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Implementation of an Interactive Chatbot System Using ChatGPT and Leonardo AI to Support Islamic Studies Teaching for MI Teachers

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Abstract. *This community engagement project facilitated the integration of interactive AI-based chatbot technologies, namely ChatGPT and Leonardo AI, into Islamic Religious Education at Madrasah Ibtidaiyah (MI) in Probolinggo City. The program aimed to enhance teaching quality by empowering teachers through intensive training based on the Participatory Action Research (PAR) approach, which included four key stages: planning (identifying digital literacy and instructional challenges), action (hands-on training in AI tools), observation (monitoring classroom implementation), and reflection (evaluation and feedback). ChatGPT effectively supported teachers in generating quizzes, assessments, and text-based materials, while Leonardo AI enabled the creation of engaging visual learning media. The results revealed a significant improvement in teachers' digital competencies, reflected in increased creativity, confidence, and autonomy in developing AI-based instructional content. This was evidenced by reflective journals, focus group discussions, and performance assessments, with 82% of participants showing measurable progress post-training. Despite challenges such as limited internet access and digital infrastructure, teachers demonstrated strong enthusiasm and adaptability. The program recommends continuous mentoring and the enhancement of digital infrastructure to ensure the sustainability of AI-driven educational transformation at the elementary madrasah level.*

Katakunci:
Chatbot; Interaktif; ChatGPT; Leonardo AI; Pengajaran Keislaman.

Abstrak. Pengabdian kepada masyarakat ini memfasilitasi penerapan teknologi chatbot interaktif berbasis kecerdasan buatan (AI), yaitu ChatGPT dan Leonardo AI, dalam pembelajaran Pendidikan Agama Islam di Madrasah Ibtidaiyah (MI) Kota *Probolinggo*. Kegiatan ini bertujuan meningkatkan kualitas pembelajaran melalui pemberdayaan guru dengan pendekatan Participatory Action Research (PAR), yang meliputi empat tahap: perencanaan (identifikasi masalah literasi digital), tindakan (pelatihan penggunaan AI), observasi (pemantauan implementasi), dan refleksi (evaluasi dan umpan balik). ChatGPT terbukti efektif dalam membantu guru menyusun soal, kuis, dan materi berbasis teks, sedangkan Leonardo AI digunakan untuk menciptakan media visual yang menarik. Hasil menunjukkan peningkatan signifikan

dalam kompetensi digital guru, terlihat dari meningkatnya kreativitas, kemandirian, dan kepercayaan diri dalam menyusun materi ajar berbasis AI. Hal ini didukung oleh data reflektif dan hasil FGD, serta peningkatan penilaian kinerja pada 82% peserta setelah pelatihan. Kendala seperti keterbatasan akses internet dan perangkat masih menjadi tantangan, namun tidak menghalangi antusiasme guru dalam berinovasi. Program ini merekomendasikan adanya pendampingan berkelanjutan dan penguatan infrastruktur digital untuk mendukung transformasi pendidikan berbasis teknologi AI di tingkat madrasah dasar.

1 Introduction

Education in Indonesia Faces significant challenges in the era of Industrial Revolution 4.0, where artificial intelligence (AI) and digital technologies increasingly dominate almost all aspects of life, including the education sector (Ruggerio, 2021). These technologies bring substantial changes in how we teach and learn, which educators need to address wisely (Qolamani & Mohammed, 2023). As the country with the fourth largest population in the world, Indonesia must anticipate these challenges by ensuring its education system can adapt to the evolving times and prepare students with relevant skills for the future (Dishon & Gilead, 2021). Consequently, programs supporting the integration of technology in education are becoming a priority, especially at the primary and secondary education levels (Mubaroq & Prafitasari, 2022).

One of the promising technologies to bring significant transformation to the education sector is artificial intelligence (AI). This technology not only improves efficiency in educational administration but also enriches students' learning experiences through personalization and interactivity. In this context, implementing interactive chatbots based on ChatGPT and Leonardo AI in Islamic primary education (MI).

According to (Nastiti et al., 2020), education in Indonesia must align with contemporary demands, particularly through technology integration, to prepare students for a world increasingly dominated by automation and robotics. This is further supported by findings from the McKinsey Global Institute (2018), which highlight that AI has the

potential to significantly improve efficiency and the quality of teaching and learning processes in educational institutions.

However, implementing technology in education, particularly in MI still faces several challenges. Many teachers lack a comprehensive understanding and mastery of AI technology, making it difficult to utilize these tools optimally in the learning process. Studies by (Chen et al., 2020) and (Launin et al., 2022) demonstrate that AI can improve various aspects of education, including enhancing teaching efficiency and enriching the curriculum through personalized learning that responds to individual students' needs. However, the application of such technology requires intensive training for teachers to master the correct use of tools such as chatbots like ChatGPT and Leonardo AI, which can assist in preparing teaching materials, providing faster feedback, and fostering better interactions between teachers and students.

Preliminary surveys conducted in several MI schools in Probolinggo City revealed that 65% of MI teachers still rely on conventional teaching methods such as lectures and rote memorization, without utilizing digital technology (Sari, 2021). Furthermore, 40% of schools that already have ICT equipment have not used it optimally in the teaching process (Fadilah, 2021). This indicates a gap between the availability of technology and its practical use in education.

This condition is further exacerbated by the lack of supporting resources such as stable internet networks and adequate hardware. Teachers who wish to use technology in teaching often face technical obstacles that are difficult to resolve without support from the school or government (Ismail, 2019). In addition, the absence of clear policies related to the use of technology in the Islamic education curriculum at MI makes many teachers hesitant to innovate with technology in their teaching.

In this context, a community service program designed to provide training for Madrasah Ibtidaiyah teachers in Probolinggo City on ChatGPT and Leonardo AI is expected to address these challenges. As explained by Crawford et al., (2023), the use of ChatGPT in education can deepen students' understanding, improve learning outcomes, and help shape student character through more interactive approaches. This technology

also provides additional resources for teachers to implement more collaborative and responsive teaching methods tailored to students' needs.

In Probolinggo City, which has 27 Madrasah Ibtidaiyah—most of which are highly accredited (A)—many schools still face challenges in mastering technology. Research by Utin Febri Yantika et al., (2023) highlights that implementing chatbot technology can increase student motivation by enabling greater interaction with learning materials. The training designed in this program aims to provide Madrasah Ibtidaiyah teachers with a deeper understanding of AI technology's potential, particularly in teaching Islamic studies.

Padma C., (2022) explains that AI in education can create a more dynamic learning environment, allowing teachers to focus more on developing students' competencies rather than merely transferring information. The use of Leonardo AI, known for its ability to handle complex data analysis, enables MI teachers to create more engaging and comprehensible teaching materials, such as posters or cartoons for Islamic studies that are visually and contextually enriched. Faiz & Kurniawaty, (2023) emphasize that integrating technology into education can enhance creativity and collaboration between teachers and students.

Developing Android-based learning media is one of the innovative solutions that can be implemented by teachers to improve the quality of teaching at MI. By using platforms such as ChatGPT and Leonardo AI, teachers can design more interactive, engaging, and student-centered learning materials (Prasetyo, 2022). These Android-based learning tools not only enable students to learn independently but also allow them to interact with the material anytime and anywhere.

Therefore, support from various stakeholders—including the government, educational institutions, and the community—is crucial to ensure the effective implementation of this technology. Continuous training for teachers in the use of digital technology and the development of AI-based learning media is expected to enhance the quality of education at MI and respond to the challenges of the Industrial Revolution 4.0 (McKinsey Global Institute., 2018).

Although AI technology has advanced rapidly and offers various benefits to education, its application in Madrasah Ibtidaiyah (MI) still faces multiple obstacles. One major factor is the lack of digital literacy among MI teachers (Hakim, 2020). Many teachers are still accustomed to conventional teaching methods and do not yet have sufficient skills in utilizing AI for educational purposes. A preliminary survey conducted by Ramadhani (2021) 20 revealed that approximately 65% of MI teachers in Probolinggo still rely solely on traditional teaching methods, such as lectures and memorization, without integrating any form of digital technology into their classrooms.

Furthermore, the lack of specific training and mentoring becomes another barrier to implementing AI in teaching. Most training programs currently available—such as general digital literacy workshops or basic ICT introduction seminars conducted by local education offices—are still broad in nature and do not specifically address the integration of AI tools for instructional use in Islamic education. For instance, a 2021 ICT training program in East Java focused primarily on Microsoft Office and basic internet usage, without touching on AI-based educational applications. Consequently, MI teachers need more specialized and hands-on training that targets the use of AI tools like ChatGPT and Leonardo AI within the context of Islamic subjects. Without continuous mentoring and contextualized training, teachers are likely to face ongoing difficulties in applying AI effectively in their day-to-day teaching activities (Arifin, 2022).

Infrastructure limitations also pose a significant challenge in the implementation of AI in Madrasah Ibtidaiyah (MI). Several MI schools, especially those in rural or semi-urban areas of Probolinggo City, still lack adequate internet access and technological devices that support AI-based learning (Nasution, 2020). Even in schools that already possess ICT facilities, their utilization remains limited to administrative tasks and has yet to be optimized for instructional purposes. This indicates that the presence of technology alone is insufficient without the capacity and confidence to use it effectively.

Beyond geographical constraints, this community service initiative is crucial in Probolinggo because of the limited exposure of MI teachers

to AI-based pedagogical tools, and the absence of structured support systems to guide their implementation. Moreover, Islamic studies—often taught using conventional methods—remain disconnected from technological innovation. As a result, students risk missing out on engaging, contextualized, and modern learning experiences. By introducing AI-based tools in this context, the program not only addresses digital disparities but also promotes a culture of innovation, empowering MI teachers to transform Islamic education through more interactive, student-centered approaches that are aligned with current digital developments.

In addition to technical challenges, psychological barriers also hinder the application of AI in the education sector, particularly in Islamic education. Some teachers remain skeptical about using AI in teaching, fearing that it might replace the role of the teacher as the primary educator (Rahman, 2020). These concerns stem from a lack of understanding about how AI can serve as a supporting tool that enriches students' learning experiences rather than replacing the teacher's role.

This gap results in unequal access to technology-based learning across MI schools. Schools with good infrastructure support tend to be more prepared to adopt AI compared to those with limited facilities. This disparity leads to inequalities in the quality of education received by students in different regions. Therefore, more structured efforts are needed to ensure that all MI schools, whether in urban or rural areas, can utilize AI in teaching more equitably.

To address this gap, collaborative efforts between the government, educational institutions, and the community are essential in providing training, supporting infrastructure, and policies that encourage the use of AI in MI. Systematic mentoring for teachers will help them gain the confidence needed to integrate technology into their teaching methods. Additionally, clear regulations must be established to encourage MI schools to adapt to the digital era and allocate sufficient resources to effectively incorporate AI into their curricula.

Using the Participatory Action Research (PAR) approach, this program aims to improve Madrasah Ibtidaiyah teachers' ability to use ChatGPT and Leonardo AI in teaching Islamic studies. This model

emphasizes close collaboration between the service team (lecturers and students) and the teachers, who are actively involved in all processes, from problem identification to planning and implementing solutions. The PAR approach is expected not only to provide technical knowledge to the teachers but also to empower them to integrate this technology independently into their teaching processes, thereby enhancing the overall learning experience for students.

The training and mentoring conducted in this program are designed to provide hands-on experience in using AI technology, enabling the creation of more interactive, responsive, and adaptive learning tailored to students' needs. Technologies like ChatGPT and Leonardo AI are expected to enrich the learning process, increase student engagement, and help teachers prepare more engaging and easily understandable teaching materials. As explained by Muhammad Sony Maulana et al., (2023), AI-based technology can enrich interdisciplinary learning and increase student engagement with the topics being taught.

2 Method

This study employs the Participatory Action Research (PAR) method, focusing on collaboration between the service team (lecturers and students) and teachers at Madrasah Ibtidaiyah (MI) in Probolinggo City for the implementation of AI technology in teaching Islamic studies. The research process began with an initial investigation stage, during which the service team identified the challenges faced by teachers in utilizing AI technology in their teaching. This identification was conducted through discussions and in-depth interviews with teachers and school principals from 10 selected madrasahs, aiming to explore their understanding and limitations regarding technology, particularly ChatGPT and Leonardo AI. The madrasahs were selected based on their accreditation status, with the majority holding an “A” accreditation. This criterion was chosen to ensure that the schools had met basic educational standards and institutional readiness, allowing the research to focus more specifically on the technological and pedagogical challenges rather than fundamental administrative or curricular issues.

Additionally, the team observed challenges related to accessibility and technological infrastructure within the madrasahs, which pose major obstacles to the implementation of this technology, as noted by Chen et al (2020) their study on technological challenges in Indonesia's education sector.

Based on the findings from the initial investigation, an action planning stage was carried out to design training modules for using ChatGPT and Leonardo AI in teaching Islamic studies. In this planning process, a collaborative approach was employed, where teachers provided input on their specific needs related to teaching materials and the challenges they faced in daily teaching. These training modules were designed with attention to the characteristics of Madrasah Ibtidaiyah students and relevant subjects such as fiqh, aqidah, Qur'an-Hadith, and Islamic cultural history. This approach also aimed to facilitate the practical use of technology in the learning process, enabling teachers to integrate technology effectively into their teaching practices, as emphasized by McKinsey Global Institute (2018) regarding the importance of AI implementation to improve the efficiency and quality of education.

The implementation phase formed the core of the training, where teachers were directly involved in sessions on using ChatGPT and Leonardo AI. In these sessions, students acted as facilitators to assist teachers in operating the technology and ensuring they could access and use it effectively. The use of ChatGPT was expected to help teachers in preparing teaching materials, providing feedback, and enhancing teacher-student interactions. Meanwhile, Leonardo AI was utilized to create visually based teaching materials such as posters or infographics, enriching Islamic studies teaching in a more interactive and contextual manner, as highlighted by Faiz & Kurniawaty (2023), who demonstrated that technology integration could foster creativity and collaboration in teaching.

Following the training, a reflection and evaluation phase was conducted to assess the effectiveness of the training and its impact on teaching Islamic studies. Teachers were given opportunities to share their experiences in applying AI technology in the classroom, while the

service team documented the challenges encountered and the results achieved. This evaluation also involved direct classroom observations to examine changes in teaching methods and student engagement in the learning process. This reflection provided insights into the success of the training and aspects that needed improvement. As noted by Crawford et al., (2023), technologies like ChatGPT can deepen student understanding and improve the quality of learning through higher interactivity.

Finally, based on the results of the reflection and evaluation, the service team carried out follow-up actions, including adjustments to the training modules or methods used. These adjustments aimed to ensure that the solutions provided could be sustainably applied by the teachers and that the technology could be further integrated into their teaching practices. The follow-up program also involved additional training and continuous mentoring to enhance teachers' abilities in utilizing AI technology in teaching Islamic studies. By employing the PAR approach, this research not only focused on knowledge transfer but also on empowering teachers to develop their capabilities sustainably, enabling them to independently integrate AI technology into their teaching practices in the future, as suggested by Nastiti et al., (2020), who emphasized the importance of adapting education to technological advancements to prepare students for future challenges. Below are the conceptual frameworks:

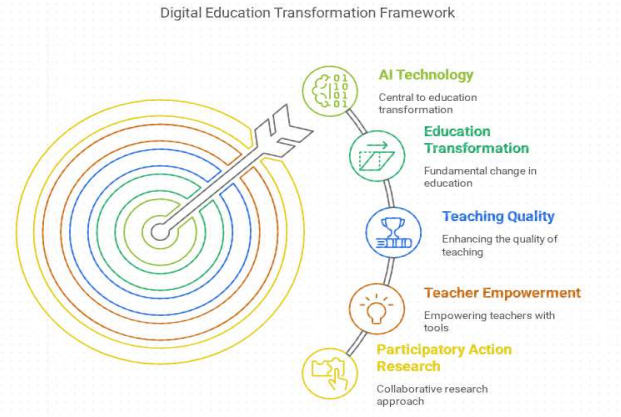

Figure 1. Conceptual Framework of Digital Education Transformation with AI

Through this approach, it is hoped that this research can provide a significant contribution to the transformation of education in *Madrasah Ibtidaiyah* (Islamic Elementary Schools) in Probolinggo City, as well as improve teaching quality in Indonesia in the digital era.

3 Results

Applying the ABCD model in empowering women housewives with an integrated fish and plant cultivation system (Budikdamber), is very efficient because it combines two production systems in one container, namely catfish farming and hydroponic plants (such as kale). The ABCD steps implemented are

From the results of the community service activities conducted at Madrasah Ibtidaiyah (MI) in Probolinggo City, it was found that the implementation of AI-based chatbot systems—ChatGPT and Leonardo AI—had a measurable and positive impact on enhancing the quality of Islamic studies teaching. This service program was carried out through five main stages: problem identification, training planning, training implementation, evaluation, and follow-up. The outcomes of each stage are described as follows:

a. Identification of Problems and Teacher Needs

The initial phase involved identifying the specific needs and challenges faced by MI teachers in implementing AI tools in Islamic education. Through interviews and focus group discussions with 10 school principals. The service team found that 80% of the teachers had never used AI technology in classroom instruction. Only 2 out of 10 teachers had heard of ChatGPT, and none were familiar with Leonardo AI.

In addition to limited knowledge, infrastructure challenges were also evident. Most schools lacked stable internet connections and had minimal access to digital devices. However, despite these limitations, teachers demonstrated high motivation to adopt new technology, provided they received practical and supportive training.

Figure 2. The mentoring team conducts teacher identification and proficiency

While infrastructure issues were clearly identified, the program strategically focused on addressing non-technical challenges, specifically the low digital literacy and limited pedagogical use of AI in Islamic studies. This decision was based on two key considerations: (1) many of the infrastructure-related issues require systemic solutions at the policy level beyond the scope of this community service initiative, and (2) even in relatively better-equipped schools, the underutilization of available technology remained a critical gap. Therefore, the community service concentrated on empowering teachers to utilize existing resources effectively and creatively. This strategic focus is reflected in the training modules and mentoring activities developed throughout the program.

These findings support Chen et al. (2020), who argue that both infrastructure and human capacity are essential components of successful AI integration in education. In this context, the initial identification served as a foundation to redirect the intervention toward the most actionable and sustainable problem domain—teacher capacity and pedagogical innovation.

b. Training Design and Module Development

Based on the problems identified, the team developed a tailored training program using a participatory approach. Teachers were involved in providing input regarding their subject needs—such as fiqh, aqidah, and Qur'an-Hadith—and the challenges they encountered in delivering them effectively.

The result was a two-part training module: The first focused on using ChatGPT to generate text-based materials, including Islamic

concept explanations, quizzes, and student exercises. The second focused on Leonardo AI, guiding teachers to create visual learning media such as infographics, posters, and thematic illustrations aligned with Islamic studies.

The module was adjusted based on each school's digital readiness, such as offering offline alternatives where internet connectivity was weak.

c. Training Implementation

A two-week intensive workshop was conducted, involving 10 Madrasah Ibtidaiyah (MI) teachers who actively participated in a series of sessions combining technical demonstrations, group practices, and personalized mentoring. These sessions were facilitated by students from the service team. Throughout the training, each participant successfully produced at least three AI-generated teaching products, such as interactive quizzes using ChatGPT and visual posters created with Leonardo AI. These outputs were then implemented in real classroom settings, where teachers observed a noticeable increase in student engagement—especially during visual-based learning activities.

Beyond technical skill development, the workshop also cultivated a strong sense of collaboration among teachers. Group discussions became a platform for exchanging experiences, sharing practical solutions, and supporting one another in exploring the pedagogical potential of AI. This collaborative dynamic echoes the findings of Faiz & Kurniawaty (2023), who emphasize that AI-based learning tools significantly enhance teacher creativity and promote richer interaction between educators and students.

Figure 3. Implementation of Mentoring Activities

Several documentation highlights from the workshop further illustrate the depth of participation and commitment. Photographs captured during the sessions show teachers engaged in hands-on learning, experimenting with digital tools, and enthusiastically

embracing the integration of artificial intelligence in their teaching practices. These images serve as visual testimony to the transformative process of empowering educators to lead innovation in Islamic education at the elementary school level.

d. Evaluation and Reflection

After the training, a reflection and evaluation phase was conducted to assess the training's effectiveness and its impact on teaching Islamic studies. Teachers were given opportunities to share their experiences in applying ChatGPT and Leonardo AI in the classroom. Most teachers reported feeling more confident and efficient in preparing teaching materials after attending the training. They also noted increased student interaction during the learning process, as the teaching materials were more varied and engaging.

However, the evaluation also highlighted several challenges, such as the limited time teachers had to fully integrate this technology into their teaching activities. Additionally, some teachers faced difficulties in overcoming technical issues like unstable internet connections or insufficient hardware.

As Crawford et al., (2023), stated, while technologies like ChatGPT can deepen student understanding and enhance engagement, their successful implementation largely depends on infrastructure readiness and teachers' commitment to continually developing their skills in using these technologies.

e. Follow-Up Actions and Sustainability

Based on the reflection and evaluation results, the service team made adjustments to the training modules and methods. These adjustments included providing follow-up mentoring sessions for teachers struggling to integrate the technology into their classrooms and offering additional training materials focusing on practical solutions for overcoming technical issues, such as unstable internet connections. Continuous mentoring was also prepared to ensure that teachers could independently further develop their skills in using these technologies.

The positive impact anticipated from this training includes the creation of a learning environment that is more interactive, responsive, and adaptive to students' needs. Nastiti et al., (2020) emphasized that the sustainability of technology use in education depends heavily on teacher mentoring and capacity-building,

ensuring that technology is not just viewed as a teaching aid but also as a tool to enrich students' learning experiences.

Overall, the implementation of ChatGPT and Leonardo AI in teaching Islamic studies has significantly improved teaching effectiveness. Teachers reported that they could now prepare teaching materials more quickly and easily while being more creative in presenting content to students. Students, in turn, were more engaged in learning due to the more interactive and varied teaching materials. Additionally, these technologies have the potential to improve student learning outcomes by enabling more personalized and student-centered learning, as highlighted by Padma C., (2022).

This study demonstrates that, despite challenges in infrastructure and technological access, implementing AI technologies such as ChatGPT and Leonardo AI can bring significant changes to teaching methods and students' learning experiences in MI. Moving forward, continuous mentoring and training module adjustments will be crucial to ensuring the sustainable use of these technologies in madrasahs, further enhancing the quality of education in the digital era.

4 Discussion

The implementation of AI-based technologies—specifically ChatGPT and Leonardo AI—within the context of Islamic studies at Madrasah Ibtidaiyah (MI) in Probolinggo City provides not only a practical solution to digital learning gaps, but also reinforces key theoretical perspectives on educational innovation and teacher empowerment.

From the standpoint of technological integration in education, this program affirms what Chen et al (2020) highlighted—that effective adoption of artificial intelligence in schools depends not merely on access to tools, but on structured training and pedagogical support. The participatory training model applied in this service mirrors the core principles of constructivist learning theory, where knowledge is built through experience and reflection, and teachers become active agents of change rather than passive recipients of technology.

Moreover, this community service effort also aligns with the framework of teacher professional development, particularly in its emphasis on contextual and sustained training. As emphasized by Nastiti

et al., (2020), educational transformation in the digital era requires the cultivation of teacher autonomy and digital competence. The teachers involved in this initiative did not simply learn how to use ChatGPT or Leonardo AI—they engaged in collaborative module development, contextual adaptation, and classroom experimentation. This participatory model reflects the principles of transformative learning theory, where change is driven by critical reflection and experiential learning.

From a social change perspective, the introduction of AI technology in the context of Islamic religious education—often considered traditional and resistant to technological change—suggests a shift in mindset and practice (Masoumian Hosseini et al., 2025). The use of AI tools not only modernized instructional materials, but also fostered pedagogical innovation within religious subjects that are often taught didactically. This confirms Padma (2022)'s view that AI can act as a catalyst for change in educational culture, especially when combined with sustained mentoring and support systems.

Additionally, the collaborative role of students in facilitating the training process also illustrates the value of intergenerational learning and horizontal collaboration, where digital-native students support educators in navigating technological challenges. This dynamic promotes a more inclusive and community-based approach to digital transformation in education.

Despite these advances, the challenges identified—such as uneven infrastructure, low digital literacy, and limited institutional support—echo broader systemic issues in Indonesian education, particularly in rural or under-resourced madrasahs. These barriers align with findings byNasution, (2020) and Ramadhani (2021), who argue that without policy-level support and targeted investment in infrastructure, technology integration will remain uneven and unsustainable.

In summary, this community service initiative demonstrates how practical interventions, when grounded in participatory methods and theoretical frameworks, can not only enhance teaching practices but also contribute to educational reform in faith-based schools. The linkage between theory and practice in this program emphasizes that AI is not

merely a tool, but a medium to reframe the roles of teachers, reshape the classroom environment, and reformulate the pedagogical process toward a more adaptive and responsive model of Islamic education.

a. Theoretical Discussion Relevant to Findings

The implementation of ChatGPT and Leonardo AI in teaching Islamic studies at Madrasah Ibtidaiyah not only provides practical benefits for teachers and students but can also be analyzed from educational theory and social change perspectives. The use of technology in education, particularly AI, has been extensively discussed in the literature as a tool to improve teaching efficiency and enrich learning experiences (Chen et al., 2020; Launin et al., 2022). In this context, ChatGPT, functioning as an interactive chatbot, and Leonardo AI, generating visual teaching materials, both contribute to achieving better educational outcomes, such as improved teaching quality and increased student engagement.

In line with Nastiti et al., (2020), who highlighted the need for education to adapt to contemporary demands through technology integration, this study's findings demonstrate that the use of AI at Madrasah Ibtidaiyah can address challenges in teaching Islamic studies, which some students might find difficult or less engaging. Leonardo AI, as a tool for creating visual materials like posters and infographics, proved to make learning more contextual and easier to understand.

Furthermore, the application of ChatGPT aligns with the perspective of the McKinsey Global Institute (2018), which stated that AI technology can help create more personalized and responsive learning experiences. ChatGPT enables students to interact directly with teaching materials through structured questions, quizzes, and concept explanations, enhancing their understanding of Islamic studies.

From a social change perspective, this community service initiative also played a role in driving changes in how teachers teach and interact with students. As Padma C., (2022) noted, technology can create dynamic learning environments, allowing teachers to focus more on developing student competencies rather than merely transferring information. These changes in teaching methods are expected to lead to broader social transformations at the madrasah level, including shifts in teacher and student mindsets toward embracing technological advancements in education.

b. Theoretical Insights from the Community Service Process

Several theoretical insights emerged during this community service process concerning technology integration in education and social change at the school level.

Infrastructure Limitations A key finding was that while AI technology has significant potential to enrich teaching and learning, its implementation is not always smooth, particularly in areas with limited infrastructure. This underscores the importance of continuous mentoring and training for teachers to address the challenges of using this technology, aligning with Launin et al., (2022), who emphasized that technology adoption in education requires sustained guidance to optimize its use.

Social Change and Digital Competence The initiative fostered improvements in teachers' digital competence and created more interactive and innovative learning environments. This reflects the concept of technology-driven social change, often discussed in social change theory, where technology facilitates transformations in social and cultural structures, particularly in the education sector.

c. Recommendations for Sustaining the Initiative

Based on the findings of this community service initiative, several recommendations should be considered to ensure the program's sustainability:

Continuous Mentoring Given the ongoing technical challenges, such as limited devices and internet access, it is essential to provide continuous mentoring for MI teachers. This could involve follow-up mentoring sessions or additional training to help teachers address these obstacles.

Improving Technological Infrastructure A primary recommendation is improving technological infrastructure at madrasahs, particularly regarding stable internet access and adequate devices. This could include facilities like computer labs or Wi-Fi hotspots to support technology use in learning.

Broader Integration of AI Technology In the future, the use of AI technologies such as ChatGPT and Leonardo AI should be expanded beyond Islamic studies to other subjects. This will enrich students' overall learning experience and improve the quality of education at Madrasah Ibtidaiyah.

Strengthening Technology-Based Curricula, This program could also propose the development of technology-based curricula at madrasahs, integrating AI as a teaching tool. This would ensure

that the use of technology is not limited to Islamic studies but is also applied to other subjects, fostering a comprehensive technological adaptation in education.

5 Conclusion

This community service program at Madrasah Ibtidaiyah (MI) in Probolinggo City demonstrated that the integration of AI-based tools—ChatGPT and Leonardo AI—can significantly enhance the quality of Islamic studies teaching by increasing teacher creativity, efficiency in preparing materials, and student engagement. The findings confirm that targeted training and participatory mentoring effectively strengthen teachers' digital competencies, aligning with theories of educational innovation and social transformation. However, the success of such initiatives is constrained by infrastructure limitations, including unstable internet access and inadequate digital devices. Therefore, future programs should emphasize sustainable mentoring, improved technological support, and policy advocacy to ensure equitable access and long-term adoption of AI in religious education settings. This initiative serves as a replicable model for empowering Islamic school teachers to embrace digital transformation and innovate in their pedagogical approaches.

6 Acknowledgment

This community service program was successfully implemented in collaboration with the principals and teachers of Madrasah Ibtidaiyah in Probolinggo City, whose enthusiasm and active participation greatly contributed to the program's success. We also express our appreciation to the students who supported the training as facilitators, as well as to the internal funding support from Institut Ahmad Dahlan Probolinggo which enabled the realization of this initiative.

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