

STUDENTS STRATEGIES ON SECOND-STEP VERIFICATION IN USING CHATGPT

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Abstract

*The development of Artificial Intelligence (AI) technology has brought significant changes to the way students obtain, process, and utilize information to support academic activities. One of the increasingly popular technologies is ChatGPT, an AI-based system capable of providing information quickly, easily, and responsively to various user needs. The presence of ChatGPT offers numerous benefits for students, particularly in assisting information retrieval, completing assignments, and supporting the learning process. However, despite its convenience, ChatGPT may generate information that is inaccurate, incomplete, outdated, or difficult to verify. This condition requires students to possess critical thinking skills and conduct *second-step verification* of the information they obtain before using it in academic contexts. This study aims to explore the strategies employed by students to verify information obtained from ChatGPT, identify the reasons that motivate them to conduct verification, and examine the sources they use during the verification process. This research adopts a descriptive quantitative approach, with data collected through a survey involving university students from various higher education institutions in Indonesia. The findings are expected to provide insights into students' verification behaviors when using AI technologies and contribute to the development of digital literacy, critical thinking skills, and the responsible use of Artificial Intelligence in higher education.*

Keywords: ChatGPT; second-step verification; university students; digital literacy; artificial intelligence

INTRODUCTION

The integration of Large Language Models (LLMs), especially OpenAI's ChatGPT, into higher education has significantly changed the academic landscape from a traditional model of limited information to a new era of abundant information. In today's digital campus, ChatGPT has evolved from a novelty tool to a common academic resource. Students across various fields use this generative artificial intelligence to make their work easier. They rely on it for brainstorming research topics, outlining essays, summarizing complex academic papers, and refining their writing style. The efficiency and conversational nature of ChatGPT provide students with an instant support system, making personalized tutoring and quick writing help more accessible.

However, this fast adoption of technology also brings important challenges that threaten the fundamental values of higher education. A major issue with LLMs is the problem of "AI hallucinations," which occur when the model confidently produces information that sounds plausible but is factually incorrect, outdated, or completely made up. Since ChatGPT

works on predicting the next word based on probabilities rather than true understanding of facts, its responses can be misleading. Therefore, relying on AI outputs without careful evaluation poses a serious risk to academic honesty, spreads misinformation, and hampers students' ability to think critically and independently. To address these concerns, the academic community emphasizes the need for a "second-step verification." This involves a process where students actively check, fact-check, and critically assess AI-generated content against reliable sources.

This verification process is crucial to modern teaching methods, as noted by Crompton (2024). Crompton argues that ChatGPT and similar LLMs should not be treated as passive tools for gathering information. Instead, higher education institutions should teach students to view the AI as a learning partner or a critical facilitator. Users must always validate its claims through testing and in-depth examination. In this context, the real educational benefit of AI lies not in the answers it gives, but in the cognitive challenges it presents, pushing students to verify information. Without active verification, students risk becoming complacent and may lose the critical thinking and analytical skills that artificial intelligence cannot replace.

While current academic literature mainly describes this second-step verification as a protective measure against AI mistakes, we believe this process also has a broader, proactive role. In this study, we will observe whether our fellow university students use these verification strategies not only to avoid errors, but also to intentionally improve and enhance the quality of the responses they receive. When students check ChatGPT's output against credible sources, they can uncover weak arguments or generic language, which allows them to refine the AI's prompts or combine its output with solid evidence. Thus, we propose that second-step verification acts as a collaborative process that ultimately results in more rigorous academic content.

Despite the clear significance of this issue, research focusing specifically on the strategies and practical steps students take during this second-step verification is limited. To fill this gap, this study aims to explore the specific methods used by university students to verify ChatGPT outputs, examining how they tell fact from fiction and uphold academic standards to achieve better results when working with artificial intelligence.

METHOD

This study employed a descriptive quantitative research design with a qualitative descriptive component to investigate students' strategies in conducting second-step verification of information obtained from ChatGPT. While a quantitative approach was primarily selected to collect numerical data and describe general patterns, behaviors, and tendencies (Creswell & Creswell, 2018), the inclusion of qualitative elements allowed for a deeper exploration of the students' critical thinking processes. This hybrid descriptive approach ensures that the phenomenon of cognitive verification is captured both in breadth (trends) and depth (context).

The population of this study consisted of university students in Indonesia who have experience using ChatGPT for academic purposes. Since the exact parameters of this user base cannot be quantified definitively, the researchers employed a non-probability convenience sampling technique, which is appropriate when the sampling frame is inaccessible or unknown (Saunders et al., 2019). The final sample comprised 41 university

students from various higher education institutions who voluntarily participated. Although a sample size of $N = 41$ represents a localized, small-scale exploratory study, the rich textual data from respondents effectively compensates for the modest quantitative sample size.

The study utilized primary data collected directly from respondents through a self-administered online questionnaire. The questionnaire was carefully operationalized to gather multi-dimensional information regarding students' behavioral patterns, including their frequency of ChatGPT usage, explicit verification heuristics, underlying motivations for double-checking AI outputs, and the specific categories of authoritative secondary sources they deploy for validation.

Data were collected using a structured, cross-sectional questionnaire distributed digitally through Google Forms to maximize reach across diverse student networks (Fowler, 2014). To ensure data triangulation, the instrument was structured into two sections. The first section gathered demographic variables (such as gender, academic major, and educational level). The second section utilized a mixture of Likert-scale close-ended questions to quantify general behavioral trends and open-ended text fields to allow students to articulate their exact step-by-step verification methods in their own words.

The gathered data underwent a dual-method analysis to extract comprehensive insights. Quantitative data from close-ended questions were processed using descriptive statistical analysis, with results converted into frequencies and percentages to identify macro-trends (Creswell & Creswell, 2018). Conversely, qualitative data from the open-ended responses were evaluated using manual thematic analysis. This involved an iterative process of open coding, where raw textual responses were systematically categorized into distinct themes representing specific verification habits, motivational factors, and trusted reference types (Braun & Clarke, 2006).

To uphold strict academic integrity, thorough ethical protocols were implemented. Complete anonymity was maintained throughout the study, with no personally identifiable information (such as names or email addresses) collected. Respondents were strictly assigned alphanumeric codes (e.g., R1, R2, R3) during data processing and reporting. Furthermore, an informed consent clause was placed at the absolute beginning of the instrument, ensuring that participation was entirely voluntary and that all data would be used exclusively for aggregate academic research.

RESULTS AND DISCUSSION

This study involved 42 respondents who had experience using ChatGPT for academic purposes. All respondents completed the questionnaire, resulting in a 100% response rate. The collected data were analyzed using descriptive qualitative analysis to identify students' second-step verification strategies, their reasons for verifying ChatGPT-generated information, and the sources they used to validate the information.

Students' Verification Strategies

This illustrates the strategies employed by students to verify information generated by ChatGPT. The findings indicate that most respondents conducted second-step verification by comparing ChatGPT's responses with reliable sources, including academic journals, books, Google Scholar, official websites, and other credible references. Some respondents also reported requesting references from ChatGPT and independently checking their validity, while others compared ChatGPT's responses with those generated by other AI platforms.

These findings suggest that students do not rely solely on ChatGPT but actively verify information before using it for academic purposes.

Table 1. Thematic Description of Students' Verification Strategies

Theme	Description
Academic Journals	Comparing ChatGPT's responses with peer-reviewed journal articles.
Google Scholar	Searching for academic evidence related to the information.
Books	Confirming theories and concepts using textbooks or academic books.
Official Websites	Verifying factual information through authorized institutions.
Lecturers and Course Materials	Consulting lecturers and course materials for confirmation.
Multiple Sources	Cross-checking information using several credible references.

Reasons for Conducting Second-Step Verification

Presents the reasons why students verify information obtained from ChatGPT. Most respondents agreed that verification is necessary because ChatGPT may generate inaccurate, incomplete, or outdated information. In addition, several respondents expressed concerns about incorrect citations and the possibility of misleading information. Therefore, second-step verification is considered an essential practice to ensure that information used in academic work is accurate, reliable, and credible.

Table 2. Reasons for Verification

Theme	Description
Accuracy	Ensuring that the information is correct and trustworthy.
Avoiding Misinformation	Preventing the use of inaccurate or misleading information.
Academic Credibility	Maintaining the quality and credibility of academic work.
Incomplete Information	Addressing the possibility that ChatGPT provides incomplete explanations.
Outdated Information	Ensuring that the information is current and relevant.
Confidence	Increasing confidence before using the information.

Sources Used for Verification

Shows the sources most frequently used by students to verify information generated by ChatGPT. The findings reveal that academic journals, Google Scholar, books, official institutional websites, and scholarly articles are the primary sources used during the verification process. A small number of respondents also reported using other AI platforms, such as Gemini, to compare responses. These findings indicate that students continue to prioritize authoritative academic sources when validating information generated by artificial intelligence.

Table 3. Sources Used for Verification

Theme	Description
Google Scholar	Searching for academic articles and research evidence.
Academic Journals	Confirming research findings and theories.
Books	Verifying concepts and definitions.
Official Institutional Websites	Checking factual and official information.
Scholarly Articles	Supporting claims with evidence-based references.
Other Credible Websites	Comparing information from reliable online sources.

DISCUSSION

The findings of this study indicate that students have developed a responsible approach to using ChatGPT in academic activities. Although ChatGPT provides quick and

easily accessible information, most respondents recognized that its responses should not be accepted without further evaluation. Students actively engaged in second-step verification by consulting reliable academic sources and comparing information across multiple references.

The tendency to verify information using academic journals, books, Google Scholar, and official websites demonstrates that students continue to value authoritative sources as the primary foundation for academic work. These findings suggest that ChatGPT functions as a learning support tool rather than a replacement for credible academic sources.

Furthermore, students' reasons for conducting verification reflect their awareness of the limitations of generative artificial intelligence. Respondents acknowledged that ChatGPT may generate inaccurate information, outdated content, fabricated references, or incomplete explanations. Consequently, they considered second-step verification an essential strategy for ensuring the validity, credibility, and reliability of academic information.

Overall, these findings demonstrate that students exhibit critical thinking and information literacy skills when interacting with AI technology. Rather than relying exclusively on ChatGPT, they integrate AI-generated responses with evidence obtained from trustworthy academic sources. This practice contributes to the responsible use of artificial intelligence in higher education and supports the maintenance of academic integrity.

These findings are further summarized in the thematic analysis presented in Tables Q11, Q12, and Q13. The tables demonstrate that students' verification practices revolve around three key aspects: the strategies they employ to verify ChatGPT-generated information, the reasons motivating them to conduct verification, and the reliable sources they use throughout the verification process. Overall, the findings indicate that students are aware of both the benefits and limitations of ChatGPT. Instead of accepting AI-generated responses uncritically, they consistently perform second-step verification by consulting credible academic sources. This behavior reflects the development of critical thinking, information literacy, and the responsible use of artificial intelligence in academic contexts, supporting the view that ChatGPT should complement rather than replace traditional academic sources.

CONCLUSION

This study delved into how university students approach second-step verification when using ChatGPT for their academic work. The results show that while ChatGPT has become a valuable tool for learning, students don't just take its responses at face value. Instead, they actively cross-check the information generated by AI against reliable academic sources like peer-reviewed journals, books, Google Scholar, official institutional websites, and their course materials. This behavior highlights that students are aware of the limitations of generative AI, including the risks of receiving inaccurate, incomplete, outdated, or even fabricated information.

The research also indicates that students engage in verification mainly to confirm the accuracy, credibility, and reliability of the academic content they encounter, steering clear of misinformation that could undermine the quality of their work. Moreover, their consistent reliance on authoritative academic sources shows a strong understanding of academic integrity and responsible AI usage. Rather than replacing traditional learning resources, ChatGPT is viewed as a supportive tool that enhances learning when paired with critical evaluation and evidence-based verification.

In summary, these findings underscore the need to bolster digital literacy, information literacy, and critical thinking skills within higher education. Universities should promote systematic verification practices among students whenever they use generative AI in academic settings. Future research could involve larger and more diverse participant groups, utilize mixed-method or longitudinal approaches, and explore how second-step verification impacts students' learning outcomes, the quality of their academic writing, and their understanding of responsible AI use.

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