

Students' perceptions of AI integration in enhancing autonomous learning

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Highlights

- The use of AI in students' learning process.
- The use of AI in enhancing autonomous learning.

ABSTRACT:

The rapid development of generative Artificial Intelligence (AI) has transformed multiple domains, including education, offering new opportunities for supporting student learning and autonomous study. This study investigates students' perceptions of generative AI as a supplementary learning tool and explores how it contributes to academic performance, autonomous learning, and access to information. Using a quantitative approach, data were collected from 50 students at UPN "Veteran" Jawa Timur through an online survey, covering frequency of AI use, perceived helpfulness, quality of information, satisfaction, and learning outcomes. The findings reveal that the majority of students use AI frequently to find references, additional learning materials, and answers to specific questions. Most respondents perceive AI as effective in improving their academic results. Students reported high satisfaction, with no respondents expressing dissatisfaction. Despite these positive perceptions, concerns were raised regarding accuracy, reliability, and limitations in specialized subject areas, highlighting the necessity of critical evaluation and responsible use. Future research should expand to larger, more diverse student populations, investigate educators' perspectives, and conduct longitudinal studies to examine the long-term impact of AI on critical thinking, creativity, and academic development. Overall, while generative AI presents significant potential to enhance autonomous learning, its benefits are maximized only when combined with careful oversight and active engagement in the learning process.

Keywords: AI integration, Autonomous Learning, Benefits of AI, AI for learning

Introduction

There has been growing interest in the use of Artificial Intelligence (AI) in everyday life. In this digital age, this technological advancement has affected not just the worlds of business, politics, and the environment, but also education (Pratikno, 2017). Generative AI has the

ability to generate content based on the prompt given in the form of multimodalities, including text, images, sound, and video (Nah et al., 2023). The accessibility and ability to answer most questions, even imperfectly, make generative AI a viable option for students to fill knowledge gaps or explore topics further. Furthermore, it gives the opportunity to support educators in facilitating the teaching and learning process, especially in accessing learning resources (Mulyani & Haliza, 2021). Additionally, educators can also use AI to provide feedback, translation, learning activities, and scenarios for language learning (Bown, 2012; Heaven, 2020; Lim et al., 2023).

One of the attractions of this new technology is the easy access for the users. It allows users to engage with the bot through discussion without requiring them to download or open an app on their device (Sandu & Gide, 2019). Furthermore, it has the ability to match the user's input sentence with the pattern that was already present in the knowledge base. Next, each pattern is matched against the chatbot's comprehensive knowledge base, which is compiled from various sources (Hiremath et al., 2020). AI is often used as an assistance in students' learning journey. AI helps students to learn independently in understanding programming, such as applying functions, constructing algorithms, and coding programs, which gives positive results in student learning (Choi, 2019).

Beyond functioning as an accessible knowledge base that answers specific queries, AI's advanced capabilities also allow it to actively analyze student comprehension. Accordingly, previous studies found that AI can be used to identify learning gaps and suggest how students can improve their performance (Somasundaram et al., 2020). Students can have their own learning path and work at a pace they are most comfortable with (Somasundaram et al., 2020). Furthermore, it also has the potential to be used in personalized learning, dynamic evaluation, and the promotion of meaningful interactions in online, mobile, and hybrid learning environments (Zhang & Aslan, 2021). The novelty and modern capabilities of generative AI inherently attract students to utilize it (Haristiani, 2019). Thus, in this case, AI can be used to complement students' learning methods by adding new ways for students to learn effectively.

AI can be used to support both teaching and learning. AI offers an adaptive structure of the learning process by choosing and organizing materials according to the needs and pace of the learner, as well as supporting analysis and learning motivation. AI can serve as a conversational, cooperative, and reflective partner. Furthermore, lecturers can also use generative AI to provide questions for students to answer. The chatbot can evaluate the answer and provide instant feedback (Sandu & Gide, 2019), which is often delayed when educators do it manually. Students can therefore continue their cycle of learning by applying the feedback and improving their work. Generative AI can also provide the course material and curriculum that are suitable for the needs of the students and enhance students' entire educational experience (Chen & Chen, 2020). Students are no longer limited by the curriculum, instead the curriculum facilitates the students' needs and preferences (Creely, 2024).

While AI offers significant opportunities, it is also important to discuss the notable challenges that might arise. One major concern is academic misconduct, as students may misuse AI tools to cheat on assignments or exams, undermining the integrity of academic assessments. Educators are currently struggling to design authentic assessments where students

cannot easily generate answers using AI. Some educators have begun assigning essay-based assessments to ensure the authenticity of students' writing. However, with the lack of students' digital literacy, this might increase the case of plagiarism when students pass off generative AI's work as their own. Some students might avoid this by giving their initial sentences and then asking generative AI to elaborate. Consequently, a critical question arises regarding whether the submitted work truly represents the student's original thought or whether it is simply text generated by AI.

Over-reliance on AI for learning and problem-solving may also hinder critical thinking and creativity, as students might depend on automated responses instead of developing independent analytical skills. As a result, students show little progress in their academic development, and the primary objectives of education might fail to be reached. In the midst of this change toward generative AI, the necessity of human reasoning, critical awareness, and practical problem-solving should be more emphasized (Creely, 2024). Therefore, educators should focus on involving students in discussions, reflections, and projects that foster their critical and creative thinking, ensuring that their essential skills are fully developed during learning.

Another issue that cannot be neglected is the accuracy. While students claim that AI can help them understand the material or search for references, the core question is, to what extent is the information provided accurate? Are the references cited academic? There is little evidence to support the accuracy of the information provided by AI, and AI can never guarantee the reliability of its outputs. Thus, generative AI is not always reliable, as it can provide inaccurate or biased information, potentially misleading users and compromising the quality of education. In other words, the accuracy of generative AI in providing material is also highly questionable. AI often provides inaccurate or outdated information, even with the correct knowledge on their database. These issues highlight the need for proper oversight in integrating AI into educational settings, as technological advancement should always be followed by a strong sense of responsibility to minimize the negative effects (Ratnaya, 2011).

In this AI era, it is impossible for educators to prohibit students from using AI. Instead, improving students' understanding of the role of AI becomes more crucial to take advantage of it as a learning tool, not only as a shortcut. This research aims to explore how AI can complement students in their learning journey and how AI can improve their autonomous learning.

Method

This study employs a quantitative research approach, utilizing the positivist paradigm, which is recognized as a highly influential framework in social sciences, including communication and related disciplines (Abdullah, 2015). The primary purpose of this research is to explore students' perceptions of AI integration in enhancing autonomous learning and to examine how AI serves as a supplementary resource for expanding student knowledge.

The study involved 50 student respondents from various study programs at UPN "Veteran" Jawa Timur who actively use AI chatbots to support their material understanding or skill development outside of their primary learning sources. To ensure a comprehensive view

of the effectiveness and benefits of AI integration, participants were randomly selected across different academic departments and semester levels, as subject diversity is essential in quantitative research for obtaining inclusive insights and experiences (Fiantika et al., 2022).

Data were collected through an online survey using the Google Forms platform, which is an effective method for gathering responses from a broad population (Fiantika et al., 2022). Conducted from 06 December 2023 to 09 December 2023, the survey instrument was designed based on the established research framework (as detailed in Table 1) to include structured questions regarding the frequency of AI use, perceived benefits, satisfaction levels, and preferences towards specific AI features.

The random selection method was implemented to provide a better representation of the student body (Rawung, 2020). Furthermore, respondents were given the flexibility to complete the survey at their convenience to ensure a higher response rate. All data were processed anonymously and treated with strict confidentiality measures to uphold research ethics throughout the processing and analysis stages. By utilizing this methodological framework, this study aims to provide representative insights into the role of AI chatbots in contemporary university learning environments.

Table 1.

Questions for the respondents

No.	Question	Answer Option
1.	What generative AI do you use? Why	Multiple options and Open-ended question
2.	How often do you use AI in the learning process? Why?	Multiple options (Never / Rarely / Often / Very Often) and Open-ended question
3.	Does AI help in the learning process?	Not helpful / Helpful / Very Helpful
4.	How does AI help in learning? Why?	Multiple options and Open-ended question
5.	Do you believe that AI can be an effective tool in improving academic outcomes? Why?	Yes / No and Open-ended question
6.	How do you assess the quality of the information or answers provided by AI compared to other learning sources? Why?	The same / Better / Worse and Open-ended question
7.	What is your level of satisfaction with the learning experience using AI compared to other learning sources?	Not satisfied / Satisfied / Moderately Satisfied / Very satisfied

Findings and Discussion

Based on the data collected from 50 students across various departments at UPN “Veteran” Jawa Timur, the analysis begins by identifying the specific generative AI tools utilized in their autonomous learning. As detailed in Chart 1, among the nine platforms surveyed, ChatGPT

emerged as the most widely adopted AI, used by 24 respondents (48%). Other platforms include Copilot/Bing with 21 users (42%), Bard with 14 users (28%), Blackbox with 9 users (18%), and Perplexity with 4 users (8%). Meanwhile, tools like Sonix, Gamma, DeepAI, and Canva were the least utilized, selected by only 1 student each (2%).

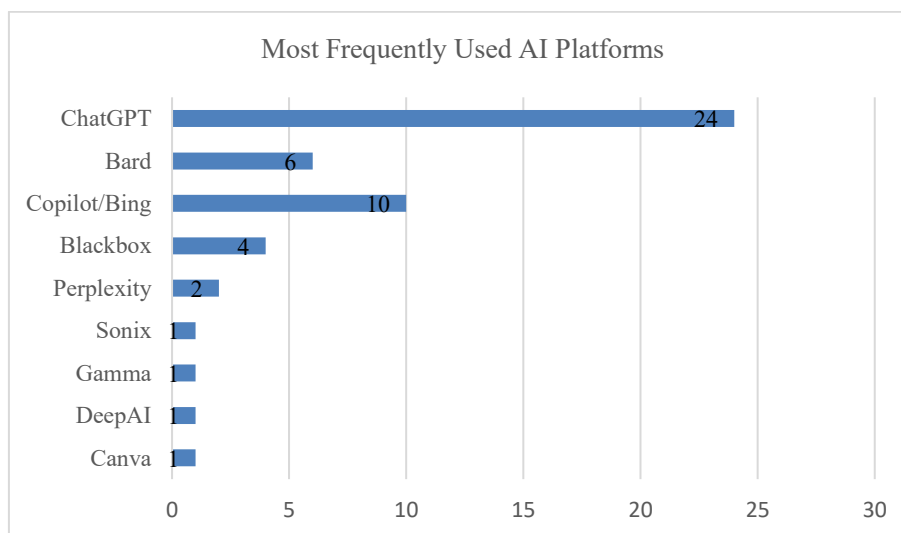


Chart 1. Respondents' Usage of Generative AI Platforms

While the immense popularity of ChatGPT may not be surprising, the underlying reasons for this preference offer valuable insights. Many students explained that they are either unfamiliar with alternative AI tools or already feel entirely satisfied with ChatGPT's capabilities. This heavy reliance is primarily driven by the platform's high accessibility and user-friendly design. The fact that it requires no specialized technical skills, is free to use, and simplifies complex concepts makes it highly appealing.

These findings strongly align with Azmir and Atikuzzaman (2024), who noted that ChatGPT's conversational design and time-saving features make it more appealing than complex AI tools. However, research on students in more intensive academic settings shows a different pattern, as some prefer platforms tailored for real-time literature searches and citation support such as Perplexity (Suryanti & Ramadhanti, 2024). This contrast suggests that while ChatGPT is widely favored for general use, its dominance may shift depending on students' specific academic demands.

The dominance of ChatGPT usage, reaching 48% and driven by its ease of use and free accessibility, shows that technical barriers are no longer an obstacle to self-directed learning. Within this context, the simple conversational interface helps reduce students' academic anxiety when dealing with complex material. AI is therefore seen not merely as a search engine but as an adaptive virtual discussion partner, consistent with the concept of personalized learning (Zhang & Aslan, 2021), in which students have full control over when and how they learn without relying entirely on the lecturer's schedule.

Corresponding to the high adoption rate of these platforms, the frequency of AI utilization among students is also notably high. Chart 2 shows that a majority of students, specifically 26 respondents (52%), use AI often, as they feel supported by its role as an additional source of learning material. It is also common for students to rely on AI to find solutions to problems they encounter in learning, viewing it as a crucial supplementary resource. Meanwhile, 19 respondents (38%) reported that they rarely use AI specifically for the learning process. However, in the open-ended section of the survey, several of these students clarified that their AI usage is mostly limited to personal activities, such as creative storytelling or seeking general advice, which explains the low frequency in academic contexts. Conversely, 5 respondents (10%) reported using AI very frequently, primarily for academic purposes such as searching for answers, clarifying unfamiliar terms or materials, consulting on coding errors, and finding references. Significantly, none of the students (0%) reported that they 'never' use AI, highlighting that every respondent has integrated this technology into their learning process to some degree.

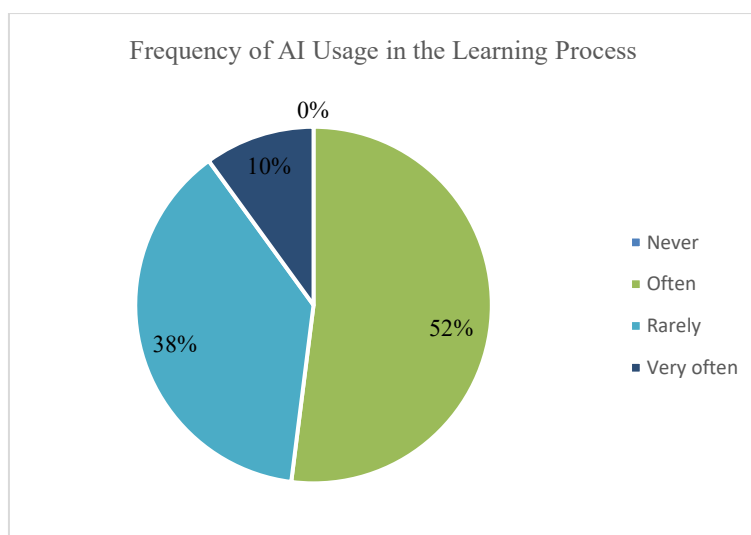


Chart 2. Frequency of AI Integration in Learning

This active engagement is directly correlated with the perceived utility of AI tools. When assessing its helpfulness, all respondents acknowledged the benefits of AI (Chart 3), specifically stating that they feel it is helpful as a supplementary source for the learning materials they need. Consequently, 52% of students found AI to be very helpful, while the remaining 48% considered it helpful. Strikingly, none of the respondents (0%) felt that AI was not helpful. This absolute consensus is particularly significant, indicating that generative AI has transitioned from a mere experimental tool into an essential academic lifeline.

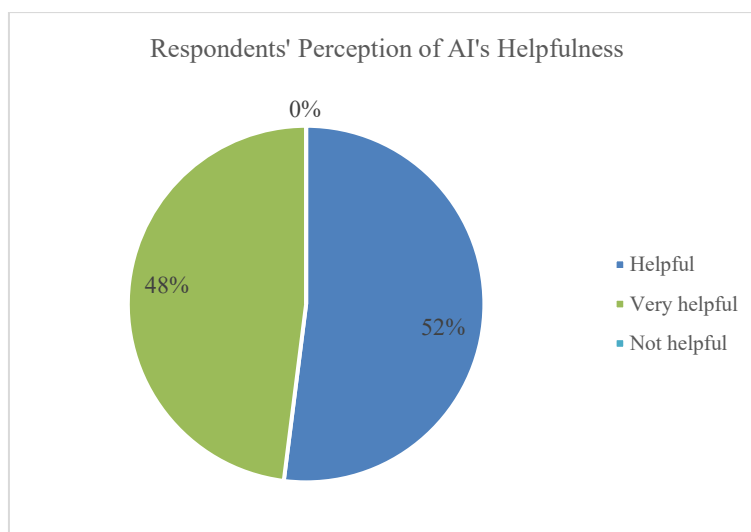


Chart 3. Perceived Helpfulness of AI

The fact that no student considered it unhelpful shows that AI successfully addresses immediate learning gaps that traditional classroom settings often leave behind. This observation aligns with Ngo et al. (2024), who assert that generative AI effectively bridges these gaps while increasing overall academic efficiency. Furthermore, the consensus on AI's helpfulness in sourcing materials corroborates Mulyani and Haliza (2021), highlighting AI's crucial role in independent resource access. This unanimous positive response also illustrates how AI creates a psychologically safe environment for autonomous learners, allowing them to ask basic questions, clarify uncertainties, and make mistakes without the fear of judgment that might occur when interacting with peers or lecturers. In the end, this consistent and judgment-free support highlights the important role of AI in strengthening and facilitating a truly autonomous learning process.

Given this unanimous agreement on AI's helpfulness, the study sought to identify exactly how students integrate it into their studies. As detailed in Chart 4, the findings indicate that students use AI in various ways to support their learning. The most common uses are finding references, selected by 19 students (38%), and looking for additional material, chosen by 16 students (32%). Meanwhile, 13 respondents (26%) stated that AI helps them to find answers to specific questions they may have, and 2 students (4%) reported using AI for other purposes.

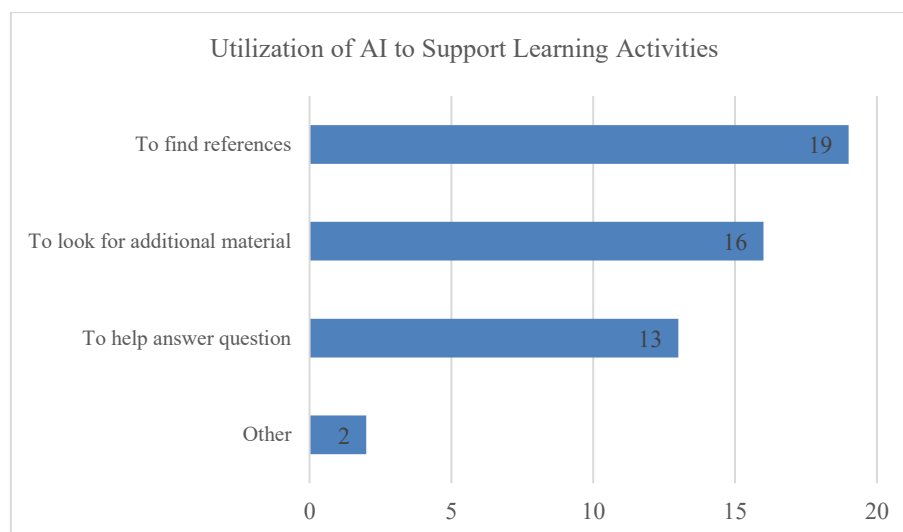


Chart 4. Bar chart showing how AI helps in the respondent's learning process

These significant percentages directly illustrate a strong manifestation of autonomous learning in practice. By proactively utilizing AI to seek out references and supplementary materials, students are actively taking ownership of their educational process. Rather than passively relying solely on materials provided by lecturers, they demonstrate a self-directed initiative, proving that AI integration effectively enhances their capacity for autonomous learning. This suggests that students often rely on AI to quickly identify literature sources, particularly when they seek simplified explanations, summaries, or alternative perspectives on topics introduced in class. AI is perceived as an efficient tool to guide them toward relevant readings while simultaneously clarifying complex concepts.

The high frequency in both of these usage purposes marks a shift in information literacy strategies among students. While previously, autonomous learning was often hindered by the time-consuming process of traditional literature searches, the presence of generative AI acts as a catalyst that accelerates the discovery phase. This function of AI provides supplementary learning resources that highly support autonomous learning without replacing formal instruction from lecturers.

The tendency to use AI for finding specific answers reflects students' inclination to use it as an on-demand problem-solving tool, particularly when they are pressed for time or unable to consult lecturers or peers. The immediate response of AI allows students to overcome learning obstacles efficiently. Furthermore, students utilizing AI for other purposes reported seeking assistance in drafting assignments, practicing language skills, or checking grammar and writing style. Some students also mentioned using AI to brainstorm ideas, generate outlines, or simulate discussions. These varied uses demonstrate the flexibility of AI in supporting not only content-related tasks but also the development of academic skills.

However, while AI acts as a powerful catalyst for resource discovery and flexible learning, its use as an instant problem-solver introduces a critical paradox. True autonomy requires cognitive struggle, and when AI gives instant answers, it risks skipping this important

learning stage as students bypass the necessary cognitive effort (Grassini, 2023). Therefore, these findings highlight a new challenge. On one hand, AI accelerates access to educational materials, yet on the other hand, it requires students to develop stronger digital literacy and critical awareness. The reliability and academic rigor of AI-generated references must still be carefully evaluated. In line with Creely's (2024) warning, the rapid availability of information risks weakening independent analytical skills if students accept AI-provided references without cross-checking them against credible academic databases.

Despite these concerns regarding analytical depth, the students' overall perception of AI's practical utility remains remarkably high. As illustrated in Chart 5, the findings reveal that an overwhelming majority of respondents (96%) view generative AI as an effective tool for improving their academic performance, while a small minority (4%) expressed skepticism regarding its effectiveness.

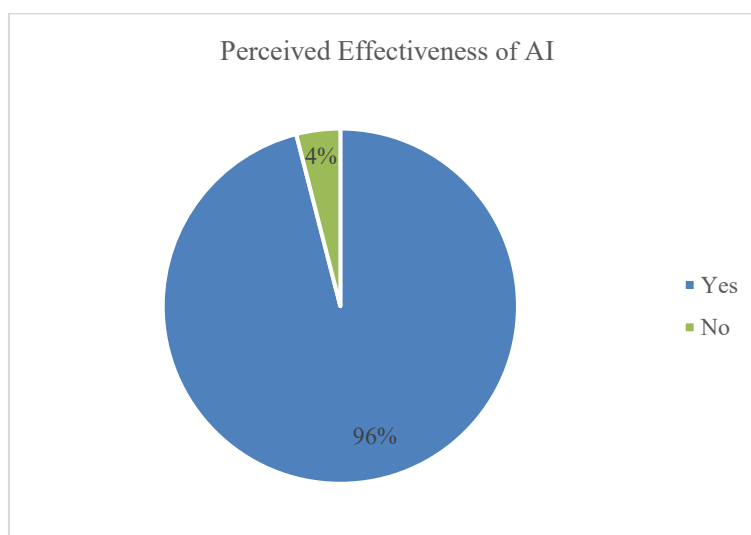


Chart 5. Pie chart showing what the respondents think about the effectiveness of AI

This high percentage of positive responses signifies that students increasingly perceive AI as a valuable academic support system. A common reason cited by respondents is that AI provides immediate access to information and explanations, which helps students save time and focus on understanding course materials more efficiently. AI's ability to generate summaries, provide practice exercises, and clarify complex concepts is highly regarded for exam preparation and assignment writing. For many respondents, these led to improved performance and greater confidence in their academic work. This strong perceived effectiveness of AI integration empirically supports Choi's (2019) findings, who observed that AI-assisted tools generate positive outcomes in students' autonomous learning trajectories, particularly in comprehending complex concepts.

On the other hand, the students who expressed skepticism questioned the accuracy and reliability of AI-generated content, noting that not all responses meet academic standards or are supported by credible references. This skepticism aligns with the concerns raised by Creely

(2024) about the weakening of independent analytical skills and resonates with the findings of Uppal and Hajian (2024), who reported that heavy reliance on AI tools is significantly correlated with increased procrastination and the risk of superficial learning rather than genuine knowledge mastery. It is possible that these individuals possess a general discomfort with digital tools or hold a strong preference for traditional learning approaches, such as consulting textbooks or engaging in direct discussions with lecturers.

This profound optimism among students, heavily reflected in the 96% effectiveness belief, serves as a strong indicator that AI has seamlessly integrated into their autonomous learning ecosystem. However, this high level of confidence must be approached critically. The boost in students' confidence derived from instant AI responses can create an illusion of competence, where students feel they have mastered the material even though they are only skilled at formulating prompts. This situation carries important implications for educational institutions, as traditional teaching methods and learning resources may increasingly be seen as rigid or unresponsive by the digital generation. Therefore, there is an urgent need for pedagogical renewal that integrates AI ethically and systematically, ensuring that students build genuine cognitive skills rather than relying solely on automated outputs.

While pedagogical renewal is essential to foster genuine cognitive skills, this initiative must also address the foundational quality of the information students access. As illustrated in Chart 6, the findings reveal a significant shift in how students perceive the authority of knowledge, with 64% of respondents considering the quality of AI-generated information to be on par with traditional sources, 34% asserting it provides better quality, and a mere 2% rating it as poor.

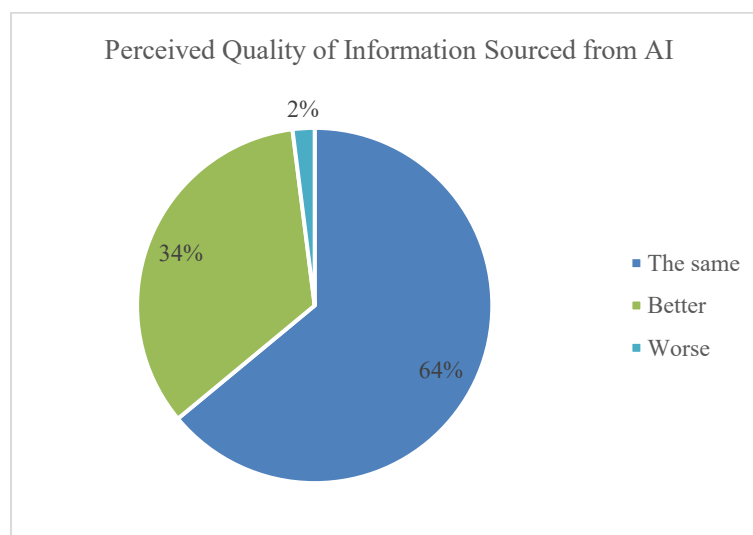


Chart 6. Chart showing the respondents' opinion on the quality of information sourced from AI

For the majority who consider it on par with traditional sources, such as textbooks, lecture notes, or online articles, this perspective suggests that students increasingly regard AI as a supplementary tool that can complement, rather than replace, established sources of

knowledge. The similarity may also be attributed to AI's ability to summarize content and present explanations in accessible language, which makes it as practical and reliable as conventional resources in supporting day-to-day learning activities.

Interestingly, according to the students who assert that AI provides better information quality than other learning sources, AI offers a level of personalization, efficiency, and the ability to integrate information from diverse fields, enabling them to access diverse perspectives more quickly. For some learners, particularly those who prefer concise and simplified explanations, this immediate responsiveness proves more effective than traditional resources that are often time-consuming or less accessible. The fact that a combined 98% of students view AI as equal or superior to established academic sources further suggests that generative AI is no longer perceived merely as a search engine, but as a highly capable and personalized digital tutor (Zhang & Aslan, 2021).

Conversely, the students who rated AI's information quality as poor noted that AI occasionally generates generic, outdated, or incorrect answers, particularly in specialized or highly technical disciplines. This empirical finding directly validates the issue highlighted previously, as generative AI cannot guarantee the reliability of its outputs; it often provides inaccurate or outdated information despite having the correct knowledge base. As emphasized by Ratnaya (2011), technological advancement must always be accompanied by a strong sense of responsibility to minimize potential negative effects and misinformation. High perceived quality among students does not necessarily reflect factual accuracy, which underscores the continuing need for critical evaluation.

Building upon these perspectives regarding information quality, the study further evaluated students' overall satisfaction with their AI-assisted learning experience as a crucial indicator of seamless integration. In accordance with the data in Chart 7, the findings reveal a generally positive perception, with 8% of respondents reporting being very satisfied, 48% satisfied, and 44% moderately satisfied.

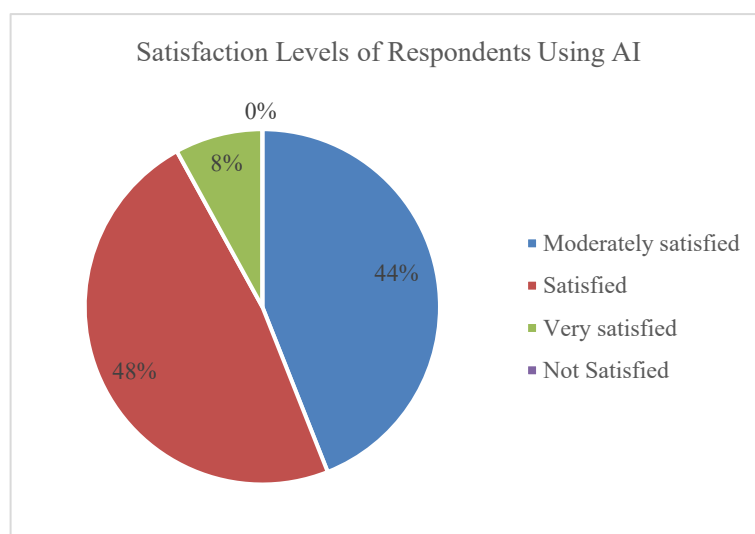


Chart 7. Chart showing the respondent's level of satisfaction when using AI

For the group of respondents who felt very satisfied (8%), this finding indicates that AI not only met but exceeded their expectations in enhancing the learning experience. These students likely benefited most from the immediacy, personalization, and accessibility of AI-generated responses, which align with their individual learning needs. The largest proportion of respondents (48%) reported being satisfied, suggesting that for nearly half of the participants, AI provided consistent value as a complementary resource in their academic journey. Students in this category likely appreciated AI's ability to simplify complex information, provide quick references, and support autonomous learning. However, their responses also imply that while AI was helpful, it did not entirely replace the richness or reliability of traditional learning materials.

Meanwhile, those who felt moderately satisfied (44%) demonstrated a more cautious acceptance. This group recognizes the benefits of AI but remains aware of its limitations, such as occasional inaccuracies, a lack of depth in certain subjects, or the risk of overreliance. Their assessment reflects a balanced perspective, where AI is useful but still requires validation from more authoritative sources.

Overall, the absence of any reports of dissatisfaction is a significant finding, reinforcing the perception that AI has established itself as a broadly acceptable and effective learning aid. These satisfaction levels directly align with the predictive findings of Pabreja & Pabreja (2024), whose machine learning models showed that undergraduate students overwhelmingly fall into the 'satisfied' category when using ChatGPT for academic tasks. Nevertheless, educators must remain vigilant against the false sense of mastery, where high satisfaction might mask a lack of genuine cognitive development.

In synthesis, the findings of this study demonstrate that generative AI functions as a dual facilitator within the realm of autonomous learning. On one hand, it extraordinarily empowers students' independence by accelerating the discovery of materials, simplifying complex concepts, and providing on-demand academic support. On the other hand, the absolute satisfaction and high trust placed in AI's outputs risk fostering intellectual complacency. For autonomous learning to be truly effective in the AI era, students must not only rely on the technology's efficiency but also actively exercise self-regulation, cross-validation, and critical thinking to ensure their academic integrity and actual cognitive development remain intact.

Conclusion

This study concludes that generative AI chatbots are widely perceived by students as highly effective tools for enhancing their autonomous learning, particularly in accessing references, exploring supplementary materials, and addressing specific academic queries. The unanimous satisfaction reported by respondents underscores a broadly positive acceptance of AI's role in the educational process. However, while most students perceive the quality of AI-generated information as equal to or better than conventional resources, a critical minority highlights valid concerns regarding accuracy, reliability, and inconsistent performance across specialized

disciplines. This underscores that the reliance on AI must be balanced with rigorous critical evaluation and validation against authoritative sources.

Ultimately, these findings imply that generative AI holds substantial potential to complement, rather than replace, traditional forms of learning. To maximize its benefits and prevent intellectual complacency and academic misconduct, its usage must be accompanied by robust digital literacy training and clear ethical guidelines within academic contexts. For future research, it is recommended to expand the sample size across diverse institutions and disciplines, explore educators' perspectives on classroom integration, and conduct longitudinal studies to examine how sustained AI usage impacts students' long-term critical thinking, creativity, and overall academic development.

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