JIPSINDO (Jurnal Pendidikan Ilmu Pengetahuan Indonesia)
ISSN: 2355-0139 (p); 2615-7594 (e)
Vol. 13. No. 1 (2026), pp. 14- 27, DOI: https://doi.org/10.21831/jipsindo.v13i1.88403

An Exploratory Study on Students' Experience in Using Chat-GPT for Problem-Based Learning

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Article History
Submitted:2 September 2025
Revised: 11 March 2026
Accepted: 11 March 2026

Keywords:

ChatGPT, problem-based learning, student experiences.

Abstract

This study is motivated by the growing use of artificial intelligence (AI) technology, particularly ChatGPT, to support Problem-Based Learning (PBL). It aims to explore students' experiences in utilizing ChatGPT as a learning aid in PBL, including their perceptions of its effectiveness, encountered challenges, and its impact on critical and independent thinking skills. This research employed a descriptive quantitative approach, involving 176 purposively selected university students as respondents. Data were collected using Likert-scale questionnaires and open-ended questions, then analyzed using descriptive statistics and thematic analysis. The findings indicate that students have positive perceptions toward using ChatGPT across all measured dimensions (Understanding Problems, Planning Solutions, Evaluating Results, Critical Thinking, Collaboration, and Metacognition), with mean scores falling into the high category. Nevertheless, some challenges were identified, such as limited answer accuracy, access constraints, and a tendency toward dependence that might reduce critical thinking engagement. Overall, ChatGPT was perceived as helpful in accelerating material comprehension, enhancing learning independence, and supporting idea development, although its use requires appropriate guidance and sufficient digital literacy. This study highlights the importance of wise AI utilization so it can serve as effective scaffolding to support PBL.

Introduction

Problem-Based Learning (PBL) is a pedagogical approach that emphasizes active student involvement in the learning process through solving authentic problems. This model is designed to develop critical thinking skills, problem-solving abilities, and the capacity to work both independently and collaboratively (Manurung et al., 2023). In practice, students are presented with problem scenarios that they must analyze and solve by exploring literature, engaging in group discussions, and applying relevant concepts.

This approach has been widely implemented across various disciplines, especially in medicine, engineering, and education, as it has proven effective in enhancing students' conceptual understanding and analytical skills.

With the advancement of artificial intelligence (AI) technology, various AI-based tools, such as ChatGPT, have become increasingly utilized in higher education contexts (Dwihadiah et al., 2024; Marlin et al., 2023; Setiawan et al., 2023). ChatGPT is an AI language model capable of providing automated and contextual textual responses to user queries or commands. In problem-based learning, students have begun leveraging ChatGPT as an auxiliary tool for finding references, understanding complex concepts, and developing arguments for assignments. However, despite its growing use, limited studies have specifically explored how students utilize ChatGPT within PBL, their experiences using it, and the extent to which this technology impacts learning effectiveness.

This study aims to explore students' experiences in utilizing ChatGPT as a tool in problem-based learning. ChatGPT, as an AI technology, has brought significant transformations to education. Researchers have observed that students across various universities consider ChatGPT to be an easily accessible and valuable source of information. ChatGPT can assist students in finding thesis topics aligned with their interests and fields (Waluyo et al., 2023). This aligns with findings from Meihan et al., indicating that the majority of students are aware of ChatGPT and over half use it to seek learning-related information, reflecting the ease of access provided by this technology (Meihan et al., 2023).

The use of ChatGPT in PBL has also been investigated by Baharuddin et al., who examined its effectiveness in providing diagnostic responses to PBL cases and found high accuracy in the answers provided (Baharuddin et al., 2023). Moreover, Sholekah et al. demonstrated that field practicum experiences could be integrated with technologies such as ChatGPT to enhance students' interest in educational fields (Sholekah et al., 2021).

Students’ perceptions of using ChatGPT in academic environments are important to understand. Gaol and Manalu described how students from various study programs interact with this technology and feel supported in their learning, supporting the argument that ChatGPT positively contributes to their learning experiences (Gaol & Manalu, 2024). The combination of traditional learning and modern technologies like ChatGPT has the potential to create more effective educational experiences, stimulating critical thinking and problem-solving skills among students (Palayukan et al., 2024).

Through an exploratory survey approach, this study seeks to identify usage patterns, students' perceptions of ChatGPT's effectiveness in supporting learning, and the challenges encountered during the learning process.

Method

This research employed a quantitative descriptive approach to describe students' perceptions of using ChatGPT in problem-based learning (PBL). The primary focus was on mapping students' learning experiences, including cognitive and social dimensions influenced by their interactions with AI-based technology. The study involved 176 university students who had experience using ChatGPT within PBL contexts. Participants were selected using purposive sampling to ensure that respondents met the criteria of having direct experience with ChatGPT during learning.

Data were collected through a questionnaire based on six main dimensions: Understanding Problems, Planning Solutions, Evaluating Results, Critical Thinking, Collaboration, and Metacognition. Each dimension consisted of three statements measured using a five-point Likert scale ranging from strongly disagree (score 1) to strongly agree (score 5). In addition to closed-ended questions, the questionnaire included several open-ended items allowing respondents to share their experiences and opinions in depth regarding challenges and benefits of using ChatGPT in learning.

Quantitative data from the questionnaires were analyzed using descriptive statistics with SPSS software, including calculations of mean scores, standard deviations, and categorization into low, medium, and high interpretative categories based on predetermined intervals. Meanwhile, responses to open-ended questions were analyzed thematically to identify key themes representing students' experiences, such as technical obstacles, language barriers, and the influence of ChatGPT use on critical thinking and independent learning.

Result and Discussion

Descriptive Data

Table 1. Respondents by Gender

Gender	Frequency	Percent
Male	60	34.1 %
Female	116	65.9 %
Total	176	100 %

Source: Output SPSS.

Based on the data recapitulation results in Table 1, the total number of respondents in this study was 176 students. Of the total participants, the majority were female (116

people) (65.9%), while male respondents numbered 60 (34.1%). This distribution indicates that female participation in this study was more dominant than male. This imbalance may reflect the composition of the student population in the study program or institution where the research was conducted, or the tendency of female participants to participate in completing research questionnaires related to the use of learning technologies such as ChatGPT.

Table 2. Descriptive Statistics

Dimensions	Understanding Problems	Planning Solutions	Evaluating Results	Critical Thinking	Collaboration	Metacognition
Mean	10.28	10.10	9.93	9.95	10.07	9.97
Std. Deviation	2.011	1.763	1.887	2.001	1.984	1.980
Minimum	3	3	3	3	3	4
Maximum	15	15	15	15	15	15

Source: Output SPSS.

Based on the descriptive analysis results, information was obtained regarding the mean scores and standard deviations of each dimension of students' experiences in using ChatGPT within problem-based learning (PBL). The Understanding Problems dimension had a mean score of 10.28 with a standard deviation of 2.011, indicating relatively stable data variation around the central value. Meanwhile, in the Planning Solutions dimension, the mean score was 10.10 with a standard deviation of 1.763, suggesting a narrower data distribution compared to the previous dimension.

For the Evaluating Results dimension, the mean score was 9.93 with a standard deviation of 1.887, while the Critical Thinking dimension had a mean score of 9.95 with a standard deviation of 2.001. These two dimensions showed similar levels of response consistency in the assessments provided.

Furthermore, in the Collaboration dimension, the mean score was 10.07 with a standard deviation of 1.984, and finally, the Metacognition dimension had a mean score of 9.97 with a standard deviation of 1.980. Overall, these scores reflect relatively close score distributions across the dimensions, with mean values ranging from 9.93 to 10.28 and standard deviations ranging from 1.763 to 2.011. These data indicate that students' perceptions of using ChatGPT across all measured aspects were relatively uniform and did not deviate substantially from their respective mean values.

Furthermore, the study categorized each dimension to provide qualitative meaning to the quantitative scores obtained from the questionnaires. Each dimension consisted of three statements measured on a 1–5 Likert scale. The total score for each dimension was categorized into ranges presented in Table 3.

Table 3. Category Intervals for Dimension Score Assessment in ChatGPT-Based PBL

Score Range	Category	General Interpretation
3.00 – 6.99	Low	Negative or very limited perception
7.00 – 9.99	Moderate	Adequate or neutral-positive perception
10.00 – 15.00	High	Positive and dominant perception

Source: Output SPSS.

Table 4. Descriptive Statistics and Categorization of Student Experience Dimensions in Using ChatGPT for Problem-Based Learning

Dimension	Mean	Std. Deviation	Category
Understanding Problems	10.28	2.011	High
Planning Solutions	10.10	1.763	High
Evaluating Results	9.93	1.887	High
Critical Thinking	9.95	2.001	High
Collaboration	10.07	1.984	High
Metacognition	9.97	1.980	High

Note: This table presents mean scores, standard deviations, and student perception categories based on the total score for each experience dimension using ChatGPT in the context of problem-based learning. Categories were determined based on the following ranges: 3.00–6.99 = Low, 7.00–9.99 = Moderate, and 10.00–15.00 = High.

Table 4 presents the descriptive analysis results for the six dimensions of students' experiences in using ChatGPT in problem-based learning (PBL), showing that all dimensions fell into the high category. This indicates that, in general, students have a positive perception of using ChatGPT as part of their learning process within PBL.

In the Understanding Problems dimension, a mean score of 10.28 (SD = 2.011) suggests that ChatGPT was perceived as helpful in understanding contexts, identifying key aspects, and accelerating the problem comprehension process during learning. Students felt that ChatGPT provided clarifications that helped them understand problems from the early stages of PBL.

For the Planning Solutions dimension, a mean score of 10.10 (SD = 1.763) indicates that ChatGPT was considered effective in supporting students in designing problem-solving steps. Students used this technology to seek alternative solutions and organize strategies in addressing problem-based tasks.

The Evaluating Results dimension obtained a mean score of 9.93 (SD = 1.887), slightly lower than other dimensions but still within the high category. This shows that ChatGPT assisted students in evaluating the solutions they created, although in some cases, it may still have limitations in providing in-depth critical feedback.

In the Critical Thinking dimension, a mean score of 9.95 (SD = 2.001) demonstrates that students experienced improvements in their ability to analyze and consider various perspectives on the problems faced. Responses from ChatGPT were seen as able to trigger alternative thinking and deeper understanding.

The Collaboration dimension also achieved a high category, with a mean score of 10.07 (SD = 1.984). This suggests that although ChatGPT is an individual AI-based tool, students felt its use still supported group communication and discussions. ChatGPT served as a catalyst for discussions and collaborative decision-making within teams.

Finally, in the Metacognition dimension, a mean score of 9.97 (SD = 1.980) indicates that ChatGPT contributed to students' abilities to reflect on their understanding, thinking strategies, and personal weaknesses during the learning process. With ChatGPT's assistance, students were able to assess their thinking processes more consciously and systematically.

Thematic Analysis of Challenges Faced by Students in Utilizing ChatGPT in Problem-Based Learning

Analysis of respondents' answers revealed that students encountered various challenges when using ChatGPT during classroom learning processes. From the hundreds of responses collected, five main themes emerged that describe the most common issues faced by students.

The first and most dominant theme is the limited accuracy and relevance of the responses provided by ChatGPT. Many students complained that the answers generated were often too general, convoluted, or not aligned with the context of the questions. One respondent stated, *"The answers are sometimes too broad and convoluted,"* while another added, *"Sometimes ChatGPT's answers are not relevant to the class material."* This indicates that inaccuracies and lack of adaptation to local contexts become obstacles in utilizing this technology.

The second theme relates to technological access limitations, particularly issues with internet connectivity and account restrictions. Students reported unstable internet connections and the limited features of ChatGPT when not using the premium version. As one respondent noted, *"There are issues with the signal and it often errors,"* and

another mentioned, *"When not using premium, it often hits limits, so it cannot be accessed again."* These obstacles disrupted the smooth process of information retrieval and reduced the effectiveness of using ChatGPT in learning.

The third theme involves language and explanation styles that are difficult to understand. Some students felt that ChatGPT used language that was too formal or academic, making it challenging to comprehend the explanations. For example, a respondent mentioned, *"The language is too high-level,"* and another stated, *"Sometimes the explanations are illogical or don't make sense."* This barrier potentially reduces the effectiveness of ChatGPT, especially for students whose academic literacy skills are still developing.

The fourth prominent theme is dependence and a tendency not to engage in critical thinking. Several respondents expressed concerns that excessive use of ChatGPT could reduce students' cognitive engagement in learning processes. As one respondent noted, *"We become too dependent on ChatGPT without thinking,"* and another added, *"It reduces critical thinking skills."* This is an important concern since effective learning should stimulate students' analytical abilities and reasoning rather than replace them.

Finally, technical difficulties in formulating questions or prompts were also identified, which led to ChatGPT providing irrelevant answers. Respondents stated that they often struggled to compose questions in a way that would elicit relevant responses. One student remarked, *"Sometimes I am confused about how to formulate the question to get the right answer,"* and another acknowledged, *"The question sentences are sometimes not appropriate, so the answers are irrelevant."*

Overall, these results indicate that while ChatGPT offers various conveniences, students still face technical, cognitive, and technological limitations. Therefore, enhancing digital literacy and question-formulation skills (prompt engineering) should be prioritized when integrating ChatGPT into meaningful and responsible learning processes.

Students' Perceptions of ChatGPT's Role in Supporting or Hindering Learning Processes

When asked whether ChatGPT was more helpful or hindering in their learning process, the majority of respondents indicated that they experienced positive benefits from using ChatGPT, although a minority also highlighted potential drawbacks. Analysis

of the responses revealed four main themes representing students' perceptions of ChatGPT's role in learning.

The first and most dominant theme is that ChatGPT facilitates easier access to information and accelerates understanding of materials. Respondents stated that ChatGPT provided quick answers, simplified material searches, and helped them comprehend topics that they did not fully grasp. One student wrote, *"It is very helpful because all the learning content we ask about is available on ChatGPT,"* while another stated, *"It helps the learning process because if there are questions we don't understand, we can use ChatGPT to get the answers."*

The second theme indicates that ChatGPT supports independent learning and helps generate ideas or responses for assignments. Respondents felt that ChatGPT allowed them to remain productive even when struggling to understand explanations from lecturers or written materials. One respondent shared, *"It helps because it can provide ideas related to problem-solving,"* and another added, *"It helps me design solutions for assignments and provides additional information."*

However, the third theme, which also stood out, is the concern over excessive dependence on ChatGPT, which could decrease students' cognitive engagement. Some respondents stated that although ChatGPT was helpful, they realized that relying on it too much could make them less active in thinking or developing deeper understanding. As one respondent wrote, *"If relied upon too much, it can make us lazy to seek information independently or think critically,"* and another emphasized, *"Sometimes it makes me feel dependent on ChatGPT, thus reducing my ability to generate critical thoughts."*

The fourth theme reflects a neutral or ambivalent view, suggesting that ChatGPT's benefits depend greatly on how it is used. Some students felt that while ChatGPT helped, it could not completely replace active and in-depth learning processes. One respondent stated, *"I'm neutral because not everyone uses ChatGPT,"* and another mentioned, *"It can both help and hinder because the answers can aid learning but can also cause confusion."*

From these findings, it can be concluded that ChatGPT is generally perceived as more helpful than hindering, especially in terms of information access speed and support for understanding materials. Nonetheless, students are becoming aware that the effectiveness of ChatGPT usage heavily depends on wise application, particularly to avoid dependence and ensure that critical thinking processes are maintained during learning.

The Impact of ChatGPT Usage on Students' Overall Learning Experience

When asked whether using ChatGPT affected their overall learning experience, most respondents stated that they felt a positive impact, although some emphasized that the impact was not comprehensive or absolute. Analysis of responses revealed four main themes regarding students' perceptions of the influence of ChatGPT on their learning experience.

The first prominent theme is that ChatGPT positively influences learning efficiency and information access. Respondents felt that with ChatGPT, they could understand material faster, find answers that were difficult to access from other sources, and save time in completing assignments. One student shared, *"It has a big influence on my learning because I can find answers I didn't know before,"* while another added, *"Yes, because ChatGPT speeds up information searches and aids understanding."*

The second theme indicates that ChatGPT encourages exploration and broadens learning perspectives, especially for students who feel hesitant to ask lecturers directly. Respondents mentioned that they felt more confident in independently seeking information and found inspiration or new frameworks of thought through interactions with ChatGPT. One student wrote, *"Yes, if I don't understand the material and feel shy to ask the teacher or lecturer, I can ask ChatGPT, so I can understand,"* and another added, *"Yes, because ChatGPT helps me find ideas and shape them into complete thoughts."*

However, the third frequently appearing theme is the concern about dependence and reduced critical thinking abilities. Some respondents stated that excessive use of ChatGPT could decrease efforts to think independently and compose answers reflectively. For instance, one student wrote, *"Yes, because I become dependent and not confident in my own answers,"* while another stated, *"If I use ChatGPT too often, my brain stops developing."*

The fourth theme reflects a neutral or limited perception, suggesting that while ChatGPT is helpful, it does not significantly influence the overall learning experience. Some respondents felt that ChatGPT was only used in certain situations and was not a primary tool in the learning process. One student shared, *"Not entirely, it just helps to find information quickly,"* and another said, *"It doesn't affect much because I still study from other sources as well."*

Overall, the analysis shows that most students felt a positive impact from using ChatGPT on their learning experience, particularly in terms of information access speed,

independent learning, and material understanding. Nevertheless, they are becoming more aware of the importance of controlling its use to avoid overdependence and maintain cognitive engagement during the learning process. These findings emphasize the need for fostering critical digital literacy and reflective thinking habits in the use of AI-based learning tools in educational settings.

Discussion

This study reveals that using ChatGPT in problem-based learning (PBL) has a significant impact on students' learning experiences. The majority of respondents reported that they felt supported in understanding materials, designing solutions, and evaluating learning outcomes through this technology. However, the findings also indicate concerns about potential dependence and the decline in critical thinking capacity if ChatGPT is used excessively.

From the perspective of Project-Based Learning (PBL) theory, technology like ChatGPT can be interpreted as a form of scaffolding that supports students in actively and independently constructing their understanding. PBL is a learning approach that encourages students to participate in active and collaborative investigations, in which digital technologies like ChatGPT can provide substantial support. According to Al-Abdullatif and Gameil, the integration of digital technology into PBL offers valuable characteristics that support communication and collaboration among students, which is central to project-based learning processes (Al-Abdullatif & Gameil, 2021). Thus, ChatGPT can function as a tool that facilitates such interactions.

ChatGPT plays an important role in increasing student engagement. In the context of PBL, where students are expected to think critically and creatively, ChatGPT can provide immediate feedback that accelerates cognitive processes (Sirisathitkul & Jaroonchokanan, 2025). Additionally, ChatGPT can assist students in writing and structuring scientific arguments (Chen & Hou, 2024). Studies have shown that technology-based learning, including the use of ChatGPT, improves students' communication and collaboration skills, which are crucial in the 21st century (Haniah et al., 2021).

Furthermore, research by Shin et al. indicates that ChatGPT can enhance student engagement during group activities, showing that this technology can facilitate better collaboration among students (Shin et al., 2024). Additionally, there is an indication that ChatGPT can also support the development of students' computational thinking skills, although it has not yet shown significant effects on problem-solving skills specifically

(Liao et al., 2024). This highlights ChatGPT's role as scaffolding that not only provides information but also supports the development of social and cognitive skills through continuous interaction.

PBL demands independent learning, and ChatGPT provides the necessary support for students to become more independent in exploring materials and solving problems they encounter. A good scaffolding system involves interactions that help students control their learning experiences, thereby creating a more dynamic and responsive environment to their needs (Baryshnikova et al., 2022). In this regard, ChatGPT fulfills this function by facilitating cognitive and social learning (Alsahli et al., 2025), making it an effective tool in designing and implementing high-quality PBL.

In line with PBL theory, technology such as ChatGPT can be understood as scaffolding that supports students in actively and independently constructing their understanding. The PBL approach encourages learners to explore and solve problems independently, where technology can serve as a tool to bridge understanding gaps (Hmelo-Silver, 2004). In this context, ChatGPT is capable of providing rapid concept explanations, clarifying information, and offering initial references for further exploration.

The findings of this study also align with studies (Kasneci et al., 2023), which show that large language models like ChatGPT have positive potential in supporting individual learning processes. Students can use this model to understand complex topics, formulate ideas, and quickly access information. However, these studies also emphasize the importance of critical and reflective use, as LLMs like ChatGPT do not always guarantee the accuracy or depth of the information provided.

Several respondents in this study also mentioned that using ChatGPT made them more reflective about their learning processes. They felt encouraged to develop broader understanding and clarify their thinking structures when evaluating and modifying answers generated by ChatGPT. This aligns with the role of technology as a tool to strengthen metacognition, as emphasized in the constructivist learning framework by Vygotsky (1978). Nevertheless, there was also acknowledgment that some students felt “lazy to think” and tended to accept ChatGPT's answers directly without further verification or elaboration.

Conclusion

Based on these findings and discussions, it can be affirmed that using ChatGPT in learning presents two sides that must be carefully balanced. On one hand, this

technology can serve as a powerful learning aid, improving learning efficiency and expanding access to information sources. On the other hand, if used without pedagogical guidance and critical reflection, ChatGPT risks reducing cognitive engagement and facilitating passive learning practices.

Therefore, the pedagogical implications of these findings are crucial. First, educational institutions need to integrate digital literacy and critical thinking skills training into the curriculum. Second, educators are expected not only to provide freedom in using technology but also to act as facilitators guiding students to use ChatGPT as a learning aid rather than a replacement for the learning process itself. Third, there should be ethical policies regarding AI technology use in classrooms to uphold the principles of active and comprehension-based learning.

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