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Artificial Intelligence and Learning Innovation: A Perception of Learning Transformation in Islamic Religious Higher Education Institutions (PTKI)

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Abstract: This study aims to explore the perceptions of lecturers and students at Islamic Religious Higher Education Institutions (PTKI) regarding the use of artificial intelligence (AI) in learning, as well as to analyze its benefits, obstacles, ethical values, and the level of readiness for implementation. Using a descriptive quantitative approach, data were collected through a Likert-scale questionnaire distributed to lecturers and students at STAIN Teungku Dirundeng Meulaboh. The results show that lecturers' knowledge of AI has a significant relationship with the perceived benefits in learning, identified obstacles, ethical awareness, and implementation readiness. A strong correlation was found between the benefits of AI and user readiness. The study also found a significant relationship between AI use and lecturers' teaching preparedness. However, no significant relationship was found between perceived benefits and perceived obstacles. In general, respondents showed a positive attitude toward the integration of AI in learning, with the caveat that AI usage must be aligned with Islamic values. The main obstacles to AI usage were identified as limited digital infrastructure and low technological literacy, which, while present, have not completely hindered AI adoption in learning. This study emphasizes that institutional readiness and the knowledge of academic stakeholders are key to successful and contextual digital transformation in PTKI environments, particularly at STAIN Teungku Dirundeng Meulaboh.

Keywords: Artificial Intelligence; Learning; Perception; Ethics; Islamic Higher Education Institutions (PTKI); Digital Transformation
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INTRODUCTION

Artificial Intelligence (AI) is a field of science that has continued to develop rapidly since the mid-20th century. Initially, AI was only a basic idea about machines that could imitate human intelligence. AI existed before the 20th century, but it was not widely known. However, when it was developed in the mid-20th century, the use of AI as a machine that could imitate human intelligence began to be widely recognized. In the history of philosophy and logic, the idea of artificial devices capable of rational thought can be traced back to Ancient Greece. Aristotle, for example, formulated the principles of deductive logic that became the foundation for the future development of formal logic in artificial intelligence

The history of AI began in 1950 when Alan Turing, a British mathematician, published a paper entitled *"Computing Machinery and Intelligence.*" In the paper, he posed the fundamental question: *"Can machines think?"* and introduced the concept of the Turing Test as a measure of a machine's ability to exhibit intelligent behavior indistinguishable from that of humans. In 1956, the Dartmouth Conference was held by *John McCarthy, Marvin Minsky, Claude Shannon, and Nathaniel Rochester*. This conference marked the formal beginning of the establishment of AI as a separate discipline. At that time, *McCarthy* defined AI as "the science and engineering of making intelligent machines." *The* 1950s to the early 1970s were known as a period of optimism for AI. Researchers successfully created early computer programs such as *Logic Theorists and General Problem Solvers* (GPS), which were capable of solving logic problems automatically. However, as expectations rose and computing capacity was limited at the time, AI experienced significant disappointment. This led to a period known as the " *AI Winter,*" a period of declining interest and funding in AI research from the mid-1970s to the early 1990s. Then, in the 1980s, expert systems emerged, computer systems designed to mimic the decision-making abilities of experts in a specific field. Although these systems had limitations in flexibility and learning, their presence demonstrated the practical applications of AI in industry and healthcare.

The modern era of AI began in the early 21st century, marked by advances in cloud computing, increased graphics processing power (GPUs), and the availability of comprehensive big data. *Machine learning technology,* particularly *deep learning,* has become a centerpiece of innovation in AI development. These developments enable AI to perform demanding tasks ranging from facial recognition, language translation, big data analysis, and even autonomous driving. One of the most well-known achievements in the modern history of AI is the success of *AlphaGo,* an AI system developed by *DeepMind* (a subsidiary *of Google*), in defeating the world champion of Go in 2016. This event demonstrated

AI's ability to master a game that is both incredibly difficult and intuitive, previously considered a major challenge for machines

As technology advances, *Artificial Intelligence* (AI) has emerged as a transformational force capable of comprehensively processing big data, analyzing student learning patterns, and providing more personalized and adaptive learning approaches. This innovation provides opportunities for developing a dynamic curriculum that is responsive to individual student needs and able to balance the challenges and opportunities of future education

AI is a field of computer technology capable of performing various activities typically performed by humans. These activities include learning, perception, reasoning, communication, and decision-making. AI is also capable of completing complex tasks that require specialized skills, even surpassing human capabilities in some areas

The development of AI in Indonesia shows a positive *trend, with various initiatives and applications of AI technology in education, healthcare, and government. The Indonesian government has begun adopting and developing policies and programs that support AI innovation, such as the establishment of AI research and development centers and collaborations with various educational institutions and industries. Furthermore, several startups* and local technology companies have begun integrating AI into their products and services to improve efficiency and quality. However, challenges such as uneven infrastructure and the need for competent human resources remain a concern in accelerating AI development in Indonesia

The development of AI in Indonesian education is rapidly gaining ground, with AI being used to improve the quality of learning and develop student potential, including in the field of creativity. One approach is the implementation of the AI-based Pancasila Student Profile Strengthening Project (P5), which helps students explore Pancasila values through creative work and complex problem solving Furthermore, AI is also being used in various applications such as *machine learning, natural language processing,* and *image processing* to support the creative process and student skill development.

AI is crucial in education because it can help make the teaching and learning process more effective and foster greater creativity. AI can adapt learning materials to suit each student's abilities and learning style, making it easier for them to understand the lessons. Furthermore, AI also assists lecturers by providing rapid feedback, expanding the scope of the material, and creating innovative and engaging learning media. With this technology, the teaching and learning process becomes more efficient and enjoyable for both students and lecturers

In education, the application of artificial intelligence (AI) offers various benefits and innovations that can improve the efficiency, personalization, and quality of the learning process. Madani (2021) explains that, based on current

literature and technological developments, AI can be applied in education by assessing learning styles, learning speeds, and areas of strength and weakness to create individually tailored learning materials (Madani, 2021).

The government and various institutions have also begun adopting AI technology to improve the efficiency and quality of public services and support the development of competent human resources in this technology. Although still in its early stages, the use of AI in Indonesia shows great potential to support progress in various sectors and increase national competitiveness in the digital era. Between September 2022 and August 2023, AI usage in Indonesia reached 1.4 billion visits to AI applications, or 5.6% of total traffic

The use of AI in education has been evident since the early 2010s, particularly in *adaptive learning* and *intelligent tutoring systems* (ITS). AI began to be widely introduced across various online and face-to-face learning platforms. However, widespread adoption of AI only began in the mid- to late 2010s, particularly after 2020, when the need for online learning increased dramatically due to the global pandemic. The global pandemic situation triggered the acceleration of the integration of artificial intelligence technology into the teaching and learning process, both at the elementary, secondary, and tertiary levels In Indonesia, the use of AI in education is still in the development and adaptation stage. Several educational institutions have begun integrating this technology to support a more effective and efficient learning process. These initial steps in the use of AI indicate that AI-based education is no longer merely discourse, but rather a capability to respond to global challenges and prepare a generation of adaptive learners (Yollanda, 2024).

Islamic Religious Colleges (PTKI), as higher education institutions that teach Islamic studies and modern science, face significant challenges in maintaining balance amidst rapid technological developments. One technological innovation currently receiving significant attention in education is *Artificial Intelligence* (AI). The use of AI in PTKI opens up new opportunities for transforming the learning process, academic management, and strengthening digital-based research in education (Nadila & Septiaji, 2023).

PTKI is an abbreviation for Islamic Religious College. The term PTKI refers to higher education institutions under the auspices of the Ministry of Religious Affairs of the Republic of Indonesia, which specifically provide higher education in the field of Islam PTKI focuses on higher education based on Islamic values, encompassing classical Islamic studies such as tafsir, hadith, fiqh, and ushul fiqh, as well as integrating modern sciences such as Islamic economics and Islamic information technology

Based on the above background, it is important to implement the use of AI in realizing learning innovation at PTKI STAIN Teungku Dirundeng Meulaboh

in improving the quality of learning, strengthening the adaptation process to the development and use of technology, and supporting the creation of an education system that is more creative, innovative and relevant to current developments.

The focus of this research is on the utilization of artificial intelligence (AI) to explore how artificial intelligence can be utilized in the learning transformation process at STAIN Teungku Dirundeng Meulaboh Islamic Religious College (PTKI). This research specifically highlights the perceptions of lecturers and students of STAIN Teungku Dirundeng Meulaboh towards the use of AI in learning, and also on the benefits and challenges faced in its implementation, as well as how far AI can be integrated harmoniously with Islamic educational values.

This study aims to identify the perceptions of lecturers and students of STAIN Teungku Dirundeng Meulaboh towards the use of artificial intelligence in the learning process, analyze the potential benefits offered by AI in improving the quality of learning in PTKI, and examine the main challenges in implementing AI in the PTKI environment, both from technical aspects and Islamic values.

RESEARCH METHODS

The research began with data collection using descriptive quantitative methods and a survey approach using a questionnaire. The questionnaires were distributed to lecturers and students at PTKI STAIN Teungku Dirundeng to gauge their perceptions of the use of AI in learning.

The research focused on lecturers and students in the STAIN Teungku Dirundeng Meulaboh environment. This selection was based on several important considerations, firstly the development of locality-based Islamic education, and is currently in the stage of accelerating the integration of technology in learning. Secondly, this institution shows a strong commitment to the digitalization of education, which is seen from the initiative in the use of *Learning Management System* (LMS) and digital technology training for lecturers, the geographical and cultural background of Meulaboh which is relatively outside the major city centers provides a unique perspective on the challenges and opportunities for implementing AI in the PTKI environment, especially in the context of digital infrastructure and the integration of Islamic values.

The population in this study were lecturers and students of STAIN Teungku Dirundeng Meulaboh, with a sampling technique using *purposive sampling,* namely selecting respondents who are considered to have relevant experience and understanding of the research topic. The research instrument in the form of a questionnaire was arranged in the form of a Likert scale of 1–5 In the book *Qualitative Data Analysis: A Methods Sourcebook* by , this technique is referred to as a way to limit data collection (*bounding the collection of data*)

strategically, so that only sources considered to have high informative value are selected for further analysis

The data obtained from the questionnaire were analyzed descriptively quantitatively using simple statistical techniques such as frequency distributions, percentages, and diagrams to illustrate the overall pattern of respondents' perceptions. To strengthen the analysis, data triangulation was conducted by reviewing relevant literature and previous research

RESEARCH RESULT AND DISCUSSION

AI was once a field limited to programming and formal logic. In 1956, the *Dartmouth Conference* became a significant milestone, officially marking the birth of AI as a new discipline. Since then, AI has experienced various phases, including periods of optimism and rapid progress, as well as periods of stagnation known as " *AI winter* " due to technological limitations and unmet expectations. Other significant developments include the emergence of machine learning algorithms, the introduction of artificial neural networks, and advances in computing that enable AI to understand human language, translate images, and perform complex data analysis. Today, AI is developing exponentially and has become an integral part of various aspects of life, including education, healthcare, and industry

Understanding of AI in Indonesia remains limited, particularly among educators and the general public. Approximately 60 percent of educators in Indonesia reportedly have limited knowledge of information technology, which contributes to low levels of AI mastery in general. Furthermore, uneven technological infrastructure and a low digital ethics index exacerbate the challenges of understanding and adopting AI broadly in Indonesia. Many lecturers and educators over 45 also struggle to adapt to the latest technologies, including AI, slowing the understanding and implementation of AI in education.

The educational paradigm is shifting from a traditional, one-way approach focused on knowledge transfer to a more modern, student-centered paradigm. This new paradigm emphasizes personalized learning, active student empowerment, and the development of digital and technological literacy competencies The application of AI supports an individual-centered learning paradigm, where the learning process is tailored to the characteristics and needs of each student through adaptive learning systems and data analysis.

AI is applied in various fields, including education, healthcare, and business. In education, AI is used to personalize learning, provide rapid feedback, and help teachers expand material coverage and improve interaction with students. This technology is also used in the development of innovative and adaptive learning media, making the learning process more effective and

engaging. Furthermore, AI helps automate assessments, create content, and efficiently manage student data

AI Knowledge

Based on the research results, the majority of respondents indicated they had basic knowledge of artificial intelligence. They understood key AI functions such as natural language processing (NLP), image recognition, and automated data processing. This knowledge came from various sources, ranging from social media and short training sessions to personal exploration using applications like *ChatGPT, Grammarly,* and *Google Bard.*

This level of knowledge is conceptual, not practical, meaning that respondents only have direct knowledge without any formal training materials. The majority of respondents have never participated in formal training on AI, either organized by the university or an external institution. Lecturers over 45 years of age tend to have lower technological mastery, in line with the findings of Agustina et al., (2024) that older teachers have more difficulty adopting more modern technologies

The correlation between knowledge and other dimensions is quite strong. The data shows correlations between knowledge and benefits (r = 0.5614), barriers (r = 0.5353), readiness (r = 0.578), and ethics/values (r = 0.3742). These correlations indicate that increased understanding of AI leads to more positive perceptions across various dimensions.

Benefits of AI in Learning

In general, AI can bring significant benefits to Islamic education, particularly in facilitating personalized learning, streamlining academic assignments, and increasing interaction in the teaching and learning process. For example, students report using AI to create summaries, search for academic references, and even expedite the writing of papers. Meanwhile, lecturers are starting to use AI to generate automated quiz questions and tailor teaching materials to class needs.

The perceived benefits of AI directly impact readiness to use it. The correlation between benefits and readiness shows a strong relationship (r = 0.6429). The greater the perceived benefits, the higher the motivation of the academic community to adopt AI. Some lecturers stated that AI can help them manage large classes more efficiently. The significant benefits of AI do not mean there are no barriers to its use; the relationship between benefits and barriers is weak (r = 0.1766), meaning that perceptions of AI's benefits are not significantly influenced by existing barriers. This indicates that AI is perceived quite positively even though there are still technical obstacles in learning.

Asbara et al., (2024) in their research found that AI in higher education is able to accelerate the teaching and learning process, increase student learning motivation, and help lecturers in designing data-based learning

Barriers to AI Implementation

Implementing AI at Teungku Dirundeng Meulaboh State Islamic University (STAIN) faces challenges. The most prominent ones identified by researchers are as follows:

1. Limited digital infrastructure, the STAIN Teungku Dirundeng Meulaboh Campus environment has disruptions in the internet network system, this internet instability makes AI difficult to access by its users, and the lack of hardware such as computers and laptops is a major obstacle in the use of AI in the STAIN Teungku Dirundeng Meulaboh environment, and the limited availability of premium AI makes the use of AI even more difficult to access.
2. Technological literacy also has a significant impact on the use of AI. Many students are not yet accustomed to using digital platforms or web-based applications, which means that AI is still less popular and used at STAIN Teungku Dirundeng Meulaboh.
3. Guidelines for the use of AI are not available internally at the STAIN Teungku Dirundeng Meulaboh Campus, resulting in the absence of rules regarding the limitations of the use of AI in academic activities.

The above barriers do not directly hinder AI adoption. The data shows a low correlation between barriers and benefits ($r = 0.1766$) and a relatively weak correlation between readiness and benefits ($r = 0.3394$). Despite these barriers, lecturers and students remain prepared and see AI as a promising learning tool. Many students are actively seeking alternative solutions, such as using free versions of AI tools or following tutorials on YouTube and social media. Thus, students demonstrate a "digital initiative" that stems from practical needs in the field.

The Influence of AI on Islamic Ethics and Values

Islamic ethics and values are crucial aspects of AI implementation at STAIN Teungku Dirundeng Meulaboh. Research conducted by the majority of lecturers and students confirms that the use of AI in education must align with Islamic values, such as honesty, responsibility, and not replace the role of humans as primary educators. AI is viewed solely as a learning aid, not a substitute for teachers.

Concerns surrounding the use of AI include its potential misuse in education, such as automated assignment creation without a thorough learning process, hidden plagiarism, and the most feared concern, the weakening of emotional interactions between lecturers and students. A strong correlation with readiness (r = 0.468) raises a heightened ethical awareness of each individual's readiness to implement AI in learning. The correlation between ethics and barriers shows a relatively weak correlation of 0.25%. This suggests that awareness of Islamic values may not always arise due to technical constraints.

STAIN Teungku Dirundeng Meulaboh's Readiness to Implement AI

Lecturers and students of STAIN Teungku Dirundeng Meulaboh in adopting AI are classified as very high, as evidenced by the majority of lecturers and students expressing interest in participating in training and trying AI and using AI technology in their daily learning routines.

Respondents' knowledge and readiness showed a fairly strong correlation with a percentage of 0.57% and between readiness and ethics gave the same value with a percentage of 0.47% which shows that adequate knowledge provides a high awareness of the high benefits of Islamic values.

These findings provide a strong argument for the successful implementation of AI at STAIN Teungku Dirundeng Meulaboh, requiring a holistic approach, including readiness for technology, human resources, and Islamic values. STAIN Teungku Dirundeng Meulaboh needs to provide technical training, ethical guidelines, and curriculum integrity that adapts to AI developments.

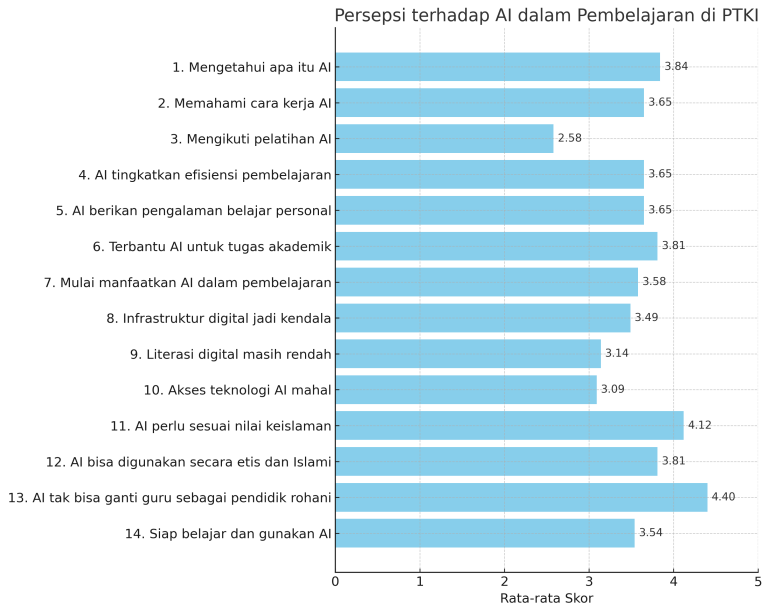

Figure 1. Respondents' Perceptions of AI in Learning

The results of this study were obtained by combining the dimensions of statements from the questionnaire given to respondents, the dimensions in question are knowledge, benefits, obstacles, ethics and values, and readiness

Table 1. Correlation Results (r) Dimensions

Dimensional Pairs	Correlation Value (r)	Strength of Relationships
Knowledge – Benefits	0.5614	Strong Enough
Knowledge – Barriers	0.5353	Strong Enough
Knowledge – Ethics and Values	0.3742	Weak – Sufficient
Knowledge – Readiness	0.578	Strong Enough
Benefits – Barriers	0.1766	Very weak
Benefits – Ethics and Values	0.3236	Weak
Benefits – Readiness	0.6429	Strong
Barriers – Ethics and Values	0.2563	Weak
Obstacles – Readiness	0.3394	Weak – Sufficient
Ethics and Values – Readiness	0.468	Strong Enough

Previous analysis revealed a number of significant relationships between groups regarding the use of AI in education. Knowledge has a positive and significant relationship with various other dimensions, including benefits, barriers, Islamic ethics and values, and readiness (Holmes, Maya, & Fadel, 2019). The data found by this researcher shows that the higher the respondents' knowledge about AI, the greater the perceived benefits, the greater the perception of barriers, the greater the awareness of ethical aspects, and the readiness to implement AI. Benefits are also significantly positively correlated with Islamic ethics and values, as well as readiness. The data shows that perceptions of AI benefits influence ethical considerations and the readiness of individuals or institutions to adopt AI. Furthermore, there is a significant relationship between barriers and readiness, and between ethics and values and readiness. This indicates that understanding barriers and ethical values also influences the level of readiness to utilize AI

Table 2. Significant Relationship between Groups P< 0.05

Dimensional Pairs	P-Value	Strength of Relationships
Knowledge – Benefits	0	The relationship is positive and significant. The higher the knowledge, the greater the perceived benefits.
Knowledge – Barriers	0	A significant positive relationship indicates that as knowledge increases, perceptions of barriers can also increase.
Knowledge – Ethics and Values	0.0041	Significant positive relationship. Knowledge is related to ethical awareness.
Knowledge – Readiness	0	Strong and significant relationships. The more you know, the more prepared you are.
Benefits – Ethics and Values	0.0141	Significant relationships. The more people perceive AI as beneficial, the more they consider ethical aspects.
Benefits – Readiness	0	The relationship is strong and significant. The greater the perceived benefit, the higher the readiness.
Obstacles – Readiness	0.0098	Significant relationship. The more barriers are understood, the more they influence readiness.
Ethics and Values – Readiness	0.0002	Significant positive relationship. Values and ethics influence readiness.

Meanwhile, some relationships did not show significant data. For example, the relationship between benefits and barriers was insignificant, indicating that perceptions of AI benefits are not directly related to perceptions of barriers. The relationship between barriers and ethics & values was marginal and should be interpreted with caution

Table 3. Insignificant relationship between groups P ≥ 0.05

Dimensional Pairs	P-Value	Strength of Relationships
Benefits – Barriers	0.1887	Not significant. Perceived benefits are not strongly correlated with barriers.
Barriers – Ethics & Values	0.0543	Nearly significant (marginal), but still > 0.05. Careful interpretation is required.

Based on the researcher's analysis, AI can be used effectively in the STAIN Teungku Dirundeng Meulaboh environment, particularly to improve learning efficiency, provide a more personalized learning experience for students, and assist lecturers with their academic tasks. The level of knowledge and readiness of lecturers and students towards AI is quite high, indicating great potential for the development and integration of AI into the learning system. Although there are still obstacles such as limited digital infrastructure and technological literacy, this does not directly hinder the perception of benefits or readiness for AI adoption at STAIN Teungku Dirundeng Meulaboh. On the contrary, a good understanding of the benefits of AI actually encourages readiness and acceptance of its use. The main concerns are the ethical aspects and Islamic values. The majority of respondents stated that the use of AI must remain grounded in Islamic principles and should not replace the role of humans as spiritual educators. This indicates that the implementation of AI in PTKI requires a wise and contextual approach, which combines technology with religious values.

AI is highly capable and beneficial to use, as long as its use is carried out ethically, purposefully, and in line with Islamic values. The success of AI implementation at STAIN Teungku Dirundeng Meulaboh will be largely determined by the institution's readiness and the strengthening of the capacity of lecturers and students in understanding and managing this technology critically and ethically. Research is in line with that conducted by The use of AI in education is very helpful in increasing the effectiveness of the teaching and learning process. AI can be used to personalize learning according to students' abilities and learning styles, provide rapid feedback, and assist teachers in expanding the scope of material and increasing interaction with students. In addition, AI is also used to develop innovative learning media, automate assessments, and provide personalized learning services, so that the learning process becomes more efficient and engaging

Research conducted by Yustiasari Liriwati, (2023) shows that artificial intelligence (AI) has a strategic role in the process of transforming the educational

curriculum, especially in facing the challenges of the ever-evolving digital age. The results of the literature review described in her research emphasize that AI is able to present a more personalized, adaptive, and big data-based learning approach, thereby making the education system more responsive to the needs of students and developments in the world of work. The results of this study provide an illustration that the integration of AI in education is not just a technological *trend,* but an important strategy for realizing education that is relevant, adaptive, and based on future needs. This research is very likely to be used and can be used as a basis for developing innovative educational policies, including in the Islamic Religious College (PTKI) environment, where the values of science, technology, and spirituality need to be developed harmoniously and contextually.

Similar research was also conducted by Najwa Fathiro Cahyono, et al., (2023) in a study entitled "the ethics of using artificial intelligence (AI) in the field of information technology." The results of their study showed that artificial intelligence does provide many benefits to human life, such as accelerating work processes, increasing efficiency, and assisting in the fields of health, education, and the economy. However, behind these various benefits, this study also saw a number of negative impacts that require serious attention. One of these is the potential loss of jobs as many jobs begin to be taken over by automated systems. Furthermore, AI can also pose data privacy risks, especially if used unethically. Cases such as the *Cambridge Analytica scandal* are cited as clear examples of how personal data can be exploited for political gain without user consent

CONCLUSION AND IMPLICATION

Conclusion

AI has great potential to be implemented in Islamic Religious Higher Education Institutions (PTKI), including STAIN Teungku Dirundeng Meulaboh. The majority of teaching staff and students have good knowledge of the use of this technology. Lecturers and students provide very positive responses to the benefits of using AI and learning, and have maximum readiness in adopting AI as a form of support in the learning process.

Despite several obstacles, such as limited infrastructure at the university and limited digital literacy, these challenges do not hinder the readiness of every teaching staff there to utilize AI. Furthermore, Islamic values and ethics are crucial factors influencing readiness, indicating that the use of AI at PTKI STAIN Teungku Dirundeng Meulaboh must align with the Islamic principles and values that characterize every Islamic Religious Higher Education Institution.

Implication

This research implies that Islamic education in Indonesia should systematically integrate AI into higher education while ensuring alignment with Islamic values and ethics. It highlights the need to strengthen digital infrastructure and digital literacy as part of institutional development in Islamic universities. In Indonesia, this finding supports policy directions that encourage innovation without neglecting moral and religious principles. At the global level, it demonstrates that AI adoption in Islamic higher education can be both technologically advanced and ethically grounded. This study also offers a model for other Islamic institutions worldwide to adopt AI responsibly within a value-based educational framework.

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