

Utilization of Artificial Intelligence to Improve Students' Understanding through ChatGPT

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Abstract

With the advancement of technology in the era of revolution 5.0, effective education requires the right approach to maintain student engagement and prevent boredom in the teaching and learning process. This study aims to determine students' understanding of the subject matter through a more interactive and relevant approach, namely by utilizing ChatGPT. This study uses a qualitative descriptive approach with a case study type. The population involved in this study were students of class IX C of SMP Negeri 2 Pakuniran located in Glagah village. To collect data, this study used relevant instruments, namely observation and interviews. The results of the study show that ChatGPT as a learning aid can significantly improve student understanding, proven to be able to provide in-depth explanations and show increased motivation and learning activity. Students show high enthusiasm and curiosity in interacting with ChatGPT. They feel comfortable asking questions and discussing with this AI system because it can answer questions that go beyond the subject matter, especially for material that is difficult to understand. Interaction takes place in real-time so that students get feedback and clarification quickly.

Keywords : Artificial Intelligence; ChatGPT; Student Understanding

INTRODUCTION

With the advancement of technology in the era of revolution 5.0, effective education requires the right approach to maintain student engagement and prevent boredom in the teaching and learning process (Wahid et al., 2021; Dakir et al., 2021). Therefore, choosing the right learning method is very important to achieve educational goals effectively. One of the main challenges in education is the difficulty in delivering material in an interesting and effective way. A monotonous and less interactive learning system often causes boredom among students (Haris et al., 2023; Adawiyah & Nahar, 2024). Therefore, the use of technological developments to improve the quality of learning is very important in the world of education. Technology provides various benefits, especially in facilitating access to learning materials and encouraging the creation of more innovative learning methods that can increase students' interest in learning (Rijal, 2023; Fitriya, 2023). The presence of technology also allows individuals to access information that continues to develop quickly and easily. One of the technologies that is currently popular in learning is *ChatGPT* which is based on artificial intelligence or Artificial Intelligence (Curtis, 2023; Rospigliosi, 2023; Malinka et al., 2023).

In the context of learning at the institution being studied, namely SMP Negeri 2 Pakuniran, the main sources used by students are mostly limited to textbooks and PowerPoint (PPT) presentations presented by teachers. Although these materials provide basic information, both do not provide dynamic and interactive feedback, thus limiting students' ability to obtain further clarification or explanation regarding the material being studied. In addition, students at SMP Negeri 2 Pakuniran show a tendency to ask critical and relevant questions, often going beyond the topics contained in the textbook. This reflects a high level of curiosity and a drive to dig deeper into knowledge. However, without adequate additional sources of information, students have difficulty finding answers that can answer their questions. In this case, the application of *artificial intelligence* (AI) in the form of *ChatGPT* can provide a significant solution. With its ability to provide more in-depth explanations, refer to other relevant sources and provide answers to questions that go beyond the existing material, AI can be an effective tool to help students obtain the information they need (Heeg & Avraamidou, 2023; Dai et al., 2023). Thus, the presence of AI in this learning process can enrich students' learning experience, provide wider sources of information, and enable more responsive interactions that are in accordance with individual needs. AI can not only help

answer students' questions, but also support the creation of more effective, personalized learning that is oriented towards developing students' potential.

To strengthen the arguments in this study, references are needed from previous relevant studies regarding the application of *ChatGPT* in learning. Several studies have discussed topics related to the use of *ChatGPT* that support this study. such as research conducted by Okulu & Muslu, (2024) that the use of *ChatGPT* provides significant benefits for students and teachers, with *ChatGPT*'s ability to answer questions, summarize documents, translate text, and understand program code. Student responses after training were also very positive about the use of *ChatGPT* in learning. Thus, *ChatGPT* is effective in meeting students' learning needs. Furthermore, Mukarohmah et al., (2024) added that the use of *ChatGPT* can enrich Islamic Religious Education (PAI) learning by increasing two-way interaction, providing flexibility in the learning process, and providing materials tailored to the needs of individual students. However, ethical challenges such as the accuracy of information and the potential for dependence on technology still need to be considered. This study provides an important contribution in revealing the role of *ChatGPT* in improving the quality of PAI learning and providing guidance for ethically integrating AI technology in education.

From previous studies relevant to this study, there are similarities in the use of *ChatGPT*, namely to improve the quality of education and student understanding. *ChatGPT* as an *artificial intelligence* technology can help students by providing clearer explanations, answering questions, and adjusting materials to individual student needs. However, the difference lies in the research method used. This study uses a qualitative approach, while previous studies used a literature review or classroom action research (CAR) method, with a focus on community service. The novelty of this study lies in the integration of *artificial intelligence* (AI) and an interactive learning approach that optimizes the use of *ChatGPT* to improve student understanding. This study carries a new concept by utilizing AI technology to provide a more adaptive learning experience that allows students to interact directly with the AI system to obtain deeper explanations that are relevant to their individual needs. In addition, this study also highlights the application of *ChatGPT* in the context of Islamic religious education which provides opportunities for students to learn more personally and responsively with feedback tailored to their understanding. This approach offers a significant contribution to developing the potential of AI technology to improve the quality of learning.

The purpose of this study is to improve students' understanding of the subject matter through a more interactive and relevant approach. By utilizing *ChatGPT*, this study aims to enrich students' learning experiences by presenting more interesting and easy-to-understand material. Based on a literature review related to personalized learning and the application of *artificial intelligence* (AI) technology, this study argues that with its ability to adapt to individual learning styles and provide specific feedback, *ChatGPT* can significantly improve students' understanding. *ChatGPT*'s ability to provide repeated explanations that are tailored to students' needs is expected to help overcome certain learning challenges and improve mastery of the material being studied. This study focuses on the use of *ChatGPT* to improve students' understanding and analyzes its ability to provide personalized feedback to improve students' understanding. Furthermore, this study will assess the positive and negative impacts of using this technology in the context of learning.

METHODS

This study uses a qualitative descriptive approach with a case study type that aims to explore the application of *ChatGPT*, a large language model based on *artificial intelligence* in improving student understanding. The main focus of this study is to explore the influence of *ChatGPT* features, such as personalized feedback, adaptive explanations, and interactive interactions, on students' learning processes. This study will also investigate how *ChatGPT* helps students understand complex concepts, overcome learning barriers, and increase their motivation. Through this case study, the study aims to provide a comprehensive understanding of the effectiveness of *ChatGPT* as a learning tool and how its use can be integrated into existing learning practices. This approach was chosen because the study aims to explore phenomena in the field, such as students' understanding of learning materials and their interactions with technology (Dr. J.R. Raco, M.E., 2010). The population involved in this study were class IX C students of SMP Negeri 2 Pakuniran located in Glagah village.

To collect data, this study uses relevant instruments, namely observation and interviews. Researchers will conduct observations and interviews with students and teachers to obtain relevant data. In the observation, researchers observed how students of class IX C interact with learning tools through *Artificial intelligence* (AI) using *ChatGPT*, how this technology helps them understand the material, and how effective this technology is in improving their understanding and exploring their experiences in participating in learning

through AI using this *ChatGPT*. In addition, interviews were conducted with 5 randomly selected students of class IX C and one of the teachers, namely the homeroom teacher of class IX C to describe their experiences in using AI through *ChatGPT* in learning. challenges faced, and benefits felt. Interviews also serve to obtain a direct perspective on the factors that influence the success of learning using AI, such as student comfort with technology and the availability of adequate devices. One of the teachers, namely the homeroom teacher who participated, has an important role in providing insight into the integration of AI into the curriculum and the challenges faced in its implementation.

The data collected in this study were then analyzed using techniques by Miles & Huberman (1992) in their book "Qualitative Data Analysis: A Sourcebook of New Methods" put forward a qualitative data analysis model consisting of three interrelated and simultaneous activity flows, namely: first, Data Reduction, which is the process of summarizing, simplifying, and categorizing raw data that has been collected. The goal is to reduce large and complex data volumes into forms that are easier to understand and analyze. Second, Data Display, which is the process of compiling and organizing data that has been reduced into forms that are easier to understand and interpret. and third, Conclusion Drawing, which is the process of interpreting data that has been reduced and presented, finding meaning and relationships between themes, and drawing conclusions that are relevant to the research question.

RESULTS

Artificial intelligence (AI) technology has been developing rapidly and offers various opportunities to revolutionize various sectors including education. *ChatGPT* as one of the large language models has significant potential to improve students' learning experience. This paper discusses the application of *ChatGPT* as an interactive and personalized learning tool with the aim of improving students' understanding of the subject matter. This study uses a qualitative approach with a case study type to analyze the effectiveness of using *ChatGPT* on student learning outcomes and explores its implications for future learning practices

As a virtual tutor in learning

ChatGPT as a virtual tutor influences students' ability to understand the subject matter and increases their enthusiasm for learning. The discussion will focus on how

ChatGPT features such as ease of use and speed of response contribute to improving the quality of learning.

This is proven by the results of interviews with 5 students of class IX C SMPN 2 Pakuniran who were selected randomly, which can be presented in the following table.

Table 1. Interview data on students' experiences using *ChatGPT*

Theme/category	Dimensional analysis	Interview excerpts	Interpretation
Experience using <i>ChatGPT</i>	Ease of use	" <i>ChatGPT</i> is very easy to use for me who is not very tech savvy"	Users feel that <i>ChatGPT</i> is designed with a user-friendly interface, even for those who are less familiar with technology.
	Clarity of explanation	"The explanation is clear and easy to understand, unlike textbooks which can sometimes be confusing."	<i>ChatGPT</i> provides explanations that are easier to understand compared to textbooks, which can sometimes be confusing due to the language or indirect delivery.
	Interactivity	"When I am embarrassed to ask the teacher, I can directly ask <i>ChatGPT</i> and get answers quickly"	Users feel more comfortable asking questions to <i>ChatGPT</i> than to teachers, perhaps due to shyness or fear of being wrong.
Impact on understanding	Increased understanding	"I feel like I understand the material better after using <i>ChatGPT</i> "	Users feel there is an increase in understanding of the material after using <i>ChatGPT</i> .
	Motivation to learn	"I am more enthusiastic about learning because the response is very fast"	The speed of response from <i>ChatGPT</i> provides additional motivation to learn. With immediate answers, users feel more engaged and motivated to continue learning.

Based on the interview data presented in the table above, it shows the effectiveness of *ChatGPT* as a learning aid. *ChatGPT* is considered easy to use, provides clear explanations, and increases interactivity in learning. Overall, students expressed increased understanding and motivation to learn after using *ChatGPT*.

Table 1 above is the result of interviews with five randomly selected students of class IX C SMPN 2 Pakuniran, this study identified two main findings regarding the use of *ChatGPT* in the learning process. First, the overall user experience was considered very positive. Four out of five students stated that *ChatGPT* was easy to use, even for those with limited experience with technology. One student stated, "*ChatGPT* is very easy to use, even I who am not very tech savvy can understand it quickly." The explanation given by *ChatGPT* was considered clearer and easier to understand compared to conventional textbooks by 80% of students. One student said, "The explanations are clearer and easier to understand than textbooks which can sometimes be confusing." Furthermore, *ChatGPT*'s interactivity creates a conducive learning environment, especially for students who tend to be reluctant to ask questions in class due to shyness or fear of making mistakes. One student who used to feel shy to ask questions in class said, "Now I am more confident in asking questions because *ChatGPT* will not judge me." Second, the use of *ChatGPT* had a positive impact on understanding and motivation to learn. All students reported an increase in conceptual understanding after using *ChatGPT* to obtain additional explanations. One student said, "After using *ChatGPT*, I understand the material that was previously difficult to understand better." The instant response from *ChatGPT* also increased engagement and motivated students to study harder, because they could understand the subject matter without significant delays. One student stated, "I am more enthusiastic about learning because I can get answers immediately without having to wait long."

Simulation tools in learning

Effective learning requires media that can support individual student understanding. However, textbooks, learning modules, and learning videos, although useful, often have limitations. General explanations are often unable to answer students' specific questions while access to teachers or tutors is limited by time and resources. As a result, many students have difficulty understanding complex concepts or overcoming misunderstandings. This study explores the potential of *ChatGPT* as a solution to overcome these limitations, by

investigating its effectiveness in providing personalized and adaptive explanations to students' learning needs.



Picture 1. Interview with homeroom teacher

The image above is an interview with Mr. Ghofur as the homeroom teacher of class IX C, who discussed the impact of using *ChatGPT* in learning.

Figure 1 shows the formal interview atmosphere between the researcher and Mr. Ghofur, the homeroom teacher of class IX C SMPN 2 Pakuniran to explore the impact of using *ChatGPT* in learning. The calm and focused interview atmosphere as seen in the picture shows the conducive environment for obtaining accurate and reliable information. Mr. Ghofur said, "Students' understanding before and after using AI through *ChatGPT* in learning is different. Previously, low student participation was observed, rarely asking questions, being lazy to learn, and having difficulty understanding the material due to differences in learning styles (auditory, visual, kinesthetic). However, after using *ChatGPT*, there was an increase in student activeness, ability to ask questions, enthusiasm for learning, and easier understanding of the material." This statement is supported by research findings that showed an increase in conceptual understanding in all students. Although Mr. Ghofur did not provide quantitative data, the observed improvements can be attributed to *ChatGPT*'s ability to provide personalized and interactive explanations, accommodating various learning styles.

Independent and interactive learning

Independent and interactive learning is a learning approach that emphasizes the active role of students in the learning process. Unlike traditional learning models that tend to be passive, this approach encourages students to take responsibility for their own learning and actively interact with materials and other learning resources. In the context of this study,

independent and interactive learning is facilitated through the use of *ChatGPT* as a learning tool that provides broad access to information, personalized feedback, and opportunities to interact with learning materials dynamically. It is hoped that this approach will increase students' learning motivation, improve conceptual understanding, and develop their critical thinking skills.



Picture 2. Using *ChatGPT* in learning

Figure 2 illustrates the utilization of *ChatGPT* as a learning aid carried out by class IX C students in the computer laboratory of SMP Negeri 2 Pakuniran. Students appear active and focused, demonstrating the potential of *ChatGPT* in providing more personalized and interactive learning.

Figure 2 shows students of class IX C of SMP Negeri 2 Pakuniran who are active and focused in using the computer laboratory. They utilize *artificial intelligence* (AI), especially *ChatGPT* to learn. *ChatGPT* has the potential to provide more personalized and dynamic learning, adapting to the speed and learning style of each student. With access to more diverse and interactive learning resources, *ChatGPT* overcomes the limitations of traditional educational resources. Real-time feedback and detailed explanations provided by *ChatGPT* increase learning efficiency, demonstrating the acceptance and effective use of technology in the learning process. *ChatGPT* is not just a tool, but has great potential for personalizing education.

DISCUSSION

This study examines the role of *ChatGPT* in improving students' understanding of learning materials in class IX C of SMP Negeri 2 Pakuniran, focusing on three main aspects: its role as a personal virtual tutor, as an interactive simulation tool, and as a supporter of more dynamic independent learning. The main objective of this study is to answer the

question of how *ChatGPT* as a virtual tutor can affect students' understanding and their motivation in learning.

Based on in-depth interviews with five randomly selected students and homeroom teachers, it was found that *ChatGPT* as a learning aid has great potential in improving students' understanding of the material and learning motivation. Features such as ease of use, speed of response, and its ability to provide clear and interactive explanations have been proven to help improve the quality of learning. Therefore, *ChatGPT* is an effective tool in supporting independent and interactive learning in the classroom.

This study also examines how *ChatGPT* as a virtual tutor affects students' understanding of the material and learning motivation. With easy access and fast response, *ChatGPT* serves to improve the quality of learning by providing more customized and personalized explanations. This tool is expected to overcome the limitations of textbooks, modules and learning videos that often cannot provide specific answers to students' questions. Limitations in traditional learning materials often make it difficult for students to understand certain concepts, especially when they need a more in-depth explanation or one that is tailored to the way they learn. *ChatGPT* with its ability to provide more relevant and flexible explanations can overcome this problem. This is in accordance with the Self-Determination Theory (SDT) proposed by Ryan & Deci, (2020), which states that students' intrinsic motivation will increase when they feel they have more control over their learning process. As a virtual tutor, *ChatGPT* gives students the freedom to choose the time and pace of learning that suits their needs, thus creating a sense of control in learning (Assidik & Lesty, 2024; R Rukmini, D Sari, 2024).

In addition, SDT also emphasizes the importance of support tailored to individual needs. *ChatGPT*, by providing immediate and responsive feedback, can adjust explanations based on each student's level of understanding (Li et al., 2024; Tummalapenta et al., 2024). This personal and adaptive interaction creates a learning atmosphere that supports intrinsic motivation, as students feel more valued and encouraged to be active in their learning process without being limited by other, less interactive learning resources. Thus, *ChatGPT* not only functions as a learning tool, but also as a means to increase students' independence in managing their learning process, which in turn increases their motivation and understanding of the material (Khariani, 2024). According to Leuwol et al., (2023) In Lev Vygotsky's theory, social interaction and environmental support (scaffolding) are very important in learning.

ChatGPT as a virtual tutor, provides gradual support in understanding complex concepts. By adjusting the explanation according to the student's level of understanding, *ChatGPT* acts like a teacher who guides in the zone of proximal development (ZPD), thus supporting the student's cognitive development (Leuwol et al., 2023).

This study also emphasizes the important role of self-paced and interactive learning facilitated by *ChatGPT*. Xiao, (2024) argues that the distance learning theory developed by Michael G. Moore and Greg Kearsley highlights the importance of interaction in distance learning. In this context, *ChatGPT* can serve as a substitute for instructors or tutors by providing quick feedback, answering questions, and providing more dynamic and personalized learning support. With *ChatGPT*, students have access to learning anytime and anywhere, which increases the flexibility and sustainability of the learning process. Learning. Self-regulated learning, according to Apriani et al., (2025) refers to students' ability to organize and manage their learning process independently. Students who learn independently determine goals, plan, monitor, and evaluate their learning actively. Sabrina et al., (2025) *ChatGPT* supports this by providing easy access to a variety of learning resources, giving students full control over their learning process. With *ChatGPT*, students can search for information, ask questions, and get additional explanations as needed, so that learning becomes more focused and encourages independent learning. Students have the opportunity to actively interact with the material and receive feedback tailored to their learning needs. This approach aims to improve students' conceptual understanding, motivation, and critical thinking skills. The results of the study indicate that the use of *ChatGPT* as a virtual tutor in learning has a positive impact on students' understanding of the material and motivation, which answers the main question of this study.

The learning resources used by students were previously limited to textbooks and PowerPoint (PPT) presentations delivered by teachers. Mayer, (2024) said that the multimedia learning theory proposed by Richard E. Mayer shows that presenting material in various media (text, images, audio, etc.) can improve understanding. *ChatGPT* supports this theory by offering interactive, responsive, and personalized learning materials. This AI system adjusts the material and explanations according to the needs of the students, so that learning becomes more effective and in accordance with each learning style (Wang et al., 2024). With a variety of information presentation options, *ChatGPT* supports Mayer's principles of multimedia learning. But while these materials provide basic information, they cannot provide dynamic and interactive feedback. This limits students' ability to get

clarification or further explanation of the material being studied. Learning that relies solely on these sources tends to be less interesting because it does not involve active student interaction with the material, which can reduce their motivation and involvement in the learning process. With the presence of AI-based learning through *ChatGPT*, students can be more effective in learning. Nur'aini et al., (2024) emphasizes the importance of students' active role in constructing their own knowledge for effective learning. This constructivist view supports learning methods that encourage active participation of students, thereby increasing their motivation and understanding.

Research by Sudrajat et al., (2023), said that the use of AI through *ChatGPT* has been proven to help students in learning various materials. *ChatGPT* is able to provide interactive and adaptive learning so that students can obtain information more easily and improve their understanding of the material. This finding is in line with the research results of Hidayanti & Azmiyanti, (2023), which states that the use of AI through *ChatGPT* is very beneficial for students. *ChatGPT* provides easy-to-understand explanations, provides direct feedback and allows for flexible and more personalized interactions. The use of *ChatGPT* also encourages students to learn independently and actively which can increase their motivation and involvement in the learning process. With its adaptive capabilities, *ChatGPT* can adjust explanations according to the needs of each student, helping them overcome difficulties in understanding the material.

This research provides an important contribution to the development of AI-based learning that will be very useful for future research. The use of AI by adding game elements and various other learning methods can make the classroom situation more interesting. This will be a very interesting research topic in the future. As a follow-up, the use of AI in this learning is very useful for teachers who have difficulty in creating an interesting classroom atmosphere, providing solutions to increase student engagement in the learning process.

CONCLUSION

Based on the results of the research conducted, it can be concluded that the use of *Artificial intelligence* to improve student understanding through *ChatGPT* has proven to have a positive impact on students. This study examines the role of *ChatGPT* in improving student understanding and motivation in class IX C of SMP Negeri 2 Pakuniran, with a focus on its function as a virtual tutor, interactive simulation tool, and support for independent learning.

The research findings show that *ChatGPT* plays an effective role in improving student understanding of the material and motivation through easy access, fast responses, and explanations tailored to the needs of each student. *ChatGPT* is in line with the Self-Determination Theory (SDT) because it gives students more control over their learning process, and supports distance learning theory by enabling more flexible and independent learning anytime and anywhere. In addition, *ChatGPT* supports the principle of multimedia learning by presenting more interactive materials, which are more effective than traditional learning methods.

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