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Development of an AI-Based Chatbot to Support Non-Formal Islamic Education: Integrating AI as an Interactive and Innovative Medium

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Abstract: The rapid advancement of information and communication technology has transformed educational practices, particularly with the integration of artificial intelligence (AI). One emerging innovation is the chatbot, which provides interactive and personalized learning experiences. This study aims to develop an AI-based chatbot, named Chat63, to support the educational framework of Tapak Suci Putera Muhammadiyah, an autonomous organization under Muhammadiyah that integrates martial arts training with Islamic values. Positioned within the scope of non-formal Islamic education, Tapak Suci functions not only as martial arts training but also as a medium of character building, spiritual strengthening, and the implementation of Al-Islam and Muhammadiyah values. Utilizing the Research and Development (R&D) approach with the ADDIE model, Chat63 was designed to deliver Tapak Suci's cognitive materials, including organizational knowledge, Tapak Suci principles, Al-Islam, Muhammadiyah studies, and Tapak Suci traditions. Evaluation results indicate that Chat63 effectively provided accurate, relevant, and fast responses, enhancing learners' engagement and understanding. While improvements such as visual aids and concise responses are still needed, Chat63 demonstrates strong potential as an innovative and interactive learning medium that bridges non-formal Islamic education, tradition, and modern technology.

Keyword: AI Chatbot, Tapak Suci, Non-Formal Islamic Education, Interactive Learning, Muhammadiyah

Abstrak: *Perkembangan pesat teknologi informasi dan komunikasi telah mentransformasi praktik pendidikan, khususnya melalui integrasi kecerdasan buatan (Artificial Intelligence/AI). Salah satu inovasi yang berkembang adalah chatbot, yang mampu menyediakan pengalaman belajar yang interaktif dan personal. Penelitian ini bertujuan untuk mengembangkan chatbot berbasis AI bernama Chat63 guna mendukung kerangka pendidikan Tapak Suci Putera Muhammadiyah, sebuah organisasi otonom di bawah Muhammadiyah yang memadukan pembinaan bela diri dengan nilai-nilai keislaman. Dalam ranah pendidikan Islam nonformal, Tapak Suci tidak hanya berfungsi sebagai wadah latihan bela diri, tetapi juga sebagai media pembentukan karakter, penguatan spiritual, serta implementasi nilai-nilai Al-Islam dan Kemuhammadiyahan. Dengan menggunakan pendekatan Research and Development (R&D) melalui model ADDIE, Chat63 dirancang untuk menyampaikan materi kognitif Tapak Suci, meliputi pengetahuan keorganisasian, prinsip-prinsip Tapak Suci, Al-Islam, Kemuhammadiyahan, serta tradisi Tapak Suci. Hasil evaluasi menunjukkan bahwa Chat63 mampu memberikan respons yang akurat, relevan, dan cepat, sehingga meningkatkan keterlibatan dan pemahaman peserta didik. Meskipun masih diperlukan pengembangan lanjutan seperti penambahan media visual dan peringkasan jawaban, Chat63 menunjukkan potensi yang kuat sebagai media pembelajaran inovatif dan interaktif yang menjembatani pendidikan Islam nonformal, tradisi, dan teknologi modern.*

Kata Kunci: *Chatbot AI, Tapak Suci, Pendidikan Islam Nonformal, Pembelajaran Interaktif, Muhammadiyah*

Introduction

The development of information and communication technology has experienced rapid advancements over the past few decades, significantly impacting various aspects of life, including education. These advancements have driven the integration of digital technology into the learning process, substantially transforming teaching methods and the interactions between educators and learners (Timotheou, Miliou, and Dimitriadis 2023).

A groundbreaking innovation in artificial intelligence (AI) technology is the chatbot, designed to provide an interaction experience that mimics human conversation (Isma et al. 2024). Chatbots have been utilized across various sectors, including customer service, business, and education. In the context of education, chatbots can serve as virtual assistants that help students understand learning materials through more personalized and flexible interactions (Wibowo et al. 2024). According to research, AI chatbots hold great potential as educational tools in the teaching world (Al Husaeni et al. 2024).

The emergence of large language models like ChatGPT enhances the potential of chatbots in education by offering instant feedback, on-demand answers, and explanations of complex topics. This technology not only facilitates more interactive engagement between students and learning materials but also necessitates changes in teaching and assessment methods (Albadarin et al. 2024). A study highlights the importance of educators adapting to integrate generative AI technologies like ChatGPT, ensuring that learning becomes more relevant and aligned with the needs of the digital age (Bower et al. 2024).

Non-formal Islamic education is one of the educational pathways that develops outside the formal education system, characterized by its flexibility in terms of time, methods, and participants (Sodik 2024). Its presence is not only intended as an alternative, but also as a complement in the effort to instill religious values and shape the character of the Muslim community(Reza Cahya Alfandi and Nurul Latifatul Inayati 2025). In practice, non-formal Islamic education can be realized through various institutions and activities oriented toward strengthening spirituality, deepening religious knowledge, and fostering moral development within society (Rasyid 2018).

As part of Al-Islam and Muhammadiyah studies, Tapak Suci Putera Muhammadiyah is an autonomous organization under the auspices of Muhammadiyah, focusing on the development of the Pencak Silat martial arts (Pimpinan Pusat Tapak Suci Putera Muhammadiyah 2012). Established on July 31, 1963, in Kauman, Yogyakarta (Syamsuri and Nawir 2017), Tapak Suci not only teaches martial arts skills but also instills spiritual and moral values in accordance with Islamic principles. In this regard, Tapak Suci as one of Muhammadiyah's autonomous organizations does not merely emphasize physical training and martial proficiency, but also functions as a medium of non-formal Islamic education. Through its training system, cadre formation, and value internalization, Tapak Suci becomes an instrument for the implementation of Al-Islam and Kemuhammadiyahan in shaping the character, spirituality, and discipline of its members.

Tapak Suci has expanded to various regions in Indonesia and abroad, teaching martial arts techniques based on rationality without the use of amulets or chants, emphasizing speed and precision in movements. Its training program integrates Islamic values such as prayer, leadership, discipline, honesty, and respect, with a structured system ranging from basic levels to Baitulaqrom as leadership training. The philosophy of Tapak Suci is rooted in the cultural heritage of the Nusantara, with movements inspired by nature, playing a role in cultural preservation and strengthening the national

identity of Silat (Hadiana et al. 2022). It can be concluded that Tapak Suci serves as a platform for nurturing young generations, shaping resilient character and a noble personality (Nur Subekti et al. n.d.).

In the context of Tapak Suci education, there is an opportunity to develop learning aspects that focus on cognitive knowledge without involving physical movements such as martial arts techniques. The integration of technology, particularly through the adoption of AI chatbots like ChatGPT, which has been trained to understand Tapak Suci material including organization, Tapak Suci principles, Al-Islam, Muhammadiyah studies, and Tapak Suci traditions can be further explored to foster new innovations. The use of ChatGPT in education has demonstrated potential in enhancing the accessibility and interactivity of learning (Subiyantoro et al. 2023). This approach can bridge the gap between traditional training and modern digital tools, creating a hybrid learning model that supports the comprehensive development of Tapak Suci members.

Interactive and innovative learning media provide a platform for two-way interaction between students and learning materials, supplemented with immediate feedback. This enables students to instantly understand the results of their actions or answers, allowing them to improve their comprehension and skills in real-time. Additionally, such media are often designed with engaging elements, such as animations, simulations, and educational games, which can enhance students' motivation and engagement in the learning process (Bitu et al. 2024).

The use of interactive learning media has been proven effective in improving student learning outcomes. According to research published in the Journal of Information & Communication Technology in Education, the development of interactive learning media in economics education can significantly enhance students' understanding (Tarigan and Siagian 2015). Additionally, the use of technology-based interactive multimedia can also boost students' motivation and engagement in the learning process (Yazdi, Matematika, and Tadulako 2012). Thus, the integration of interactive and innovative learning media into the educational process can serve as an effective strategy to improve the quality of learning and student outcomes.

This research stands out from other studies that typically focus on the use of chatbots in education for general learning purposes. It specifically develops an AI-based chatbot to support education within the Tapak Suci environment, addressing not only cognitive aspects but also instilling spiritual, moral, and Islamic traditions that characterize the organization. This innovation creates a contextually relevant interactive learning medium, enabling materials such as organizational skills, Tapak Suci principles, Al-Islam, Muhammadiyah studies, and Tapak Suci traditions to be accessed flexibly and personally.

The goal of this study is to develop an AI-based chatbot that supports the learning process within the Tapak Suci framework, particularly in delivering cognitive knowledge, including organizational skills, Tapak Suci principles, Al-Islam, Muhammadiyah studies, and Tapak Suci traditions. The research also aims to assess the effectiveness of the chatbot as an interactive learning medium capable of enhancing students' understanding and engagement in Tapak Suci-related materials. Additionally, this study is expected to contribute to technological innovation in education by integrating AI technology to create more personalized, flexible, and adaptive teaching methods tailored to the needs of the current digital generation.

Methodology

This study employs a Research and Development (R&D) approach using the ADDIE model (Analysis, Design, Development, Implementation, Evaluation) to develop an AI-based chatbot as an interactive learning medium within the Tapak Suci environment. The ADDIE model was selected for its suitability in systematically and structurally developing educational products that can be continuously evaluated, ensuring effectiveness and alignment with user needs (Branch 2010).

1. Analysis Stage:

   The research begins with identifying the needs and challenges in the learning process within the Tapak Suci environment. This involves thoroughly observing previous studies related to interactive and innovative learning media, particularly for delivering cognitive materials such as organizational skills, Tapak Suci principles, Al-Islam, and Muhammadiyah studies.
2. Design Stage:

   The concept of an AI-based chatbot is designed to support the delivery of Tapak Suci cognitive materials in a more interactive and personalized manner, accessible via a website platform.
3. Development Stage:

   The chatbot is developed using ChatGPT Builder, a tool provided by OpenAI specifically designed to create tailored AI chatbots based on user requirements.
4. Implementation Stage:

   The chatbot is piloted with several Tapak Suci trainers in Sragen Regency who represent Tapak Suci across various regions. This stage allows for real-world application and testing of the chatbot.
5. Evaluation Stage:

   The effectiveness of the chatbot as an interactive learning medium is assessed by collecting data through interviews and observations of chatbot users. This evaluation aims to measure its success in supporting the learning process within Tapak Suci.

Result and Discusion

Analysis

In the analysis stage, this study identifies the needs and challenges in the learning process within the Tapak Suci environment, particularly in delivering cognitive materials such as organizational skills, Tapak Suci principles, Al-Islam, Muhammadiyah studies, and Tapak Suci traditions. A review of existing literature reveals an absence of previous research utilizing interactive and innovative technology-based learning media in the context of Tapak Suci.

Most current studies and documentation on Tapak Suci learning still rely on conventional approaches, such as lectures, group discussions, and physical teaching materials like books or modules. While effective in certain aspects, these methods have limitations in terms of interactivity, flexibility, and their ability to engage younger generations who are increasingly familiar with digital technology (Suci 2024).

One modern medium already used for delivering Tapak Suci content is YouTube (Mansyah and Kurniawan 2024). This platform is leveraged to upload instructional videos covering both cognitive

materials and martial arts techniques. YouTube offers several advantages, including easy access, material visualization, and broad reach (Zhou et al. 2020). However, a significant limitation of this medium is its inability to provide real-time feedback to users. When students or users have questions or require further clarification, YouTube videos cannot respond interactively, limiting the personalization and interactivity of the learning experience.

The lack of innovation in Tapak Suci learning media underscores the urgency of introducing a new approach that leverages artificial intelligence (AI) technology. By introducing an AI-based chatbot, users can not only receive explanations in an interactive and personalized manner but also have the opportunity to ask questions and receive instant answers with relevant feedback. This chatbot is expected to be an innovative solution to increase student engagement, deepen their understanding of cognitive materials, and bridge the limitations of existing learning media, including YouTube. This study seeks to address this gap by integrating modern technology into Tapak Suci education.

Design

In the design phase, the research focuses on creating the concept of an AI-based chatbot named Chat63. The name honors the founding year of Tapak Suci, 1963, while symbolizing the spirit of innovation in the organization's education. Chat63 is designed to deliver Tapak Suci's cognitive materials interactively and personally. The design process leverages ChatGPT Builder, a platform built on the advanced and flexible GPT (Generative Pre-trained Transformer) technology. The detailed design steps include:

1. Needs Identification
    a. Relevance: Chat63 must provide accurate and relevant answers to user inquiries about Tapak Suci's organizational structure, principles, Al-Islam, Muhammadiyah, and Tapak Suci traditions.
    b. Contextual Understanding: It should understand the context of questions and provide clear, structured, and easy-to-understand explanations.
    c. Accessibility: Chat63 must be responsive, user-friendly, and compatible with various devices, such as desktops, tablets, and mobile phones.
2. Content Structure Design
    a. Organizational Knowledge:
        1) Tapak Suci's organizational structure, roles, responsibilities, and mechanisms.
        2) Philosophy, core principles, and values underpinning the organization.
    b. Al-Islam:
        1) Islamic teachings relevant to Tapak Suci, such as beliefs (aqidah), worship (ibadah), and ethics (akhlaq).
    c. Muhammadiyah Studies:
        1) The history, vision, and mission of Muhammadiyah and its contributions to Tapak Suci.
    d. Tapak Suci Traditions:
        1) Customs, practices, and routines within Tapak Suci, including training and competitions.
3. Conversation Flow Design

a. Introduction: Chat63 displays a user interface explaining its purpose, with the message: "AI Virtual Trainer Assistant to Support Tapak Suci Martial Arts Learning."
b. Material Search: Users can select categories from an interactive menu or type questions directly.
c. Dynamic Responses: Chat63 provides specific answers based on user input, supplemented with links or supporting materials when necessary.
d. Feedback Mechanism: Users can rate the quality of responses, enabling continuous improvement of Chat63's performance.

4. Supporting Technology Selection
   a. Chat63 is developed using ChatGPT Builder due to its advantages:
      1) Customized Dialogs: Enables tailoring conversations to fit Tapak Suci's specific learning needs.
      2) Multi-Platform Integration: Ensures accessibility through websites, apps, or other easily reachable platforms.
      3) Adaptive Capabilities: Chat63 can be trained and improved using Tapak Suci-specific datasets to enhance accuracy and relevance.
5. Interface Design
   a) Primary Platform: Chat63 will be available through a responsive website, making it easily accessible across different devices.
   b) Simple Navigation: An intuitive navigation menu allows users to select material categories, type questions, and provide feedback.
   c) Personalization: Chat63 is designed with a friendly and enthusiastic character to reflect Tapak Suci's values.

Development

In the development phase, the focus is on transforming the designed concept into a functional prototype of Chat63, an AI-based interactive learning chatbot. Chat63 was developed using ChatGPT Builder, a platform offering tools for creating customizable chatbots tailored to user needs. The development process involved the following steps:

1. Development of Tapak Suci Material Dataset

   The initial dataset was organized into five main categories:
   a. Organizational Knowledge: Structure, roles, responsibilities, philosophy, core values, and principles of Tapak Suci.
   b. Al-Islam: Islamic teachings such as aqidah (faith), ibadah (worship), and akhlaq (ethics).
   c. Muhammadiyah Studies: The history and contributions of Muhammadiyah to Tapak Suci.
   d. Tapak Suci Traditions: Customs, practices, training routines, and competitions within Tapak Suci.

   The dataset was structured into textual formats and trained within the ChatGPT Builder, enabling Chat63 to provide responses based on this information. The material aligns with the Tapak Suci curriculum and incorporates validated references from official documents and relevant literature.
2. Utilization of ChatGPT Builder for Chat63 Development

a. Data Input: The prepared dataset was uploaded into the ChatGPT Builder.
b. Response Customization: ChatGPT Builder's features were used to fine-tune Chat63's tone and language style, ensuring alignment with Tapak Suci's values—friendly, professional, and Islamic.
c. Conversation Flow Creation:
    1) Designed to meet user needs, including:
    2) Providing brief explanations on specific topics.
    3) Answering detailed and specific user questions.
    4) Offering links or references for further study.
d. Integration of Interactive Features:
    1) Features for receiving and responding to user feedback were incorporated to allow continuous improvements to Chat63 based on user experiences.

3. Chatbot Interface Development
    a. Primary Platform:

        Chat63 was developed as a responsive website, ensuring accessibility across devices such as desktops, tablets, and mobile phones.
    b. Interface Design:
        1) Simple and User-Friendly: The interface was designed to be intuitive and engaging, consisting of:
        2) Main Menu: Displays the categories of materials that users can select.
        3) Conversation Box: A space where users can type questions or select topics.
        4) Feedback Button: Allows users to rate the quality of Chat63's responses.

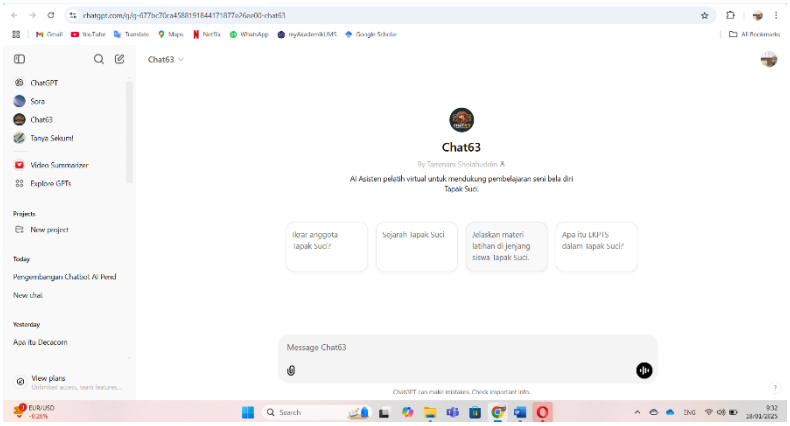

Figure 1. Desktop Interface Display of Chatbot-Chat63

Figure 2. Smartphone Interface Display of Chatbot-Chat63

4. Functional Testing of the Chat63 Prototype

The initial prototype of Chat63 underwent functional testing to ensure all features operated effectively. The testing process included the following steps:

a. User Simulation: Various usage scenarios were tested, including:

1) Direct questions about specific material categories.

2) Requests for detailed explanations about Tapak Suci principles.

b. Response Evaluation: Chat63's responses were assessed based on:

1) Accuracy: Ensuring the information provided matches the material.
2) Relevance: Verifying that the responses align with the user's questions.
3) Speed: Measuring how quickly Chat63 delivers answers.

c. Initial Feedback: Feedback from testers was collected to identify and address shortcomings in the prototype, leading to further improvements.

Figure 3. Simulation and Testing of Desktop Usage

Figure 4. Simulation and Testing of Smartphone Usage

5. Integration of Supporting Features
   a. Personalized Responses: Chat63 can provide personalized greetings using the user's name if the data is available.
   b. Additional References: Chat63 offers links to YouTube videos, digital documents, or other relevant materials to enrich the learning experience.
   c. Multilingual Support: Chat63 is configured to support Bahasa Indonesia as the primary language, with potential development for other languages.
6. Prototype Results

The initial prototype of Chat63 has been successfully developed with features designed to support interactive Tapak Suci learning. The chatbot can respond to user queries quickly and

accurately, provide structured explanations aligned with the five main categories—organizational knowledge, Tapak Suci principles, Al-Islam, Muhammadiyah studies, and Tapak Suci traditions—and receive and address user feedback to enable continuous improvement based on input.

Chat63 is accessible via a web-based platform with a simple and user-friendly interface, making it easy to use, even for those unfamiliar with technology. The successful development of this prototype indicates that Chat63 is ready for broader testing in the next implementation phase. With its innovative features specifically tailored to the needs of Tapak Suci education, Chat63 is expected to serve as an effective solution for supporting technology-based learning that is interactive, flexible, and relevant to the digital era.

Implementation

In the implementation phase, the Chat63 prototype was tested by ten members of Tapak Suci from the Regional Leadership of Tapak Suci 058, Sragen Regency. Sragen was chosen as the testing site because it is one of the most active centers for Tapak Suci development in Indonesia. This region is recognized as a model for Tapak Suci cadre training, not only nationally but also internationally, with representatives from Tapak Suci present in various countries.

The Chairperson of the Regional Leadership of Tapak Suci Sragen stated that the region produces approximately 100 trainers annually, with thousands of active trainers and students across numerous Tapak Suci branches. This makes Sragen one of the key hubs for Tapak Suci organizational development in Indonesia. Sragen often serves as a reference point for designing cadre programs and trainer development initiatives in other regions.

The Chat63 trial in Sragen involved members with diverse backgrounds, including trainers, senior cadres, and senior instructors. Test participants were granted direct access to Chat63 via a web-based platform and were asked to explore various features, such as material search, responsive interaction, and feedback submission. This hands-on testing aimed to evaluate the chatbot's functionality and effectiveness in supporting Tapak Suci education.

From the perspective of interactive learning media theory, the implementation results demonstrate that Chat63 fulfills key characteristics of effective interactive media, including two-way communication, immediate feedback, and learner control over content access. Interactive learning theory emphasizes that learning becomes more effective when learners actively engage with content rather than passively receive information. In this implementation, Chat63 enabled users to interact directly with learning materials by asking questions, selecting topics, and receiving instant responses, thereby fostering active learning within the Tapak Suci educational context.

In line with educational chatbot theory, Chat63 functions as a virtual learning assistant that supports learners by providing on-demand explanations and guidance. Previous studies indicate that educational chatbots can enhance learner engagement and autonomy by offering personalized interactions and flexible access to learning resources. The findings of this study confirm that Chat63 successfully performs this role within a non-formal Islamic education setting, where learning flexibility and accessibility are essential.

Within the framework of non-formal Islamic education, the implementation of Chat63 aligns with the principles of flexible learning, community-based education, and value internalization. Non-formal Islamic education emphasizes not only cognitive learning but also moral, spiritual, and

organizational character formation. The implementation results show that Chat63 supports this orientation by delivering materials related to Al-Islam, Kemuhammadiyahan, and Tapak Suci traditions in a manner that is accessible beyond formal training schedules. This finding reinforces the role of digital technology as a complementary medium in sustaining value-based learning in non-formal Islamic institutions.

Table 1. Testing/Implementation

Tester Number	Material Searched	Response Quality	Speed	Ease of Use	Tester Notes
One	Tapak Suci Oath	Good	Fast	Easy	Comprehensive answer aligned with organizational values.
Two	History of Tapak Suci	Excellent	Fast	Very Easy	Detailed and engaging information; very interactive.
Three	Material for each belt level	Good	Fast	Easy	Structured material, but better if presented in a table format.
Four	LKPTS in Tapak Suci	Excellent	Fast	Very Easy	Fairly detailed explanation, but additional references are needed.
Five	MKCHM	Excellent	Fast	Very Easy	Answers align with Muhammadiyah's values.
Six	Organizational Material	Good	Fast	Very Easy	Clear information, but responses are slightly lengthy.
Seven	Al-Islam Material	Good	Fast	Easy	Accurate response covering essential aspects.
Eight	Tapak Suci Techniques	Excellent	Fast	Very Easy	Interesting explanation, but visualizations of techniques would help.
Nine	Historical Tapak Suci Warriors	Good	Fast	Easy	Comprehensive and inspiring information about historical warriors.
Ten	Tapak Suci Traditions	Excellent	Fast	Very Easy	Decent answer, but illustrations would enhance understanding.

Despite its positive implementation outcomes, the use of an AI-based chatbot also presents pedagogical limitations when viewed from the perspective of AI in education theory. AI chatbots rely on predefined datasets and probabilistic language models, which may result in incomplete contextual

understanding, especially in spiritually nuanced and value-laden subjects such as Al-Islam and Kemuhammadiyahan. This limitation was reflected in testers' feedback requesting additional references, visual support, and more concise explanations.

Furthermore, educational AI literature highlights the risk of information bias and over-reliance on automated systems if human supervision is absent. Therefore, Chat63 should be positioned as a supportive learning medium rather than a replacement for instructors or spiritual mentors. Continuous validation of content by Tapak Suci educators is essential to ensure theological accuracy, contextual relevance, and alignment with Muhammadiyah values.

Pedagogically, the implementation of Chat63 offers important implications for the teaching of Al-Islam and Kemuhammadiyahan within Tapak Suci. The chatbot enables learners to revisit religious and organizational materials independently, supporting self-directed learning and reinforcing values beyond formal training sessions. This flexibility is particularly relevant for cadres and trainers who require continuous access to learning materials despite time and location constraints. However, pedagogical effectiveness can be further enhanced by integrating multimedia elements and reflective prompts to deepen spiritual understanding rather than merely transmitting information.

Compared to previous studies on educational chatbots that primarily focus on formal education settings and general academic subjects, this study extends the application of chatbot technology to a value-based, non-formal Islamic education context. While earlier research reports improved engagement and accessibility through chatbot use, the findings of this study demonstrate that similar benefits can be achieved in spiritually oriented learning environments. This comparison strengthens the academic position of the study by showing that AI-based chatbots can be adapted to support character and value education when designed with contextual and institutional specificity.

Evaluation

Evaluation is a critical stage to assess the effectiveness of the Chat63 prototype in achieving its purpose as an innovative interactive learning medium to support the cadre training and teaching processes in Tapak Suci. The evaluation results are based on testers' experiences using Chat63 and a comprehensive analysis of response quality, speed, ease of use, and further development potential

The implementation results indicate that Chat63 successfully provided accurate, relevant responses tailored to the cognitive learning needs of Tapak Suci. Testers found the chatbot's answers highly helpful in explaining various topics, such as the Tapak Suci Oath, history, belt levels, and organizational material. The responses were structured and reflected the core values of Tapak Suci education. Testers suggested presenting certain materials, like belt levels, in tables or visual summaries to enhance learning efficiency and simplify complex information.

Response speed was one of Chat63's main strengths. During testing, the chatbot delivered answers almost instantly after questions were posed. Testers appreciated this capability, especially since quick responses contribute to a seamless user experience, particularly for younger generations who prioritize efficiency when accessing information. This speed also demonstrates that the technology used in Chat63's development performs optimally to meet real-time user needs. Ease of use was another highly praised aspect. Chat63's interface was designed with intuitive navigation and a simple layout, allowing testers, even those unfamiliar with technology, to use it effortlessly. Testers felt comfortable exploring the chatbot's various features, such as selecting material categories, asking

questions, and providing feedback. This indicates that Chat63 is not just an information provider but also creates an enjoyable and inclusive learning experience for all users.

The findings indicate that Chat63 supports the principles of personalized learning by allowing users to access learning materials based on their individual needs, questions, and learning pace. Unlike conventional media that deliver uniform content, Chat63 enables users to actively seek specific information and receive tailored responses aligned with their learning context. This aligns with the concept of personalized learning, which emphasizes learner autonomy, flexibility, and individualized learning pathways supported by digital technology.

Furthermore, Chat63 demonstrates characteristics of adaptive learning through its ability to respond dynamically to diverse user inputs and adjust explanations based on question specificity. Although the chatbot does not yet employ fully automated learning analytics, its interactive response mechanism reflects an initial form of adaptive learning, where content delivery adapts to users' inquiries in real time. Previous studies highlight that adaptive digital learning systems enhance engagement and comprehension by responding to learners' immediate needs, a potential that is reflected in the implementation results of Chat63.

The evaluation also highlighted the need for further enhancements to enrich the learning experience. Adding visual components, such as images, diagrams, or videos, would make learning materials more engaging and help users understand technical aspects that are challenging to convey through text alone. Providing supplementary references, such as links or official documents, would also deepen understanding, particularly for topics like the history of Tapak Suci and LKPTS. Additionally, while responses were comprehensive, testers noted that concise answers could improve user efficiency, especially in situations requiring quick access to information.

Despite its positive performance, the use of AI-based chatbots in education also presents several limitations, as highlighted in prior studies. AI chatbots may generate responses that are influenced by limitations in training data, potentially leading to information bias or oversimplification of complex concepts. In addition, chatbots may struggle to fully understand contextual nuances, particularly in value-laden and spiritually oriented educational settings such as Tapak Suci. This limitation underscores the importance of positioning Chat63 as a complementary learning tool rather than a replacement for human instructors and trainers.

These limitations indicate that continuous content validation, supervision by subject-matter experts, and alignment with official Tapak Suci references are essential to ensure the accuracy and ethical use of AI in non-formal Islamic education.

Overall, the evaluation results indicate that Chat63 has great potential to become a relevant and innovative learning tool. The chatbot not only delivers the required information quickly and accurately but also offers an engaging and interactive learning experience. By addressing the feedback from testers, Chat63 can be further refined to meet the evolving needs of the digital generation.

Chat63 serves as a modern solution to support cognitive learning in Tapak Suci while bridging tradition and technology. This evaluation confirms that Chat63 is ready for broader implementation across various Tapak Suci learning environments at local, national, and international levels. With further development, Chat63 is expected to become a model of technology-based learning that inspires and positively impacts education within Tapak Suci and other organizations.

Conlusion

Based on the research findings and implementation, the development of the Chat63 chatbot successfully achieved its goal as an AI-based interactive learning medium to support the educational processes within the Tapak Suci environment. Chat63 effectively delivers cognitive materials, such as organizational knowledge, Tapak Suci principles, Al-Islam, Muhammadiyah studies, and Tapak Suci traditions, in a relevant and structured manner. With fast and interactive responses, Chat63 provides a more personal, flexible, and adaptive learning experience, enhancing students' understanding and engagement. The implementation in the Regional Leadership of Tapak Suci 058, Sragen Regency, demonstrated the chatbot's effectiveness in supporting learning, particularly as a substitute for less interactive conventional methods. However, the study also identified several areas for improvement, such as adding visual elements, providing additional references, and optimizing responses to improve user efficiency. With these enhancements, Chat63 can better meet the needs of the increasingly sophisticated digital generation. Overall, Chat63 serves not only as a modern solution for Tapak Suci learning but also as a model of educational innovation powered by technology, relevant for implementation in various regions, both nationally and internationally.

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