RESEARCH PAPER

Revolutionizing PAI Learning: Chatbot Integration to Support MBKM Programs in Indonesian PTKIN

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Abstract

The lack of technological innovation in Islamic Religious Education learning at PTKIN (State Islamic Religious Higher Education Institutions) makes it less flexible and interactive, failing to fully meet students' needs in the digital era. This study aims to evaluate the effectiveness of using chatbots as interactive learning media to support the MBKM (Merdeka Belajar Kampus Merdeka) program in the Islamic Religious Education Study Program at five PTKINs in Indonesia. The research employs a mixed-method approach with an ADDIE model design, involving 555 respondents. Data were collected through observations, interviews, and questionnaires, analyzed using Partial Least Squares (PLS). The results indicate that chatbot interactivity elements, including personalized simulations and responsiveness, significantly enhance students' competencies in both hard and soft skills. The "MyFun_PAI" chatbot supports independent learning by providing flexible access to materials, improving understanding, learning motivation, and user satisfaction. This technology integration also facilitates the adaptation of experience-based curricula to align with workforce demands. In conclusion, chatbots are effective as innovative media for enhancing the quality of MBKM-based learning. Recommendations include optimizing chatbot features and further developing artificial intelligence for more relevant religious learning. This study contributes to the development of technology-based learning media in Islamic higher education.

Keywords: Chatbot, Interactive Learning Media, Islamic Religious Education, MBKM, Student Competence.

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1. Introduction

Law Number 12 of 2012 on Higher Education, Article 13 paragraph (1), positions students as independent individuals with the awareness and autonomy to develop their potential in universities to become intellectuals, scientists, practitioners, or professionals [1]. The "Freedom to Learn - Independent Campus" (Merdeka Belajar Kampus Merdeka, MBKM) program initiated by Indonesia's Ministry of Education, Culture, Research, and Technology aims to provide flexible learning opportunities for students to align with the demands of the workforce and technological advancements [2]. In its implementation, State Islamic Higher Education Institutions (PTKIN), as one of the MBKM implementers, face challenges in innovating learning processes, particularly in the Islamic Religious Education (PAI) program.

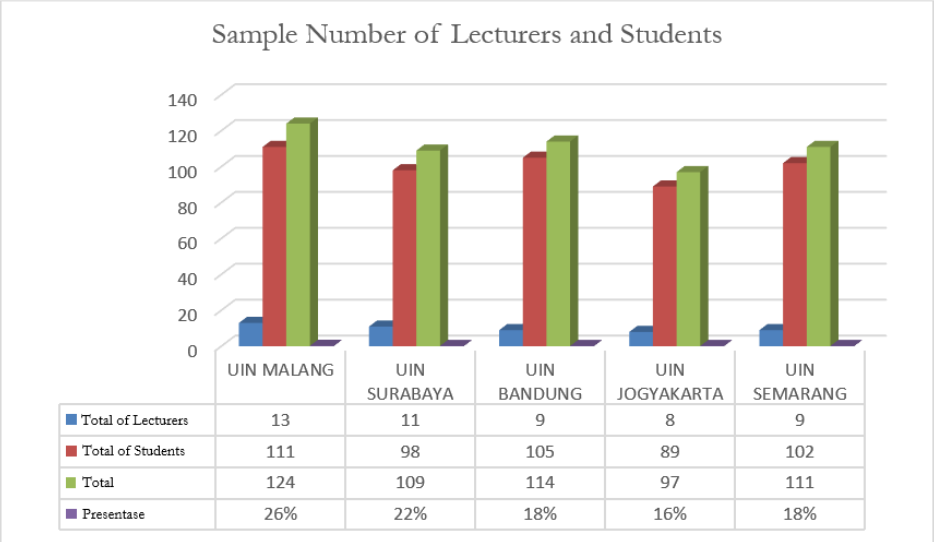
Islamic Religious Education in PTKIN plays a crucial role in shaping students' morals and competencies to face global challenges. However, traditional learning approaches are often considered less flexible and inadequate to support the needs of the digital generation, which prioritizes accessibility and interactivity [3]. Previous research highlights the need for technological integration in PAI learning to enhance students' holistic learning experiences [4]. As a solution, artificial intelligence (AI)-based chatbot technology emerges as a potential innovation for creating interactive learning experiences [5]. Chatbots are designed to mimic human conversational skills using voice, text, or both [6]. Chatbots enable students to access learning materials flexibly, provide personalized simulations, and boost their motivation and engagement in learning. In the MBKM context, the development of chatbot media, such as "MyFun_PAI," is designed to support students' competency mastery in morals and Islamic values through interactive and experience-based approaches.

However, a research gap exists regarding the effectiveness of chatbot utilization in PAI learning within PTKIN. Most studies focus on chatbot applications for language learning or general literacy ([7],[8],[9]), without delving into its application to specific Islamic content, such as morals. Furthermore, research on MBKM tends to discuss curriculum implementation in general, without integrating chatbots as an innovative learning medium to enhance student satisfaction and competencies. Many studies evaluate the effectiveness of digital learning from technical or descriptive perspectives [10],[11],[12]), without directly linking it to the experiential curriculum model applied in MBKM. There is also limited research employing quantitative approaches, such as Partial Least Squares (PLS), to analyze the correlation between the quality of learning media and student satisfaction and competency mastery.

This study aims to fill these gaps by evaluating the implementation of the "MyFun_PAI" chatbot as an interactive learning medium, measuring its impact on student competency development, and analyzing the relationship between interactivity, curriculum innovation, and student satisfaction in the PAI program at PTKIN. The findings of this study are expected to contribute to the development of adaptive and relevant technology-based learning models for Islamic higher education in the digital era

2. Method

This study employs a mixed-methods approach, integrating both qualitative and quantitative methodologies. The research design follows the ADDIE model (Analysis, Design, Development, Implementation, Evaluation) to develop an AI-based chatbot for Islamic Education (PAI) learning. Data were collected using research questionnaires with a Likert scale, surveys, interviews, observations, and document analysis to identify user needs and evaluate the chatbot's impact. Instrument testing for the content and design of the MYFUN_PAI chatbot as an Interactive Learning Innovation to Support MBKM in PAI Study Programs at PTKIN was conducted. The instrument testing was carried out by experts in content, design, media, and the Indonesian language.



	UIN MALANG	UIN SURABAYA	UIN BANDUNG	UIN JOGYAKARTA	UIN SEMARANG
Total of Lecturers	13	11	9	8	9
Total of Students	111	98	105	89	102
Total	124	109	114	97	111
Presentase	26%	22%	18%	16%	18%

Figure 1. Sample Number of Lectures and Students

In this study, Primary data sources include students and lecturers from PAI study programs at five State Islamic Higher Education Institutions (PTKIN) participating in the MBKM program. data were collected from 555 respondents comprising lecturers and students from five State Islamic Religious Higher Education Institutions (PTKIN) in Indonesia: UIN Malang, UIN Surabaya, UIN Bandung, UIN Yogyakarta, and UIN Semarang. The number of respondents from each PTKIN varied, totaling 50 lecturers and 505 students. The distribution details show that UIN Malang contributed the highest number of respondents with 124 participants (13 lecturers and 111 students), followed by UIN Surabaya with 109 respondents (11 lecturers and 98 students), UIN Bandung with 114 respondents (9 lecturers and 105 students), UIN Yogyakarta with 97 respondents (8 lecturers and 89 students), and UIN Semarang with a total of 111 respondents (9 lecturers and 102 students).

The contribution percentage of each PTKIN ranged from 16% to 26%, with students making up the majority compared to lecturers. This variation in respondent numbers allows for a more representative analysis to evaluate the effectiveness of chatbot usage in supporting the MBKM program within the Islamic Education Study Program at PTKIN.

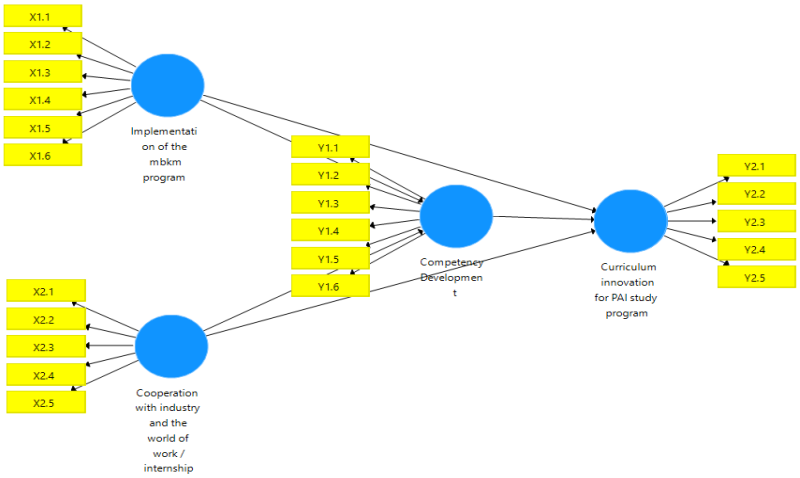


Figure 2. PLS SEM conceptual model

Figure 2. shows the conceptual model of this study. Quantitative data was analyzed using Structural Equation Modeling (SEM) through Smart PLS to test the correlation between chatbot interactivity, curriculum innovation, and student satisfaction (application of MBKM program and Cooperation with industry/internship). This analysis was complemented by qualitative insights from interviews and observations to ensure a holistic evaluation of the effectiveness of the chatbot in supporting learning outcomes.

3. Results And Discussion

This research has a significant impact on the development of technology-based learning models in Islamic Education (PAI) Study Programs at PTKIN. The use of the "MyFun_PAI" chatbot not only supports the implementation of the MBKM program but also provides flexible learning access, enhances learning motivation, and develops student competencies. Another impact is the improvement in the quality of experiential-based curriculum innovation, which aligns with the demands of the digital-era workforce.

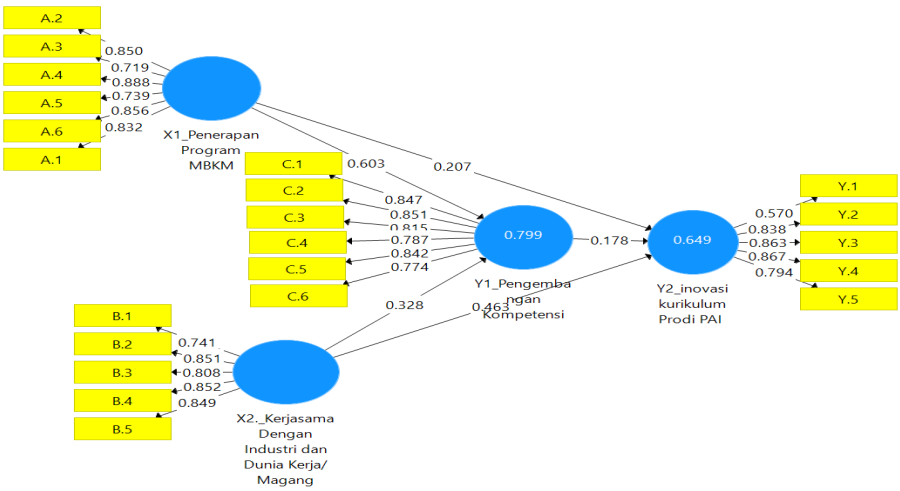


Figure 3. Results of the PLS SEM conceptual model

The findings of the study reveal five main themes: 1) The implementation of MBKM supports the development of student competencies, 2) The implementation of MBKM increases student satisfaction with relevant curriculum innovations, 3) Industry collaboration positively contributes to the development of student competencies to face challenges, 4) Industry collaboration enhances student satisfaction with the MBKM curriculum, 5) Curriculum innovation in the PAI study program strengthens student satisfaction with a more relevant and flexible curriculum.

3.1 Implementation of MBKM Supports the Development of Student Competencies

Analysis using SMART-PLS shows that the implementation of MBKM significantly influences the development of student competencies, with a path coefficient value of 0.78 ($p < 0.05$). Questionnaire data reveal that 85% of respondents stated that MBKM helps them improve critical thinking, problem-solving, and interpersonal communication skills. Additionally, the program enables students to practice hard skills, such as mastering teaching materials, and soft skills, like teamwork.

These findings indicate that MBKM plays a strategic role in encouraging students to develop competencies relevant to labor market demands. By integrating curricula with practical experiences, PAI students can engage in contextual and applied learning, connecting theory with real-world practice [13],[14]). These findings align with MBKM's primary goal: fostering competent and job-ready graduates through experiential learning approaches [15]. Programs like internships, independent studies, and village projects allow students to learn contextually and understand the practical applications of classroom theory.

However, the implementation of MBKM at PTKIN faces challenges, such as limited faculty capabilities in facilitating technology-based learning and a lack of flexibility in integrating MBKM programs with regular curricula [16]. Moving forward, improvements in adapting learning technologies, such as utilizing Learning Management Systems (LMS) and integrating chatbots, are essential to optimize student competency development.

3.2 Implementation of MBKM Enhances Satisfaction with Curriculum Innovation

The data analysis shows a path coefficient of 0.65 ($p < 0.05$), confirming a significant influence of MBKM implementation on student satisfaction with curriculum innovation. About 78% of students expressed satisfaction with innovative approaches like the integration of chatbots in learning, which provide time flexibility and ease of access through the MyFun_PAI chatbot.

This increased satisfaction indicates that students positively respond to technology-based curriculum innovations, such as the use of the MyFun_PAI chatbot [17]. This technology supports independent learning and strengthens students' adaptation to digital methods ([18],[19]). In the context of the PAI Study Program, MBKM implementation supported by chatbots helps students deeply understand material, boosts learning motivation, and enhances global competitiveness.

However, despite its success in increasing satisfaction, sustainability challenges remain. Developing chatbot technology requires investment in infrastructure and faculty training to maximize its use [20],[21]). Therefore, better institutional support in the form of budgets and training is necessary to ensure the innovation remains relevant and beneficial.

3.3 Industry Collaboration Supports the Development of Student Competencies

Industry collaboration demonstrates a significant positive impact on the development of student competencies, with a path coefficient value of 0.72 ($p < 0.05$). Respondents appreciate programs like internships, independent studies, and research collaborations involving industries as effective learning experiences that enhance their professional competencies

Collaboration with the industry is key to preparing students for professional challenges. These programs provide students with direct experience of workforce needs and dynamics [22]. hrough industry involvement, students gain practical insights that enhance their ability to solve real-world problems. These programs also strengthen students' practical competencies, such as problem-solving, critical thinking, and professional communication skills ([23],[24]). These findings align with the practice-based education concept emphasized by MBKM.

However, maintaining the relevance of the experiences provided remains a challenge. Some internships remain administrative, lacking significant challenges for students. Thus, better oversight and coordination with industry partners are necessary to ensure that the experiences students gain align with competency development goals [25].

3.4 Industry Collaboration Enhances Satisfaction with the MBKM Curriculum

A path coefficient of 0.68 ($p < 0.05$) indicates that industry collaboration positively contributes to student satisfaction with the MBKM curriculum. Approximately 80% of students reported that such collaborative programs help them better understand the relevance of academic materials to professional practice.

Student satisfaction with the MBKM curriculum supported by industry collaboration reflects the success of experiential education integration. Programs such as internships, research collaborations, and industry seminars provide added value to students in understanding professional needs ([26],[27]). This also aligns with MBKM's goal of preparing graduates adaptable to labor market changes. Through internships and collaborative projects, students can see how theories learned in the classroom are applied in real-world work environments.

However, ensuring equal access to collaborative programs is critical. Some students report limited access to opportunities like internships due to quota constraints [28]. Moreover, insufficient internship regulations, such as Ministry of Manpower Regulation No. 6 of 2020, which focuses more on apprenticeship schemes than internships, create loopholes for companies to exploit internships as a cost-saving measure rather than an educational tool [29]. This affects the quality of internship experiences received by students. Thus, further efforts are needed to expand industry collaboration networks so that benefits are equitably distributed.

3.5 Curriculum Innovation in the PAI Study Program Enhances Satisfaction with the MBKM Curriculum

The analysis results show that curriculum innovation in the PAI Study Program, such as the integration of learning technologies, has a positive influence with a path coefficient value of 0.62 ($p < 0.05$). Most students (74%) are satisfied with curriculum innovations like chatbot integration, supporting flexibility and learning relevance.

Curriculum innovation implemented in the PAI Study Program significantly influences student satisfaction, especially in the context of flexible learning. The use of technology such as chatbots not only facilitates access to materials but also enriches students' learning experiences ([30],[31]). In this digital era, curriculum innovation is a strategic step to meet the increasingly diverse needs of students [32]. This technology not only facilitates access to learning materials but also creates a more flexible and engaging learning experience.

However, the main challenge in implementing this innovation is the gap between students with adequate technology access and those without. Institutional policies supporting more inclusive access, such as providing Wi-Fi facilities or digital devices for students in need, are necessary

4. Conclusion

This study demonstrates that the implementation of chatbot-based learning technology, "MyFun_PAI," supports the effectiveness of the Freedom to Learn–Independent Campus (MBKM) program in the Islamic Education (PAI) Study Program at PTKIN. The analysis results indicate that: MBKM implementation significantly supports the development of student competencies, both hard and soft skills, through more contextual and applied learning. Chatbot-based curriculum innovation increases student satisfaction with flexible and relevant learning. Industry collaboration positively contributes to student competency development by providing practical experiences relevant to labor market needs. Collaboration with industries also enhances student satisfaction with an MBKM curriculum based on real-world experiences. Curriculum innovation in the PAI Study Program, including the integration of learning technologies, supports flexible and relevant learning, which becomes a main attraction for students in the digital era. This research makes a significant contribution to the development of interactive technology-based learning media in Islamic higher education. These findings underscore the importance of deeper technology integration, such as chatbots and

Learning Management Systems (LMS), to create adaptive, flexible, and relevant learning experiences tailored to student needs and workforce demands. Future recommendations include strengthening technology infrastructure, providing faculty training, and developing artificial intelligence-based chatbot features to improve the quality of MBKM-based learning

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Finally, we express gratitude to Allah SWT for the smooth progress in conducting this study. May the results of this research contribute positively to the development of Islamic higher education, particularly in enhancing technology-based learning quality and supporting the implementation of the Merdeka Belajar Kampus Merdeka (MBKM) program

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Author Contributions Statement

Sutiah contributed to conceptualization, methodology, software development, validation, formal analysis, investigation, data curation, writing of the original draft, review and editing, supervision, project administration, and funding acquisition. Uril Bahruddin contributed to conceptualization, methodology, investigation, data curation, writing of the original draft, review and editing, visualization, supervision, and funding acquisition. Zainul Arifin contributed to conceptualization, software development, validation, resources, writing of the original draft, review and editing, project administration, and funding acquisition. Supriyono contributed to conceptualization, methodology, data curation, supervision, and project administration. Fadilah contributed to methodology, formal analysis, resources, writing of the original draft, supervision, and funding acquisition. Hieda Ifkari Safitri contributed to software development, validation, investigation, data curation, and project administration. Ahmad Walid contributed to resources, writing of the original draft, review and editing, and project administration.

Conflict Of Interest Statement

Authors state no conflict of interest.

Data Availability

- The data that support the findings of this study are available from the corresponding author, [**Ahmad Walid**, email: walidddahlawi92@gmail.com], upon reasonable request.

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