *Jurnal Madrasah Ibtidaiyah*, 2(1), 80–95. <https://journal.unusida.ac.id/index.php/jmi/id/article/view/1112>
- Alam, B. P., Arifin, Z., Asmoro, E. T., Sutrisno, D., Syuhardi, Y. I., Sonny, M., Trista, R. T., & Nasution, S. (2024). Meningkatkan Kompetensi Guru SD Dengan Teknologi Artificial Intelligence AI Untuk Pendidikan Masa Depan. *TRIDHARMADIMAS: Jurnal Pengabdian Kepada Masyarakat Jayakarta*, 4(2), 164-172. <https://doi.org/10.52362/tridharmadimas.v4i2.1745>
- Amelia, U. (2023). Tantangan Pembelajaran Era Society 5.0 dalam Perspektif Manajemen Pendidikan. *Al-Marsus: Jurnal Manajemen Pendidikan Islam*, 1(1), 68-82. <https://doi.org/10.30983/al-marsus.v1i1.6415>
- Aranda, M. D. D. (2024). Peningkatan dan Pemerataan Perkembangan Teknologi di Dunia Pendidikan Melalui E-Learning di Indonesia: Kajian Literatur. *Jurnal Cakrawala Akademika*, 1(4), 1434–1446. <https://doi.org/https://10.70182/JCA.v1i4.32>
- Churiroh, N., Prayogo, M. S., Rahmadani, D. N. L., & Rahman, S. A. (2025). Analisis Konseptual Implementasi Pembelajaran Tematik Terpadu dalam Kurikulum Merdeka di Sekolah Dasar. *Jurnal Penelitian Ilmiah Multidisipliner*, 2(3), 2069–2078. <https://ojs.ruangpublikasi.com/index.php/jpim/article/view/1123>
- Huda, M. C. (2024). Pelatihan AI untuk Guru MI Muhammadiyah Kamulan: Meningkatkan Kompetensi Digital di Era Modern. *Jurnal Pengabdian Sosial*, 2(2), 3092–3100. <https://doi.org/10.59837/z39ngg95>
- Idawati, I., Neyarismi, F., Masrdatilla, R., Apyunita, D., & Usman, U. (2025). Implementasi Program Pelatihan Pemanfaatan Artificial Intelligence (Ai) Bagi Guru Sekolah Dasar Inpres Samata Untuk Mendorong Inovasi Dan Kreativitas Dalam Pembelajaran. *Jurnal Abdimas Indonesia*, 5(4), 2519–2529. <https://doi.org/10.34697/jai.v5i4.2332>
- Kisno, K., Fatmawati, N., Rizqiyani, R., Kurniasih, S., & Ratnasari, E. M. (2023). Pemanfaatan Teknologi Artificial Intelligences (AI) Sebagai Respon Positif Mahasiswa PIAUD Dalam Kreativitas Pembelajaran Dan Transformasi Digital. *Indonesian Journal of Islam Golden Age Education*, 4(1), 44–56. <https://doi.org/10.32332/ijigaed.v4i1.7878>
- Mandalia, S. A. (2024). Inovasi Teknologi Informasi untuk Efisiensi Manajemen Pendidikan dan Akuntabilitas di Madrasah Ibtidaiyah. *Shibyan: Jurnal Pendidikan Guru Madrasah Ibtidaiyah*, 2(1), 1-15. <https://doi.org/10.30999/shibyan.v2i1.3812>
- Manggala, I. S. A., Lestari, B. P., & Handika, R. (2025). Profil Pemahaman Guru PAI SD Terhadap Penggunaan AI. *Wahan Sekolah Dasar*, 33(2), 145-155. <https://doi.org/10.17977/wsd.v33i2.3349>
- Maulid, T. A., Maulana, M., & Isrok'atun, I. (2024). Keterampilan Guru dalam Membuat Media Pembelajaran Digital dengan Menggunakan Artificial Intelligence Aplikasi Canva. *Didaktika: Jurnal Pendidikan*, 13(1), 281–294.

- <https://mail.jurnaldidaktika.org/contents/article/view/485>
- Mukhlis, S., Setiawan, B., Ruwaida, G. A., Ms, Z., Febriyani, E. N. & Lestiani, M. E. (2025). Pelatihan Pengenalan Artificial Intelligence (AI) pada Proyek Penguatan Profil Pelajar Pancasila untuk Meningkatkan Kompetensi Guru pada Transformasi Digital di DKI Jakarta. *Inisiatif : Jurnal Dedikasi Pengabdian Masyarakat*, 4(1), 34–51. <https://doi.org/10.61227/inisiatif.v4i1.444>
- Mustofa, A., Hayuana, W., Damopolii, I., Ibrohim, I., & Susilo, H. (2024). The discovery learning and Google sites: Its application in learning the process of urine formation for high school students. *Inornatus: Biology Education Journal*, 4(2), 132–150. <https://doi.org/10.30862/inornatus.v4i2.711>
- Nasir, N. I. R. F., Mahanal, S., Ekawati, R., Damopolii, I., Supriyono, S., & Rahayuningsih, S. (2024). Primary school students' knowledge about animal life cycle material: The survey study. *Journal of Research in Instructional*, 4(1), 253–262. <https://doi.org/https://doi.org/10.30862/jri.v4i1.320>
- Rahim, A. (2025). Pelatihan Manajemen Organisasi Sekolah dalam Meningkatkan Mutu Pendidikan di Makassar. *SABAJAYA: Jurnal Pengabdian Kepada Masyarakat*, 3(4), 236–245. <https://journal.sabajayapublisher.com/index.php/jpkm/article/view/648>
- Rifa'i, Y. (2023). Analisis Metodologi Penelitian Kualitatif dalam Pengumpulan Data di Penelitian Ilmiah pada Penyusunan Mini Riset. *Cendekia Inovatif Dan Berbudaya : Jurnal Ilmu Sosial Dan Humaniora*, 1(1), 31–37. <https://doi.org/10.59996/cendib.v1i1.155>
- Siswanto, R., Kusmawan, U., Sukmayadi, D., Abidin, A. A. & Kadarisman, K. (2024). Pemanfaatan Artificial Intelligence dalam Perencanaan, Pelaksanaan, dan Evaluasi Pembelajaran oleh Mahasiswa Calon Guru Universitas Terbuka. *Jurnal Administrasi Pendidikan Islam*, 6(2), 143–158. <https://doi.org/10.15642/japi.2024.6.2.143-158>
- Suryani, A., Loliya, L., Rohman, F., Sowiyah, S., Sugianto, S., & Khomsiyati, S. (2024). Artificial Intelligence sebagai Media Pembelajaran untuk Anak Usia Dini. *Ceria Jurnal Pendidikan Anak Usia Dini*, 13(3), 391–415. <https://doi.org/10.31000/ceria.v13i3.12176>
- Wicaksono, V. D., Wijoyanto, D., Paksi, H. P., Wijaya, A., & Rahmawati, I. (2025). Inovasi AI dan Media Digital dalam Mengatasi Tantangan Pembelajaran Kelas Rangkap: Tinjauan Literatur Sistematis. *Prosiding Seminar Nasional Penelitian LPPM UMJ*. <https://jurnal.umj.ac.id/index.php/semnaslit/article/view/29206>
- Yanto, M., Sa'I, M., & Rizqiyah, N. (2025). Personalisasi Pendidikan Berbasis AI dalam Meningkatkan Kualitas Belajar Siswa. *Entita: Jurnal Pendidikan Ilmu Pengetahuan Sosial dan Ilmu - Ilmu Sosial*, 1(1), 507–522. <https://doi.org/10.19105/ejpis.v1i1.19116>
- Yulianti, E., Pratiwi, I. P., Suryati, S., Saluza, I., Marcelina, D., & Permatasari, I. (2024). Penerapan Kecerdasan Buatan Dalam Meningkatkan Produktivitas Guru Sekolah Dasar 13 Palembang. *Jurnal Abdimas Mandiri*, 8(2), 111–121. <https://doi.org/10.36982/jam.v8i2.4271>