

ANALYSIS OF THE USE OF CHATGPT IN BIOLOGY LEARNING IN THE 5.0 ERA: A QUALITATIVE STUDY ON STUDENT PERSPECTIVES

Dwi Yolanda¹, Anggi Desviana Siregar², Dinyah Rizkiyanti Zebua³

¹ Biology Education, Chemistry Education^{2,3}, ^{1,2,3} Institute of Islamic Studies Kerinci

Email: Dwiyolanda2020@gmail.com¹, Anggidesviana56@gmail.com²,
dinyahryzebua@gmail.com³

ABSTRACT

The Society 5.0 era places technology as a key element in improving the quality of education. This study aims to analyze the experiences of 5th-semester Biology Education students at IAIN Kerinci in using ChatGPT. The research employs a descriptive qualitative approach, with data collected through direct interviews with respondents. Based on a SWOT analysis, the findings indicate that ChatGPT facilitates the understanding of difficult materials and enhances task completion efficiency. This technology also offers opportunities to support flexible learning and enrich academic discussion collaborations. However, weaknesses such as inaccuracies in technical content and limitations in visualization present challenges to be addressed. Additionally, there is a threat of dependency that may reduce students' critical thinking abilities and their exploration of other information sources. These findings highlight that ChatGPT can serve as an effective learning complement if used wisely and accompanied by the development of students' digital literacy skills.

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INTRODUCTION

Society 5.0 is a concept born from Japan and reflects the stage of evolution of society based on the role of technology. Society 5.0 is a society concept that focuses on humans and is supported by technology. In the Society 5.0 era, technology is expected to not only provide convenience, but also improve the quality of life and overcome existing social challenges (Anggreini & Priyojadmiko, 2022). In this era, society is expected to be able to overcome various social challenges and problems by utilizing innovations from the industrial revolution 4.0 to improve the quality of life. In the Society 5.0 era, education plays an important role in improving the quality of human resources. Learners are expected to have 21st century skills known as the 4Cs: creativity, critical thinking, communication, and collaboration. The development of these skills is made easier by the use of digital technology in education, which allows learning to be more interactive and adaptive (Yasin et al., 2024). Therefore, there are three things that must be utilized by educators in the Society 5.0 era, namely: Internet of Things (IoT) in education, virtual/augmented reality in education, and the use of artificial intelligence (AI) to find out and identify students' learning needs (Ahmad Khoirudin et al., 2023).

*CORRESPONDING AUTHOR. Email: Dwiyolanda2020@gmail.com

In Indonesia, technology is increasingly being applied to facilitate work in various fields, including education. The rapid development of technology in this global era has a significant impact on the world of education. Global demands encourage education to adapt to technological developments in order to improve the quality of learning. In particular, the use of information and communication technology in the learning process needs to be adjusted. Technology, as a result of the development of science, should be utilized in education to support the implementation of learning. Currently, digital technology is used in educational institutions as a learning aid (Lestari, 2018). This is in line with Yolanda et al., (2024) statement that learning media greatly influences the success of the learning process. Technology functions as a means of information to access data and as a tool in learning activities and assignments. Technological advances are the main drivers of global change. From the industrial revolution to the current digital era, technological innovation has changed the way we live, work, and interact. Initially, technological development was slow, but along with the progress of human culture and civilization, its development has become faster. Cultural progress also drives technological development, which is the result of the progress of culture itself (Noperman, 2020). Literally, technology comes from the Greek "tecnologia," which in Indonesian means 'a systematic discussion of the whole world and kingdoms.' The word "tecnologia" comes from the word "techne" in ancient Greek which means art or craft. Technology can be interpreted as the art of creating and using production tools. The meaning of the word technology continues to develop and can now be interpreted as the application of science that is adjusted to human conditions and needs. In addition, technology is also interpreted as a process that adds value to the use or manufacture of products from existing products, so that it becomes an inseparable part of a particular system (Asiba, 2021).

Currently, Artificial Intelligence (AI) is a hot topic all over the world. AI, a computing technology based on machine learning, has the ability to think like humans with superior memory to solve problems. Machine learning allows machines to learn on their own from the data given. The term AI was coined by Stanford Professor Emeritus John McCarthy in 1955, who defined it as "the science and engineering of making intelligent machines." In simple terms, AI is the simulation of human intelligence by machines. One of the most widely used AIs in education is Artificial General Intelligence (AGI), which can imitate human intelligence in thinking, understanding, and acting. A famous example of AGI is ChatGPT, developed by OpenAI. ChatGPT is an AI chatbot that is able to provide highly relevant answers to various questions from users (Diantama, 2024).

ChatGPT is increasingly attracting attention and is widely used by students, including college students. The development of technology such as ChatGPT provides new benefits, challenges, and pressures in the world of education. This technology not only makes the learning process easier, but also brings changes in the way students interact with materials and teaching, allowing them to learn more independently and flexibly (Anshori, 2018). In higher education, education currently focuses on student-centered learning, where students are expected to independently and actively explore information using various learning tools and media (Faiz & Kurniawaty, 2023). The use of ChatGPT is in line with this trend, where students can use AI to access knowledge faster and improve their understanding of lecture materials (Darmawan & Adiguna, 2024). The emergence of ChatGPT has had a significant impact on learning, including in the field of biology in higher education. In the student-based learning model, they are encouraged to independently search for and process information. ChatGPT provides an opportunity for students to deepen their understanding by providing clear explanations, but still requires them to remain critical in verifying information (Sakti et al., 2024). ChatGPT supports this model by providing fast and relevant access to information.

However, challenges also arise with the use of ChatGPT in biology learning, such as the risk of over-reliance and the potential for the spread of inaccurate information. Therefore, it is important for students to remain critical and verify the information obtained from ChatGPT with trusted scientific sources. The study aims to analyze the use of AI, especially ChatGPT, on the views of students, especially 5th semester biology education students, FTIK IAIN KERINCI by exploring their opinions and experiences in the use of artificial intelligence (AI) in biology learning in college. This study uses a SWOT analysis, which is an analysis based on logic that can maximize strengths and opportunities, while minimizing weaknesses and threats (Ririh et al., 2020)

RESEARCH METHODS

1. Type of Research

This research uses a phenomenological type with a qualitative perspective and a descriptive model. A qualitative approach is chosen to seek in-depth answers to the research questions, rather than testing hypotheses. Through the description and analysis of data, this study aims to uncover general trends that can serve as a basis for further study.

The method used in this research is phenomenology. Phenomenology is a qualitative method or strategy, which can be briefly described as evidence-based research, as well as evidence-based teaching (Hutahaean et al., 2020). Meanwhile, Patilima provides a more detailed explanation, stating that this research involves the use of subjects being studied as well as a collection of empirical data from case studies, personal experiences, introspection, life journeys, interviews, texts from observations, historical data, interactions, and visuals that depict moments and meanings of everyday life, as well as the problems faced by individuals (Patilima, 2016).

2. Research Location and Time

This research was conducted at IAIN Kerinci. The research was carried out over a period of one month, starting from mid August 2024. During this one month, the researcher hopes to collect the necessary data to answer the research questions. The researcher may also collect additional data if possible.

3. Research Informants

In this research, the interview method is used as a criterion method, serving as a supplementary method for data collection in the study. The interviews were conducted with 5th-semester Biology Education students at IAIN Kerinci.

4. Data Collection Techniques

The data collection technique used in this research is direct interviews with informants. These interviews were conducted face-to-face to gain a deeper understanding of students' experiences and perspectives regarding the use of ChatGPT in learning. The interviews used open-ended questions, allowing the informants to explain their experiences in detail.

5. Data Analysis Technique

The data analysis technique used in this research follows the concept of Miles & Huberman, which includes:

- a) Data Collection: The process of data collection in qualitative research is carried out before, during, and after the study.
- b) Data Reduction: The process of combining all the data obtained into a single written form (script) to be analyzed. The format of the document study results will be transformed into a script.
- c) Data Display: The presentation of data will be done after data reduction in the form of a script or narrative, with a matrix flow aligned with the subthemes designed.
- d) Conclusion Drawing: Conclusions in qualitative data analysis contain descriptions of all subcategory themes.

Data validity testing in qualitative research includes internal validity (credibility), external validity (transferability), reliability (dependability), and objectivity (confirmability).

RESULT AND DISCUSSION

The main objective of this research is to understand how Biology Education students at IAIN Kerinci utilize artificial intelligence (AI), specifically ChatGPT, in their learning process. Based on interviews conducted with three informants, several important findings related to the use of AI were identified. In this section, the author will present the results of the interviews, which have been analyzed using the SWOT analysis framework (Strengths, Weaknesses, Opportunities, Threats), providing an overview of the benefits, challenges, as well as the potential and risks associated with the use of ChatGPT in learning.

1. Strengths in the Experience of Using ChatGPT

The informants highlighted that one of the most memorable experiences was the ease ChatGPT provided in understanding difficult material. Informant SN stated that they found it easier to grasp course material that was initially hard to understand. They explained that, by using ChatGPT, they could receive answers or explanations that were more structured and straight to the point. This experience shows that ChatGPT not only serves as an information retrieval tool but also acts as a connector, making it easier for students to quickly access new knowledge. This creates a more efficient learning experience. This aligns with the view that Putri (2023) which states that AI allows students to accelerate the learning process by utilizing technology to access information instantly. In addition, this experience is also in line with research by Widodo (2022), which shows that the use of AI in education can increase learning effectiveness by providing clearer and easier-to-understand explanations. However, this experience is not limited to understanding the material. Most students feel that ChatGPT also helps them improve the quality of their assignments. They feel more productive and organized in completing college assignments, thanks to the help of writing structures and reference suggestions from ChatGPT (Taruklimbong & Sihotang, 2023). ChatGPT provides a variety of relevant resources that can be accessed quickly, allowing students to improve the quality of their writing and save time in finding the right references (Fazira, 2024).

However, this experience is not limited to understanding the material alone. Most students feel that ChatGPT also helps them improve the quality of their assignments. They feel more productive and organized in completing their academic tasks, thanks to the writing structure and reference suggestions provided by ChatGPT

2. Weaknesses in the Experience of Using ChatGPT

However, not all experiences felt by students were positive. Some students also encountered challenges while using ChatGPT. Informants MT and IS revealed that, although they found ChatGPT helpful, they sometimes felt that the answers provided were inaccurate, especially for more specific or technical material. Informant IS stated: “Sometimes the answers don’t match my expectations, especially when I ask about more technical or detailed things.” This weakness highlights that reliance on ChatGPT can raise doubts about the accuracy of information. This experience serves as a reminder that ChatGPT cannot replace the process of information verification that students should do by seeking further references from more trusted sources. This phenomenon is also supported by research Hidayanti & Azmiyanti (2023) which mentions that artificial intelligence like ChatGPT has limitations in providing answers that are contextually or specifically tailored to the user’s needs. Thus, although ChatGPT can facilitate learning, users must still be careful and critical in utilizing the information provided (Suharmawan, 2023). In this context, AI cannot completely replace the critical thinking skills that students must have in evaluating and filtering the information received (Merentek et al., 2023).

In addition, some students feel that ChatGPT has limitations in providing visualizations, such as diagrams or images, which are often essential in biology subjects to understand complex biological processes. Informant SN stated: “When I need explanations in the form of images or diagrams, ChatGPT can’t provide that.” ChatGPT cannot process non-text input or generate non-text output, which limits its capabilities in contexts of learning that require visual aids (Ledi Trialdi, 2023). This shows that although ChatGPT can provide quite in-depth explanations in text, this visual limitation is a major problem in learning biology courses that rely heavily on visual illustrations to support understanding. Research by Saputra (2024) revealed that effective biology learning relies heavily on a combination of visual and text information, which allows students to better understand complex concepts. Therefore, the use of AI in education, especially in courses that require visualization, still needs to be improved to better support overall learning.

3. Opportunities in the Experience of Using ChatGPT

On the other hand, ChatGPT offers many opportunities for students in their learning. Some students feel that it makes independent learning easier because they can access information anytime and anywhere. Informants MT and IS shared that they experienced improved efficiency in learning, as ChatGPT provides answers and references quickly, without relying on a specific time or location. Informant MT stated: “With ChatGPT, I can find answers or references faster, so doing assignments becomes more efficient.” This experience creates a sense of flexibility in learning. This supports the view that Arly et al., (2023) .which suggests that AI provides easy access to information for students, allowing them to learn without the constraints of time and space. In line with this, research by Kusum et al.,(2023) shows that the use of AI in education can increase learning efficiency by providing fast access to information, allowing students to focus more on understanding the material without being hampered by time and place constraints. In addition, according to Anwar et al., (2022) easy access to information also has a positive impact on the development

of students' critical thinking skills, because they can quickly obtain relevant data for further analysis.

On the other hand, students also feel that ChatGPT enhances their social interactions, especially in academic discussions. Informant IS shared their experience of frequently using information from ChatGPT to enrich discussions with their peers. Informant IS stated: "I often use information from ChatGPT as discussion material. It even makes the discussion more interesting." This shows that ChatGPT not only functions as an individual learning aid but also as a catalyst for creativity in student interactions. This collaboration aligns with the view that Bone (2024) which states that AI can enrich discussion material and facilitate more effective collaboration among students. Research by Rokhman (2024) also revealed that the use of technology such as ChatGPT in the context of collaborative learning can broaden students' perspectives in group discussions and enrich the insights they can discuss together.

4. Threats in the Experience of Using ChatGPT

Although it offers many benefits, the use of ChatGPT also presents threats related to technological dependency. Some students admit that they sometimes feel reliant on ChatGPT, which could reduce their ability to think critically and explore information from other sources. Informant IS stated, "The convenience offered by ChatGPT can make us forget to explore broader literature." This reminds us that a technology-based approach must be balanced with the development of critical thinking skills. Wardhani et al., (2021) It also suggests that the use of AI should not replace independent information-seeking, but rather should complement it to enhance the effectiveness of learning. In line with this, Hadian et al., (2023) emphasize the importance of balance between the use of technology and students' critical analysis skills, which must continue to be honed so that they do not depend on technology in understanding the material. Developing critical thinking skills can also help students to be wiser in choosing accurate and relevant sources of information, which in turn will support deeper learning.

Additionally, some students feel that the use of ChatGPT could lead to misuse, such as using AI to complete assignments without fully understanding the material. This aligns with the opinion that Sugiarto & Suhono (2023) .which states that the convenience offered by technology often presents the risk of dependency, which can hinder the deeper learning process. Nevertheless, students still demonstrate a critical attitude by verifying the information provided by ChatGPT, as stated by Shiyamsayh & Yuliana (2022). that good digital literacy skills will help technology users to filter relevant and valid information. Furthermore, students also continue to seek additional sources to enrich their understanding.

With this phenomenological approach, we can understand the subjective experiences of students using ChatGPT, as well as the meaning they attribute to the strengths, weaknesses, opportunities, and threats they encounter. Each experience reveals how this technology is perceived and valued within the context of their academic lives.

CONCLUSION

Based on the research results, the use of ChatGPT by fifth-semester Tadris Biology students at IAIN Kerinci has a significant impact on their learning process. The majority of students believe that ChatGPT makes it easier to understand difficult material and helps them complete assignments more efficiently. This technology also allows them to access information quickly and flexibly, without being bound by time or location, which greatly supports independent learning styles. Additionally, ChatGPT enriches academic discussions

among students, providing them with access to relevant references and facilitating collaboration in solving academic problems. However, this study also identifies several weaknesses in the use of ChatGPT. Some students expressed concerns about the inaccuracy of answers, particularly in technical or specific topics, which could lead to doubts about the reliability of the information provided. Furthermore, ChatGPT's limitations in providing visualizations, such as diagrams or images necessary for biology learning, become obstacles.

The main threat identified in this study is the risk of dependency on this technology, which could reduce students' ability to think critically and explore other sources of information. While ChatGPT can ease the learning process, students must still be cautious in verifying the information and should not fully rely on this technology without enriching their knowledge from other more reliable sources.

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