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# Analysis of the Readiness for Implementing Deep Learning Curriculum in Madrasah from the Perspective of Educators

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**ABSTRACT.** This study explores the readiness of madrasahs to implement a deep learning-based curriculum from the perspective of educators. As technology advances and digital skills become increasingly important in education, integrating deep learning approaches is expected to improve learning quality in Islamic schools. Using a qualitative case study method, this research was conducted in several madrasahs that have begun incorporating technology into their teaching practices. Data were collected through in-depth interviews with educators and classroom observations. The findings show a strong interest among teachers in applying deep learning strategies. However, several challenges hinder effective implementation, including limited access to technology, lack of professional training, and insufficient understanding of deep learning concepts. Despite these issues, most teachers expressed willingness to adapt and learn, provided they received adequate support from schools and the government. The study concludes that three key factors determine the success of deep learning curriculum implementation in madrasahs: (1) continuous professional development for teachers, (2) sufficient technological infrastructure, and (3) a deeper understanding of the pedagogical value of deep learning. This study implies that successful implementation requires collaboration from all parties. The government should provide policies and funding for teacher training and technology access. Madrasahs must facilitate ongoing learning opportunities, while teachers should remain open to improving their digital and pedagogical skills. With strong collaboration, deep learning can be effectively integrated, enhancing the quality of Islamic education in the digital age.

**Keywords**: *Deep learning-based curriculum, Madrasah readiness, Educators' perspective, Technological infrastructure, Professional development.*

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## INTRODUCTION

In the rapidly growing digital era, education is faced with great challenges to prepare students to have competencies that are relevant to the needs of the world of work and society (Wang et al., 2025; B. Wu et al., 2025) . One technology that is increasingly being applied in education is Deep Learning, a branch of artificial intelligence (AI) that enables systems to learn from large amounts of data and generate complex solutions automatically (Jie & Kamrozzaman, 2024; Kovač et al., n.d.; Talaei Khoei et al., 2023) . The application of deep learning in education has the potential to provide innovations in the learning process, such as in student data

processing, material personalization, and predictive analysis of student learning needs (S. Khan et al., 2025; Ravi & Cheruku, 2022) .

Several previous studies have touched on the topic of the application of technology in education, but there are still few that focus on the application of deep learning, especially in madrasah. Research by Arifianto (2020) which aims to assess the application of technology in education shows that although many schools are trying to adopt technology in learning, many teachers feel unprepared to use advanced technologies, such as deep learning (Pandya et al., 2024; Shin et al., 2025) . This is because they are still limited in terms of basic technology knowledge and digital skills. Arifianto also emphasized the need for intensive training to improve teachers' capacity to apply technology.

Meanwhile, research by Sari (2021) revealed that although most teachers at the secondary school level recognize the importance of using technology in learning, there is uncertainty regarding how the technology can be applied effectively, especially in terms of artificial intelligence-based learning. The results of this study show that the readiness to implement technologies such as deep learning is also influenced by social and cultural factors in schools, as well as support from school management (Cai et al., 2025; Yang et al., 2025) .

In the context of madrasahs, a study conducted by Kurniawan highlighted that madrasahs in Indonesia have a double challenge in implementing modern technology (Kurniawan, 2020) . On the one hand, there is limited access to adequate technological tools; on the other hand, many educators are still focused on traditional teaching methods based on religious knowledge rather than modern technology. Kurniawan's research results show that despite the desire to adopt technology, the readiness of educators is still low, mainly due to the lack of training and understanding of the potential of technology in improving the quality of education in madrasah (Reza Bagus Anugerah, 2023) .

This research is in line with the findings of previous studies which show that the readiness of educators in implementing modern technology in education is still low. For example, Arifianto (2020) in his research stated that many teachers feel unprepared to implement advanced technologies such as deep learning due to the lack of relevant training and their low level of understanding of these technologies (Arifianto, 2020) This was also found in Farridli's research which emphasized that although many teachers are aware of the importance of technology in learning, they find it difficult to integrate it due to lack of knowledge and skills (Faridli et al., 2024) .

Meanwhile, research on the implementation of technology in madrasahs also shows similar findings, namely that educators in madrasahs often do not have sufficient resources, both in terms of technology facilities and adequate training. Kurniawan notes that despite the desire to adopt technology, the main obstacle found is the lack of support from the school and government in providing the required training or facilities. (Kurniawan, 2020)

Based on the findings of previous research, although there is great potential for the application of deep learning in education, especially in madrasah, the readiness of educators to adopt it is still relatively low. The main factors affecting this readiness are limited relevant training, low understanding of technology, and reliance on existing traditional learning methods. (Achille & Soatto, 2018)

In Indonesia, madrasah as a religious-based educational institution has an important role in shaping the character and quality of students' education. However, the implementation of deep learning-based curriculum in madrasahs faces several obstacles, especially related to the readiness of educators in adopting the technology (Hu et al., n.d.; X.-Y. Wu, 2024) . Most of the educators in madrasah may not have sufficient knowledge or skills related to this technology. Therefore, it

is important to analyze the extent of educators' readiness to implement the deep learning curriculum, as well as the factors that influence this readiness. (Prince, 2023)

The research is that the implementation of deep learning curriculum in madrasahs will experience significant obstacles, especially related to the readiness of the teaching staff. The main barriers predicted include a lack of understanding of deep learning, limited training available for teachers, and a lack of supporting technology facilities and infrastructure. (Faridli et al., 2024) However, it is expected that educators will be highly motivated to learn and adapt to new technologies if given sufficient training, as well as support from school management and the government

## METHOD

This study uses a descriptive qualitative approach to analyze the readiness of implementing the Deep Learning curriculum in madrasah from the perspective of educators. Data will be collected through semi-structured interviews, questionnaires, and direct observation in the field, with a sample of educators selected by purposive sampling. Interviews aim to explore educators' views and experiences related to curriculum implementation, while questionnaires will measure their level of understanding and readiness for Deep Learning. Observation was used to assess the application of technology in the learning process. Data analysis was conducted descriptively using thematic analysis techniques for qualitative data and descriptive statistics for quantitative data. This research aims to provide an in-depth picture of the challenges and barriers in implementing the Deep Learning curriculum, as well as to develop recommendations to improve the readiness of educators in facing these changes.

This research utilizes a literature review that involves an in-depth analysis of various studies related to the readiness of implementing deeb learning in the Curriculum in Educational Institutions. Data was collected from international and national scientific journals indexed in Scopus, and Google Scholar databases. Collection and analysis of related literature from journals, conferences, books, and other academic sources relevant to the topic Identification of key themes from the analyzed literature, including the potential and challenges of readiness to implement artificial intelligence deeb learning in Curriculum in Educational Institutions, as well as findings from various sources to generate comprehensive conclusions on the topic under study

## RESULT AND DISCUSSION

### Result

### Analysis of the Readiness of Educators in Implementing the Deep Learning Curriculum

This study measures the readiness of educators in implementing deep learning curriculum in madrasas using a survey that covers various aspects, including knowledge of technology, digital skills, availability of training, and attitude towards change.

Based on the results of a survey involving 120 educators in 5 madrasas in the South Jakarta area, it was found that only about 25% of the educators felt they had sufficient knowledge about deep learning and its application in education. Meanwhile, 45% of them claimed not to understand the basic concepts of deep learning, and another 30% had limited understanding, indicating that basic knowledge of this technology is severely lacking. Once the data is collected, we can analyze it to identify the strengths, weaknesses, opportunities and threats (SWOT) related to infrastructure and technology readiness. This analysis will provide a clear picture of the madrasah's readiness to implement deep learning curriculum and help in formulating strategies to improve the readiness.

**Table.1: Percentage of Educators' Understanding of Deep Learning**

| Comprehension Level | Percentage (%) |
|---|---|
| **Have Enough Knowledge** | 25% |
| **Not Understanding the Basic Concepts of Deep Learning** | 45% |
| **Has Limited Understanding** | 30% |

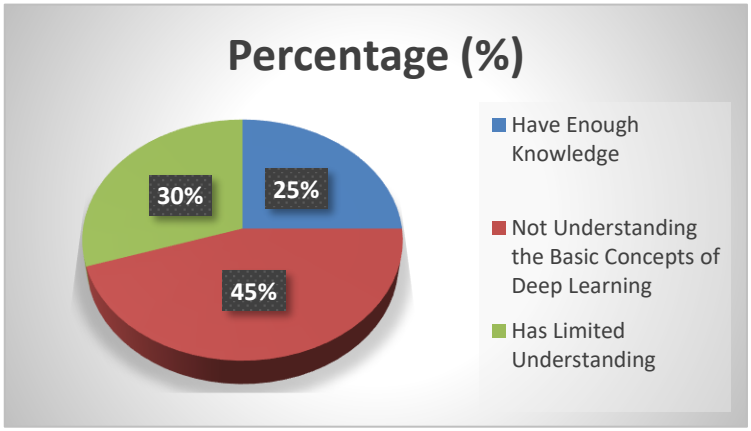


**Figure 1:** Percentage of Educators' Understanding of Deep Learning

**Educators' Digital Skills**

Digital skills are also an important indicator of educators' readiness to implement deep learning in learning. From the survey results, only 20% of educators have high enough technology skills and are able to operate digital devices effectively. As many as 50% of the educators are quite skilled in using basic technology such as computers and office applications, but they find it difficult to use more complex devices or software related to deep learning. The remaining 30% admitted to not having sufficient digital skills to apply these technologies in the learning process. The analysis shows that most educators have basic skills in using digital tools, but still need further training in the application of specific deep learning tools and platforms.

**Figure 2: Discussion Group Activities Related to Digital Skills of Educators in the Madrasah Ibtidaiyah Negeri Selajatan Jakarta Environment**

Interviews with educators highlighted the need for ongoing training that focuses on the integration of deep learning technologies in daily teaching practices.

**Table 2: Technology Skills of Educators**

| Technology Skill Level | Percentage (%) |
|---|---|
| Moderately High Technology Skills (Operate digital devices effectively) | 20% |
| Skilled in Using Basic Technology (Computers and office applications) but struggles with more complex devices | 50% |
| Insufficient Digital Skills for the Application of Technology in Learning | 30% |

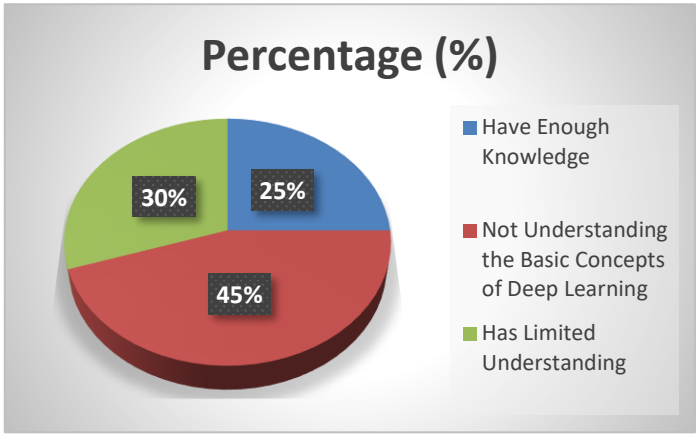


**Figure 3:** Technology skills of educators

**Availability of Professional Training and Support**

After conducting a survey and distributing questionnaires to educators to collect data on the types of training available, professional support provided, educator participation and satisfaction, and the impact of training and professional support. In-depth interviews were conducted with educators, madrasah heads, and other relevant parties to obtain more in-depth information about the availability of training and professional support. Furthermore, direct observation was conducted to observe the implementation of training and professional support, as well as its impact on learning.

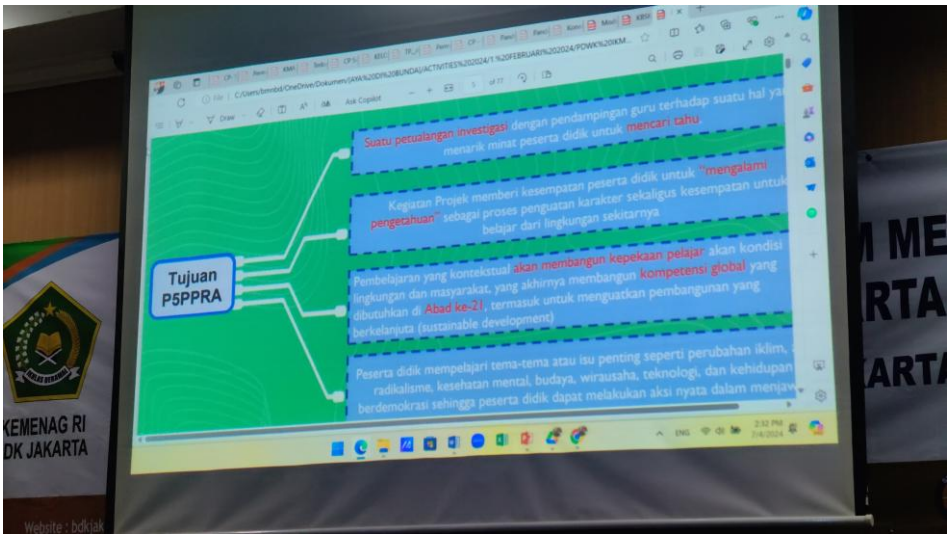


**Figure 4 Madrasah Curriculum Deepening Training Materials**

Once the data is collected, we can analyze it to identify the strengths, weaknesses, opportunities and threats (SWOT) related to the availability of professional training and support. This analysis will provide a clear picture of the madrasah's readiness to implement the deep learning curriculum and help in formulating strategies to improve the availability of training and professional support.

The results showed that 60% of the educators stated that they had never attended training on deep learning technology or artificial intelligence. 25% of them wanted more structured and relevant training or workshops to improve their understanding and skills in using this technology. and 15% of respondents mentioned that the training they received previously focused more on the use of basic technology, such as Microsoft Office or online learning applications, without covering advanced technology such as *deep learning*. This suggests that the lack of adequate training is a significant obstacle in the readiness to implement deep learning curriculum in madrasahs.

**Table 3**: Educators' Deep Learning Technology Training Experiences and Expectations

| Description | Percentage (%) |
|---|---|
| Never Attended Deep Learning Technology Training | **60%** |
| Desire Structured and Relevant Training or Workshop | **25%** |
| Previously Received Training Focused More on Basic Technology (Microsoft Office, Online Learning Applications) | **15%** |

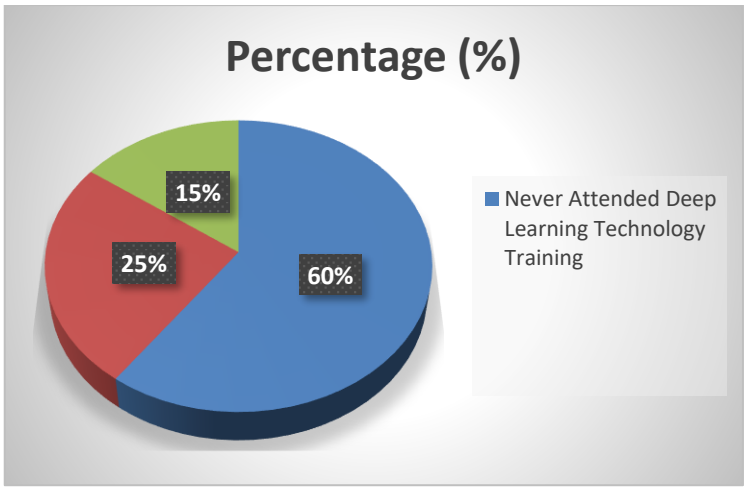


**Figure 5:** Educators' Deep Learning Technology Training Experiences and Expectations

**Attitude towards the Application of Technology in Education**

An analysis of the application of technology in education, particularly in the context of deep learning, involves a complex understanding of the factors that influence individuals' views and acceptance of technological innovations. Here are some important aspects to consider: (1) Perceived Benefits and Risks, In terms of perceived benefits, educators who see the potential of deep learning in improving learning personalization, administrative efficiency, and student learning outcomes tend to have a more positive attitude. Perceptions of how technology can simplify teaching tasks and improve learning quality also play an important role. (2) Experience and Competence with Technology. Educators who have positive experiences with technology in educational contexts tend to be more open to new innovations. Conversely, negative experiences or lack of experience can lead to resistance.

Educators' level of digital literacy and technical skills affect their confidence in using technology. Adequate training and support can increase competence and reduce apprehension.(3)Social and cultural factors. The views of society and colleagues on the use of technology in education influence individual attitudes. Traditional and religious values can also affect the acceptance of technological innovations, especially in the madrasah environment. Support from the madrasah head, colleagues and other stakeholders is crucial in shaping positive attitudes towards technology.(4) Psychological Factors i.e. Motivation and Interest. Intrinsic motivation to improve learning quality and interest in technological innovation can encourage acceptance.

Conversely, lack of motivation or interest can hinder technology adoption. Openness to change and adaptability to new technologies influence acceptance. Resistance to change and fear of the unknown can be barriers. Although most educators felt underprepared in terms of knowledge and skills related to deep learning, their attitude towards the application of this technology in education was generally positive. 70% of the respondents stated that they support the implementation of deep learning in the curriculum if given adequate training and support.

**Figure 6.** Implementation of open class IKM BK MIN 4 South Jakarta

This indicates a motivation to learn and adapt to change, even if they are hampered by limited resources and insufficient understanding. Only around 15% were hesitant or opposed to the implementation of this technology, arguing that the changes could disrupt their traditional learning methods.

**Table 4: Educators' Support for the Implementation of Deep Learning in the Curriculum**

| Description | Percentage (%) |
|---|---|
| Supportive of Deep Learning Deployment Given Adequate Training and Support | 70% |
| Doubt or Opposition to Deep Learning as it Disrupts Traditional Learning Methods | 15% |
| No Data Available and no comment | 15% |

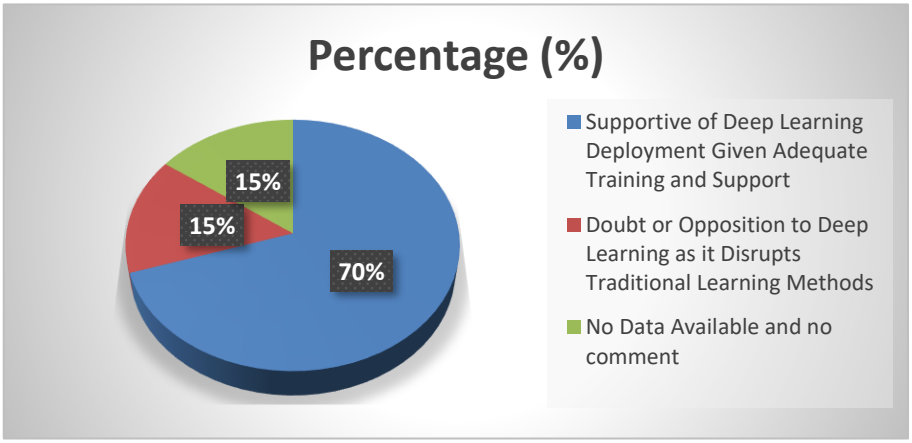


**Figure 7**: Educators' Support for the Implementation of Deep Learning in the Curriculum

## Barriers to Implementing the Deep Learning Curriculum

The analysis conducted on these barriers include: (1)Limited Infrastructure and Access to Technology. Many madrasahs, especially in remote areas, face limitations in access to hardware (computers, laptops), stable internet connections, and the necessary software. This digital divide hinders students' and teachers' ability to access deep learning resources and platforms. (Paramansyah, H. A., & SE, M., 2020) (2) Teacher Competencies and Training. Many teachers do not have sufficient digital competencies to integrate deep learning in learning. Lack of ongoing professional training and support is a barrier to teachers' skill development. (3) Limited Resources. Budget limitations are often an obstacle in providing hardware, software and teacher training. Limited human resources, such as educational technology experts, can also hinder the implementation of deep learning. (4) Curriculum and Learning Materials. The existing curriculum may not be fully relevant or suitable to be integrated with deep learning. The development of interactive and adaptive learning materials requires significant time and resources.(5)Balance with Religious and Cultural Values. In a madrasah environment, it is important to ensure that the implementation of deep learning is in line with religious and cultural values. There needs to be a balance between the use of modern technology and the preservation of traditional values.(6) Ethical and Privacy Aspects.

The use of deep learning raises questions about student data privacy, potential bias in algorithms, and the impact of technology on social interactions. (Ahmad et al., 2019) There needs to be clear policies and guidelines to protect student data and ensure ethical use of technology.(7) Evaluation and Impact Measurement. There needs to be an effective evaluation mechanism to measure the impact of deep learning on student learning outcomes and education quality. Developing relevant and valid evaluation instruments takes time and expertise. (8)Learning Paradigm Shift. The Deep Learning curriculum emphasizes on changing the learning paradigm, from teacher-centered to student-centered. (Hattie, 2008)

This change requires significant adaptation from both teachers and students. One of the main obstacles found in this study is the limited facilities and infrastructure that support the implementation of deep learning technology. As many as 55% of respondents reported that the technology facilities available in their madrasahs are very limited, such as inadequate number of computers, weak internet connection, and software that does not support deep learning-based learning. Some madrasahs don't even have computer labs or adequate technology rooms. Another barrier is the limited time educators have to attend training or implement a more technology-based curriculum.

**Table 5:** Limited Facilities and Barriers in Implementing Deep Learning in Madrasahs

| Description | Percentage (%) |
|---|---|
| Limited Technology Facilities (Computer, Internet Connection, Software) | 55% |
| No Computer Lab or Adequate Technology Room | 20% |
| Limited Time for Educators to Attend Training or Implement the Technology-Based Curriculum | 25% |

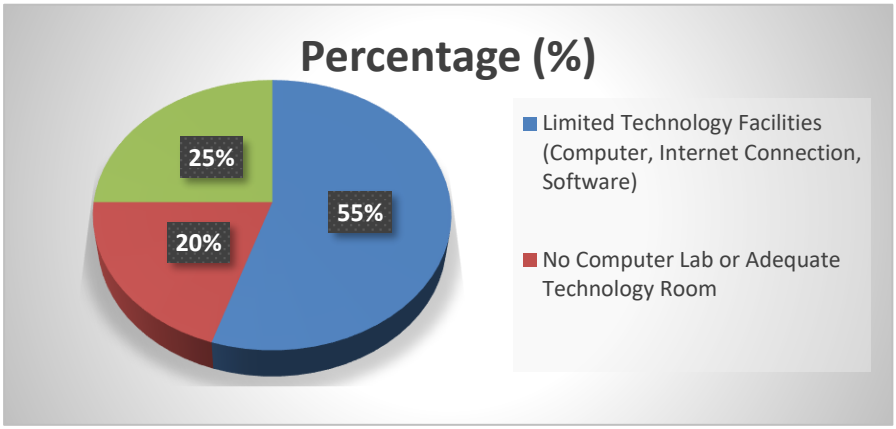


**Figure 8**: Limited Facilities and Barriers in Implementing Deep Learning in Madrasahs

## Discussion

### Implementation of Deep Learning Curriculum in Madrasahs

In implementing the Deep Learning Curriculum in Madrasahs from the perspective of educators, there can be several potential conflicts of interest that may arise between personal interests and institutional interests (McElhaney et al., 2015; Nguyen-Tat et al., 2025) . Educators may have personal preferences for certain technologies that they are familiar with or comfortable using. However, these technologies may not necessarily match the vision of the educational institution, the needs of the learners, or the curriculum objectives to be achieved (Abedi, 2024; Granić, 2022) . Conflicts can arise when educators are more concerned with personal career development, such as building a portfolio or seeking financial gain through personal projects, rather than prioritizing institutional interests and student learning outcomes.

Furthermore, between commercial interests and educational interests, with the increasing number of educational technology service providers and digital platforms, there is a possibility that educators cooperate or become affiliates of certain parties for financial rewards (Ayman et al., 2025; Kumar Dhaked et al., 2025) . This can lead to recommendations to use certain platforms or software not because of their educational value, but because of commercial incentives. When technology choices in learning are based on economic gain instead of pedagogical considerations (Rofiq et al., 2025) , then the quality of education can be jeopardized. With the development of the educational technology industry, there is a dilemma between commercial and educational interests that can impact on the integrity of the learning process. Many educators now have the opportunity to become partners, affiliates or even promoters of certain edtech platforms, offering financial rewards for promoting or using their products in the classroom.

This creates the risk that the selection of software or digital platforms for learning is no longer based on pedagogical considerations or student benefits, but on economic incentives for educators. When such decisions dominate, the quality of learning can suffer as the technology chosen does not always match the needs of the students or the curriculum. In this context, it is important that regulations and codes of conduct make a clear distinction between legitimate professional collaboration and potentially harmful commercial promotion. (Beetham, H., 2013) emphasizes that technology adoption in education should be based on pedagogical principles and learner needs, not market *trends* or potential financial gain. Therefore, transparency and accountability need to be upheld in any decision-making regarding the integration of technology in learning.

Research interests versus teaching interests. (Arifianto, 2020) Educators involved in deep learning research may face conflicts of interest if their research interferes with teaching tasks or harms students. Conflicts can arise when educators prioritize their research over the needs of students. (Suwandi et al., 2024) . Data Access and Use. The use of student data in deep learning applications raises privacy and security concerns. Educators who have access to student data may face conflicts of interest if they use the data for personal or commercial purposes. (Hart et al., 2013) The use of student data in deep learning applications in education presents significant challenges related to privacy, security and potential conflicts of interest. Unrestricted access to students' personal data by educators can open up opportunities for misuse for commercial or personal purposes, and bias the learning process.

In terms of privacy protection, approaches such as differential privacy (Abadi et al., 2016) and federated learning (Khalil et al., 2025) are offered as technical solutions to keep data secure and distributed. On the other hand, the importance of ethics in the use of educational data has been emphasized by researchers such as (Nguyen et al., 2023) Sá and (Rithvik Gujjula & Kamaljeet Sanghera, 2023) , who highlighted the need for ethical policies and training for educators in the face of the digital age. Without strict regulations and institutional policies, the risk of data misuse can not only harm individual students, but also undermine trust in educational institutions as a whole. (5) Competency Gap. Differences in digital competency levels among educators can lead to conflicts of interest. More competent educators may dominate decision-making or ignore the needs of less competent educators

**Potential Conflicts of Interest in Implementing the Deep Learning Curriculum in Madrasahs**

In the context of implementing the *deep learning* curriculum in madrasah, various potential conflicts of interest may arise, which require serious attention from various related parties (Huda & Suwahyu, 2024). Educators, as the frontline in the learning process, may be faced with a dilemma between personal preferences and institutional needs (Supardi & Hakim, 2021). These preferences may be related to certain technologies that have been mastered or feel comfortable, but are not necessarily aligned with the vision of the madrasah, the needs of students, or the established curriculum objectives (Sucipto et al., 2024). As a result, educators may focus more on personal career development, such as building portfolios or seeking financial gain through side projects, rather than prioritizing institutional interests and student learning outcomes, ultimately compromising the quality of education that learners should receive (Widodo et al., 2024). Furthermore, the world of education today is also characterized by competition between commercial interests and educational ideals. The increasing number of educational technology service providers and digital platforms opens opportunities for educators to establish cooperation or affiliation with certain parties in exchange for financial rewards (ROZIQIN, 2024). This situation can encourage educators to recommend the use of certain platforms or software not based on their educational value, but because of commercial incentives, thus obscuring the essence of learning that should be centered on students and the development of their potential (Hariyadi, 2023).

When the selection of technology in learning is based on economic gain alone, the overall quality of education can be jeopardized (ROZIQIN, 2024). This digital era offers convenience, but also brings its own impacts and conflicts for educators, especially in choosing learning materials and media that are aligned with learning (Egistiani et al., 2023). With the development of the education technology industry, there is a dilemma between commercial interests and educational interests that can impact the integrity of the learning process. Many educators now have the opportunity to become partners, affiliates or even promoters of certain *edtech* platforms, offering financial rewards for promoting or using their products in the classroom. This creates a risk that the selection of digital software or platforms in learning is no longer solely due to pedagogical considerations or benefits for students, but rather due to economic incentives for

educators. Human originality is diminished by relying on technology (ROZIQIN, 2024). Irresponsible use of AI will kill the critical thinking of its users (ROZIQIN, 2024).

Educators need to be aware of these potential conflicts of interest and act ethically and professionally. Transparency in the selection and use of educational technology is essential to ensure that decisions are based on the best interests of students and the educational goals to be achieved. Educators should be guided to negotiate the role of AI in collaborative knowledge creation, alternating between treating AI a consultant, competitor, or reflective paper in strategic decision making (Gonsalves, 2024). Training programs for educators should emphasize an understanding of revised levels of cognitive engagement and provide strategies for effectively developing and assessing these skills, ensuring that AI acts as a facilitator, not a substitute, for critical thinking (Gonsalves, 2024). Educators must also have a deep understanding of the principles of pedagogy and how technology can be used to enhance learning rather than replace it. Educational institutions need to establish clear and transparent policies regarding the use of educational technology, including ethical guidelines and procedures to avoid conflicts of interest. This policy should involve all stakeholders, including educators, students, parents and administrators, to ensure that all parties have a common understanding of the purpose and expectations of using technology in learning.

The integration of Artificial Intelligence in education, especially in madrasahs, offers a variety of potential benefits, but also presents its own challenges that need to be anticipated and managed wisely (Huda & Suwahyu, 2024; Maola et al., 2024). AI can personalize feedback, tailor learning experiences to individual styles, and identify student learning difficulties in *real-time* (Ronsumbre et al., 2023). In addition, AI can assist teachers in administrative tasks, such as grading and report generation, so that teachers can focus more on student interaction and guidance (Huda & Suwahyu, 2024). However, the implementation of AI also raises concerns about the privacy and security of student data, potential bias in AI algorithms, and the need for training for teachers to use AI effectively (Rifky, 2024). The use of *artificial intelligence* has penetrated various sectors of human life, bringing a significant impact in digital transformation (Oktavianus et al., 2023). The rapid and varied development of AI offers various tools and applications that can be utilized in the learning process, such as Jenni AI, Aithor, Consensus, Elicit, Research Rabbit, Scholarly, Slidesgo, and ChatGPT (ROZIQIN, 2024). These tools can assist in scientific writing, presentation creation, data analysis, and even provide answers to complex questions.

However, the effectiveness of AI in enhancing students' learning motivation largely depends on realistic expectations and correct understanding of the AI system (Naila et al., 2023). Excessive expectations or misunderstanding of AI capabilities can lead to disillusionment and demotivation in students. Therefore, it is important for educators and students to have a comprehensive understanding of AI, including its potential and limitations. The integration of AI-specific competencies such as collaboration, repair, and ethical reasoning into Bloom's taxonomy is crucial to maintaining the relevance of modern education (Gonsalves, 2024). Appropriate use of AI can assist students in developing critical thinking, problem solving, and creativity skills. In addition, educators also need to play an active role in guiding students in the responsible and ethical use of AI.

## CONCLUSION

Although madrasah educators have a positive attitude toward implementing deep learning, their readiness is still limited. Implementing a deep learning curriculum in madrasas is a complex and multidimensional endeavor. While it offers excellent opportunities to improve the quality of education, it also faces significant challenges and problematic phenomena. The successful implementation of the deep learning curriculum in madrasah requires infrastructure and

technology readiness, increased teacher competence, availability of adequate resources, relevant curriculum and learning materials, balance with religious and cultural values, attention to ethical and privacy aspects, and practical evaluation and measurement of impact. Collaborative efforts from various parties, including the government, madrasah, teachers, students, and the community, are essential to overcome these challenges and realize the potential of deep learning in improving the quality of education in madrasah.

The main factors affecting this readiness are a lack of understanding of deep learning technology, limited digital skills, and a lack of adequate training and support. In addition, the limited technology facilities available in madrasahs are also significant obstacles to implementing this advanced technology-based curriculum. Therefore, madrasahs, the government, and other stakeholders need to provide appropriate training and improve technological infrastructure to support the implementation of deep learning in learning in madrasahs. The readiness to implement deep learning curriculum in madrasahs from the perspective of educators still faces a number of obstacles. Although there is positive support for the implementation of this technology, strategic steps are still needed to increase the capacity of educators, provide adequate facilities, and ensure relevant training so that the implementation of deep learning technology can be effectively implemented.

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