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PROMPTING BEHAVIOR GENERATIVE AI BY POSTGRADUATE STUDENTS OF STATE UNIVERSITY OF MALANG IN WRITING SCIENTIFIC ARTICLES

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Abstract
This study aims to identify patterns of prompting behavior of graduate students of State University of Malang in utilizing Generative AI, especially ChatGPT, for scientific article writing. Using a qualitative approach based on grounded theory, data was collected through in-depth interviews with two main informants. The results showed that students applied a systematic and iterative prompting approach in five main aspects: input semantics, output customization, error identification, prompt improvement, and interaction & context control. Analysis through open, axial, and selective coding stages resulted in the SURE Framework (Strategic Prompt Design, Utilization & Output Optimization, Refinement & Iterative Interaction, Evaluation & Academic Validation), which describes the practice of active and reflective use of GenAI in an academic context. This research contributes to a deeper understanding of human-GenAI interaction in academic contexts. It underscores the importance of prompting literacy as a critical skill to enhance the effectiveness and integrity of AI-assisted scientific writing. Furthermore, the findings highlight the need for developing digital and information literacy among students and academics, in line with the demands of the digital era. Specifically, within the field of Library and Information Science, this study provides a foundational perspective for designing adaptive curricula that integrate digital technologies into learning, research, and information management. Such an adaptive curriculum is expected to equip students with the ability to use AI tools more effectively and ethically in academic settings. Additionally, the study offers practical insights for improving academic information management systems, thereby promoting more efficient and relevant learning and research processes. Overall, this research bridges the gap between emerging AI technologies and pedagogical innovation in higher education.

Keywords: *prompting behavior, generative AI, AI Literacy, prompt engineering, higher education.*

INTRODUCTION

Generative artificial intelligence (Generative AI) is increasingly integrated into various aspects of human life, not only as an innovation, but also as a necessity to increase efficiency and productivity. One of the most popular GenAI platforms, ChatGPT, dominates with more than 2.3 billion visits in March 2024 (Liu & Wang, 2024). In August 2024, ChatGPT was reported to have 200 million weekly active users (Zhu, 2024). This figure indicates that the adoption of GenAI continues to experience rapid growth. In Indonesia, the use of GenAI has also shown a significant increase. In the world of work, as many as 92% of office workers have utilized this technology to support their work (Fahky, 2024). Meanwhile, in the academic realm, GenAI has become a tool widely used by students and academics to support various scientific activities. Data shows that 86.21 percent of students aged 15–21, both at high school and college levels, use AI to help complete their academic assignments (Hartanto & Rohmah, 2024). These findings support research by Haque et al. (2022), which shows that the three largest early adopter groups of this technology consist of software practitioners, academics, and students.

Niyu et al. (2024), also revealed that the level of academic awareness of ChatGPT reached 91.25 percent. In addition, more than half (63.75 percent) have actively integrated this technology into academic activities, thus confirming that GenAI is increasingly becoming an integral part of the higher education ecosystem. Research conducted at Padjadjaran University reinforces this trend. The study found a significant positive relationship between the use of ChatGPT and the fulfillment of students' learning needs, as indicated by a correlation coefficient of 0.834 (Nashir et al., 2024). This study not only indicates that students are familiar with GenAI, but also shows that they are starting to use it actively in the learning process.

However, the effectiveness of GenAI usage depends on the user's ability to construct appropriate prompts. A study in Hong Kong showed that training in prompt engineering techniques increased confidence, understanding of AI, and more effective prompt-building skills (Woo et al., 2024). In line with these findings, Cronjé (2024) emphasized that more specific prompts produced more relevant responses than general questions. In addition, O'Dea & O'Dea (2023) also highlighted the importance of training in verifying AI output and hands-on practice in constructing optimal instructions to minimize misinformation (hallucinations). Several other studies have also discussed how prompting techniques can improve students' academic skills, but most are still limited to small-scale studies or only focus on certain fields.

Although various studies have highlighted the benefits of prompts in academic contexts, there is still a gap in understanding how postgraduate students use prompting techniques to assist scientific writing. Postgraduate students have higher levels of academic confidence than undergraduate students (Johnston et al., 2024), but they also face more complex academic challenges, such as rigor in writing and meeting stricter scientific standards. Therefore, this study aims to identify the prompting patterns of postgraduate students at Malang State University in utilizing GenAI, especially ChatGPT for writing scientific articles.

This research is expected to enrich the understanding of the interaction between humans and GenAI technology in an academic context. This has the potential to develop information literacy and relevant digital skills for students and academics, so that they are in accordance with the demands of the times. Specifically, in the field of Library and Information Science, this research can provide a basis for designing a curriculum that is adaptive to advances in digital technology in aspects of learning, research, and information management. With a more adaptive curriculum, it is hoped that students can learn to use technology more effectively in

learning and research activities. This research can also help improve the way information is managed in an academic environment, so that the learning and research process becomes more efficient and in accordance with the needs of the times.

Generative AI

Generative AI is an evolution of deep learning approaches and large language models (LLMs) designed to create original content based on training data patterns (Banh & Strobel, 2024). The history of GenAI development can be traced through several important phases. The early era (1950-2010) began with the concept of the Turing Test and was strengthened by the development of machine learning (Feuerriegel et al., 2024). The next phase (2010-2017) was marked by the emergence of important architectures such as Generative Adversarial Networks (GANs) and Variational Autoencoders (VAEs) that enabled the generation of visual content (Goodfellow, 2016; Kingma & Welling, 2013). The transformer revolution in 2017 laid the foundation for modern text-based generative models, and since 2020 we have entered the era of mass application with the presence of ChatGPT which has reached 200 million weekly users (Vaswani et al., 2017; Zhu, 2024). Unlike conventional AI systems that are reactive, GenAI is proactive in producing coherent text, images, or audio (Lim et al., 2023).

The use of GenAI in higher education raises various complex pedagogical implications. On the one hand, this technology offers opportunities to increase research efficiency through automated literature review and data analysis (Łodzikowski et al., 2023). However, on the other hand, there are various serious challenges, including students' excessive reliance on AI for essay assignments and the risk of plagiarism where the source of AI is difficult to trace (Johnston et al., 2024; krzysztof & Wojciech, 2023). Facing this complexity, it is important for users to have AI literacy that includes three main pillars of competence: technical understanding of the capabilities and limitations of AI models, critical evaluation skills of output, and awareness of responsible ethical implementation (Long & Magerko, 2020).

Prompting Behavior

Prompting is an interaction technique with GenAI that aims to direct the language model to produce relevant responses according to user needs (Wan & Chen, 2024). Prompts function as the main input that guides AI to understand and respond accurately (White et al., 2023). Prompting behavior refers to how users translate their goals into instructions that AI understands (Hwang et al., 2024). To achieve optimal effectiveness in prompting GenAI, several basic principles need to be considered (Sikha, 2023), namely (1) linguistic nuances, namely the selection of the right words so that AI understands and responds more accurately; (2) iterative refinement, namely the repeated refinement of prompts to increase the relevance of AI output; (3) bias mitigation, which emphasizes the importance of designing neutral and objective questions to reduce bias in AI responses. Mantell (2024) and Giray (2023) identify six key elements in prompt engineering, namely (1) specificity in keyword selection to increase response accuracy; (2) contextual clarity so that AI understands the purpose of the instruction; (3) structured format that makes it easy for AI to construct answers; (4) explicit constraints related to certain theories or language styles; (5) iterative process in refining prompts based on previous AI responses; (6) setting the type of expected answers according to user needs.

In practice, various prompting techniques have developed according to the complexity of user needs (Hwang et al., 2023; Wan & Chen, 2024), namely (1) zero-shot prompting, which is a technique where the model is asked to complete a task without previous examples, relying

on the basic knowledge that has been acquired during training; (2) few-shot prompting, which is a technique that includes several concrete examples to help the model understand the expected pattern or format; (3) chain-of-thought prompting, which is a technique that guides the model through a gradual reasoning process before reaching a final conclusion; (4) fine-tuning, which is a technique for adjusting the model to a particular knowledge domain by providing a specific context.

Various frameworks have been developed to improve the effectiveness of prompting in GenAI. One of them is the Classification Framework (White et al., 2023), which divides the prompting process into five main aspects: (1) input semantics (how the model understands instructions); (2) output customization (adjustment of response format and style); (3) error identification (detection and correction of errors in AI output); (4) prompt improvement (improving prompt quality); and (5) interaction (management of ongoing interactions between users and AI).

In addition, the CLEAR Framework (Lo, 2023) emphasizes the effectiveness of prompts through five main principles; (1) concise (short and clear); (2) logical (having a logical structure); (3) explicit (providing explicit instructions); (4) adaptive (flexible in various contexts); and (5) reflective (continuous evaluation to improve AI responses). This framework helps ensure that prompts are not only efficient but also easy for the model to understand.

Meanwhile, the IDEA Framework (Park & Choo, 2024) outlines four main steps in developing effective prompts: (1) include essential PARTS (ensure the role, purpose, audience, theme, and structure in the prompt); (2) develop CLEAR prompts (apply concise, logical, explicit, adaptive, and restrictive principles); (3) evaluate outputs and refine prompts (evaluate results and refine prompts iteratively); and (4) apply with accountability (ensure ethical and responsible use of AI).

Writing Scientific Articles

Writing is the process of transforming ideas and thoughts into written language that can be understood by others (Dewi et al., 2023). In an academic context, this process becomes more complex because it requires a strict structure, logical arguments, and empirical evidence support. According to Slameto (2016), a scientific article is a structured research report that aims to be published in an academic journal. In this case, Putranti (2023) emphasizes the importance of a logical and coherent flow of thought in scientific writing, where each argument must be supported by empirical evidence and presented systematically. Steiss et al. (2024) adopted Graham's framework which divides the academic writing process into five important stages, namely (1) conceptualization; (2) ideation; (3) translation; (4) transcription; and (5) reconceptualization. The conceptualization stage involves a deep understanding of the purpose of writing and the characteristics of the target reader. At the ideation stage, the writer collects various ideas and supporting evidence. The translation process then transforms these abstract ideas into coherent sentences, while transcription transfers them into the physical form of text. The final stage, reconceptualization, is a crucial revision and refinement process to ensure the quality of the writing.

In the process of scientific writing, the issue of plagiarism is one of the main challenges that must be avoided by every academic. Novantara and Pasruli (2017) classify plagiarism into three main types, namely (1) word-for-word plagiarism; (2) authorship plagiarism; and (3) idea plagiarism. Word-for-word plagiarism occurs when someone copies text from another source without giving proper credit. Authorship plagiarism refers to the inclusion of a name as the

author of a work that is not his own work, while idea plagiarism occurs when the main idea of a work is used without giving proper attribution to the original owner of the idea.

To prevent the practice of plagiarism, academic writers must apply the principles of integrity in every piece of writing. Geraldi (2021) emphasizes three basic principles in academic writing, namely (1) honesty; (2) originality; and (3) respect for authorship. Therefore, the use of AI in scientific writing must be carried out responsibly, ensuring that all content produced meets academic ethical standards and does not violate the principles of scientific integrity.

RESEARCH METHOD

This study uses a qualitative approach with a grounded theory type to explore in depth the prompting behavior of GenAI, especially ChatGPT, by postgraduate students in writing scientific articles assisted by GenAI. The selection of qualitative methods is based on the characteristics of research that aims to understand the complexity of informants' experiences, perceptions, and strategies holistically, where quantitative approaches are considered less able to capture these nuances (Moleong, 2017). Grounded theory was chosen because of its ability to build substantive theories rooted in empirical data, through a rigorous inductive process (Corbin & Strauss, 2015). This approach allows researchers to identify patterns, develop concepts, and formulate theoretical frameworks that are relevant to the context of prompting in academic writing. The research data were collected through in-depth interviews with two doctoral students from Malang State University who were selected purposively based on the following criteria: (1) actively publishing indexed scientific articles (10–20 articles/year), and (2) having substantive experience in using GenAI to assist academic writing. Although the number of informants was limited, data saturation was reached when additional interviews no longer produced significant new information (Corbin & Strauss, 2015). Consistency of responses between informants regarding initial prompt input, evaluation of AI results, and the revision process are indicators of data maturity. Secondary data in the form of journal articles, books, and supporting documents are used to enrich the analysis and provide broader context.

Data collection was carried out through in-depth interviews that allowed researchers to explore in-depth responses through probing techniques (Robinson, 2023). Each interview was recorded and transcribed verbatim to ensure the accuracy of the analysis. Data triangulation was applied by comparing the interview results with literature related to GenAI and scientific writing, as well as supporting documents such as examples of prompts used by informants. This procedure is to validate the findings through cross-source confirmation.

Data analysis followed three stages of codification in grounded theory, namely (1) open coding, involving the identification of key concepts from interview transcripts; (2) axial coding, these concepts are connected into broader categories; and (3) selective coding, unifying these categories into a theoretical model that explains prompting behavior in scientific writing. The process ended with theoretical coding to integrate the findings with related theories (Charmaz, 2006).

RESULT AND DISCUSSION

This study aims to identify the prompting patterns of postgraduate students at State University of Malang in utilizing GenAI, especially ChatGPT, for writing scientific articles. In this study, the Classification Framework was used as a reference in compiling interview guidelines,

allowing for deeper exploration of students' prompting patterns. The results showed that postgraduate students at State University of Malang not only used ChatGPT for information retrieval, but also as a tool to optimize writing structure, increase answer relevance, and validate AI output. Students applied various prompting patterns as summarized in Figure 1.



Figure 1. Prompting Pattern of UM Postgraduate Students

Input Semantics

Input Semantics refers to how students structure initial command sentences so that AI systems provide more accurate output. In interviews, students stated that they often emphasized the importance of clarity and command structure to obtain optimal answers. This pattern reflects the concept of linguistic nuances (Sikha, 2023), where the right choice of words can improve AI's understanding of user requests. Students also applied various patterns to ensure that AI better understood the intent and context of their questions. Two patterns found in the interviews were the mention of roles in the prompt and the use of supporting documents.

"I usually explain my position first. You have to convey who you are. For example, I usually make a prompt like this, 'I am a researcher in the field of Indonesian who is currently researching related to this ... to facilitate my research ... "give what is requested. So there must be an introduction first. After that, what is the purpose. That's usually the model. After that, the results given will be structured." (Informant 1, February 14, 2025)

This approach is in accordance with the IDEA Framework (Park and Choo 2024), which recommends that AI users include elements of persona (user role), aim (research objective), and recipients (target audience) in the preparation of prompts. Students also use supporting documents to help AI understand the context of the research being conducted. Uploading an article or research report before asking for an answer allows AI to provide a more specific and relevant response.

> *"Usually using files, right... there are several files sent. At least it, this machine, already understands that what we are going to ask is related to the document we are using. I usually do that too, but rarely." (Informant 1, February 14, 2025)*

> *"Upload documents. To let them review the article that we have downloaded. Well, from that document, for example, we give the prompt to ChatGPT again, 'Try to make a grid to create a background according to the article,' like that, 'in the context of...,' what, what do we want. Later, the same example will be made and we just edit it." (Informant II, February 22, 2025).*

This pattern is in line with the concept of few-shot prompting (Huang, 2023), which allows AI to learn from examples before producing more accurate answers. However, technical limitations in the free version of AI make some students choose other alternatives, such as providing a manual summary of the document in the prompt. In addition to ensuring the clarity of the prompt structure, students also try to customize the AI output format to better suit their academic needs, as explained in the following Output Customization aspect.

Output Customization

Output Customization refers to how students customize information requests to AI so that the results obtained are more in line with their academic needs. Interview results show that students apply various patterns to customize ChatGPT output, such as limiting the scope of information, determining the format of the answer, and asking analytical questions.

"I do it like this... from the very beginning, I ask first, 'I want to do research related to Artificial Intelligence. I am a researcher of this...' right, ask first, 'I as a researcher related to this... I want to do research related to this... give me an interesting topic,' like that. Well, then the problem that I will solve. So it starts from the problem." (Informant I, February 14, 2025)

> *"I first determine the aspects that I want to discuss, then I upload relevant documents to help AI provide appropriate analysis. I usually say 'What is meant by this?' 'What is the summary?' like that. Just be specific, because we have to know what we want to write first." (Informant II, February 22, 2025)*

This approach allows students to better control the AI output, ensuring that the answers provided focus on aspects that are truly needed in their research. This pattern is in line with Restrictive Prompting in the IDEA Framework (Park & Choo, 2024), which emphasizes that explicit restrictions in prompts can increase the focus of the answers provided by AI.

Informant II added that he applied Higher Order Thinking Skills (HOTS)-based questions in prompting, such as: "How is this concept applied in different contexts?" "Why does this phenomenon occur?" This pattern is in line with Chain-of-Thought Prompting (Wan and Chen 2024), which helps AI produce more analytical and argument-based answers. Students also optimized the output format to better suit their academic needs.

> *"For background, the questions are HOTS. For literature review, sometimes the questions are a combination of HOTS and LOTS..." (Informant II, February 22, 2025)*

Students also asked AI to present answers in the form of tables, bullet points, or graphs to help present data.

> *"Oh, making graphs... graphs that are not images, graphs that are like charts, right? That too, yes." (Informant I, February 14, 2025)*

> *"Oh yes, you can, for example, 'make it in a table', like that. He follows, like Excel, he can also do it. SPSS can do it. Basically, all quantitative research data can be done. It depends on what we instruct. It depends on the needs, but I rarely do it. Like this, 'Make me statistical data,' 'Try to form SPSS,' well, we are told to download it here. So it really is according to our instruction needs. He can do anything if he just reads the data." (Informant II, March 4, 2025)*

Thus, students not only ask for answers from AI in general, but also adjust the format and information boundaries in their prompts. This is in accordance with the CLEAR Framework (Lo, 2023) which emphasizes the importance of explicit format in prompting to increase the effectiveness of AI output.

Error Identification

In using ChatGPT, students realized that AI did not always provide accurate answers. One of the main challenges faced was the inaccuracy in citations and references generated by AI, as well as answers that were too general or not argumentative enough. To overcome this, students implemented several strategies, including manual verification of sources, gradual repetition of prompts, and providing explicit feedback to AI. One of the main weaknesses of ChatGPT in academic research is the hallucination phenomenon, which is the tendency of AI to produce references that appear credible but actually have no academic basis.

> *"...that happens often. ChatGPT's weakness is in the matter of citations, and the citations are still wrong. So sometimes you have to check it again in Google Scholar or in some... in Scopus. For the citations in the bibliography, sometimes they don't match what is quoted." (Informant I, February 14, 2025)*

> *"In terms of accuracy, it is indeed lacking. So if it's like this, for example, ChatGPT, 'references about multimodal in text', well, he's working, but what he says might not be true and the source doesn't exist. For example, 'provide a source...' even though this is premium, it's like this. So you have to be careful when using AI." (Informant II, March 4, 2025)*

Students found that the citations provided by AI often did not match the bibliography or could not even be found in academic databases such as Google Scholar or Scopus. To overcome this, some students implemented a manual verification strategy, comparing the references provided by AI with sources available in credible academic databases.

> *"…if we get information during brainstorming, given a link to access it, don't accept it immediately. But we have to think critically. What do you mean by critical thinking? That is, we can recheck, evaluate, or trace the sources provided." (Informant II, February 22, 2025)*

This is in line with Babl & Babl's (2023) research, which shows that AI often produces academic references that appear valid but actually have no strong basis. Therefore, the application of double verification is an important step in ensuring the accuracy of information. Students also realize that the results obtained should not be used immediately without re-evaluation. To overcome answers that are not in-depth enough, students apply an iterative refinement strategy, namely making gradual revisions to the prompt so that AI can provide answers that are more in line with academic needs.

> *"I make it first, then I read it. 'Ohh, this is lacking this, this is lacking this, this needs 2 more quotes, this needs 3 additional sentences, this needs 9 sentences.' I ask, even for a regular paragraph, make a text I ask. Usually if the prompt is not clear, it is not detailed, it is just made carelessly, right, he usually makes points, right." (Informant I, February 14, 2025)*

Students realize that the more detailed the instructions given, the better the quality of the AI's answers. Therefore, some students gave explicit instructions regarding the length and structure of the text they wanted. This pattern supports the concept of iterative refinement (Mantell, 2024), which suggests that AI users can improve the quality of output by making more specific requests and making incremental adjustments. Some students also used the approach of providing direct feedback to the AI to improve the quality of the answers it gave.

> *"Sometimes I make a prompt like this, 'I'm not satisfied with your performance, please improve it. Please explain something that makes more sense.'" (Informant II, February 22, 2025)*

This approach shows that students are not only using AI passively, but also applying a pattern of improvement iteratively to get more accurate and relevant answers.

Prompt Improvement

In an effort to obtain more optimal AI output, students apply various strategies in modifying and improving prompts, so that the resulting answers are more in line with academic needs. These strategies include repeating prompts, editing variables in questions, and utilizing conversation history to maintain the context of the discussion. Students often edit or repeat prompts multiple times to obtain more accurate results. If AI provides an answer that is less than ideal, they will make minor revisions to the instructions given, then rerun the prompt with certain adjustments.

> *"This modification is sometimes, for example, we make something, but the command is almost the same, but there are, for example, different variables. If you want the prompt*

> *to have the same answer, next to it there is an edit image there, like near the middle, you can edit it. Well, just click on it, so the answer is definitely the same as the desired variable. " (Informant I, February 14, 2025)*

This pattern is in line with the concept of iterative refinement (Mantell, 2024), which states that users can improve the quality of AI output by making gradual revisions to the prompt. In addition to repeating prompts, students also utilize conversation history with AI to maintain context and ensure answers remain relevant.

> *"Yes, it is repeated. I create a folder first. So create a folder first, for example this, this is a folder. Well, this can put several folders here, so that what is discussed is already a lot." (Informant I, February 14, 2025)*

> *"Oh yes, I continue because I like to read from the beginning. I never open a new tab from ChatGPT, I usually continue. Yes, one article one chat from the beginning." (Informant II, February 22, 2025)*

Students realize that starting a new conversation can cause a loss of context, so they prefer to continue the same conversation session in one chat so that the AI maintains the topic being discussed. This shows that students use a systematic pattern by editing variables in prompts, repeating prompts, and experimenting until they get the right results.

Interaction & Context Control

Students use AI not only as a tool to help them get references, but also as a partner in composing, refining, and controlling the flow of their academic writing. Students rely on AI to refine the structure of their writing, evaluate the answers given, adjust the context so that the results obtained are more relevant to the needs of their research, and improve cohesion between paragraphs and technical revisions such as punctuation and the use of conjunctions.

> *"Often, often. So ChatGPT does help to perfect it too. Perfecting the writing, improving the structure, improving the content too, not to mention the punctuation, conjunctions, that will be fixed by ChatGPT. So if for example for a thesis, type it yourself, for example, if you type it yourself, it usually jumps around because one takes it here, one takes it here, one takes it here, then copy-pastes. Well, to fix that, ask ChatGPT for help to fix it. Each paragraph is coherent. Connect between paragraphs. " (Informant I, February 14, 2025)*

This approach shows that the use of AI in academic writing can improve the readability and quality of writing. However, students also realized that the results provided by AI must still be evaluated to ensure that they remain in accordance with academic standards.

"If all writing must use AI, we just have to know first, evaluate what is given first." (Informant II, February 22, 2025)

Students also realized that AI would provide more appropriate answers if given additional, more specific information in the prompt. Students also implemented strategies such as providing sample texts as references so that AI could produce answers that were in accordance with the desired academic pattern. The results of the study showed that students

adapted prompting patterns such as Iterative Refinement, Restrictive Prompting, and Fine-Tuning Prompting, to optimize the use of AI in various aspects of scientific writing. However, challenges such as reference accuracy and understanding of context are still obstacles that require additional strategies in prompting.

Grounded Theory Analysis

This study uses a Grounded Theory approach to identify the prompting patterns of Postgraduate students at the State University of Malang in utilizing Generative AI (GenAI) for writing scientific articles. This approach allows theories to develop inductively based on empirical data obtained from interviews. The analysis was carried out through three main stages, namely Open Coding, Axial Coding, and Selective Coding, until finally forming the SURE Framework as the main pattern found in this study.

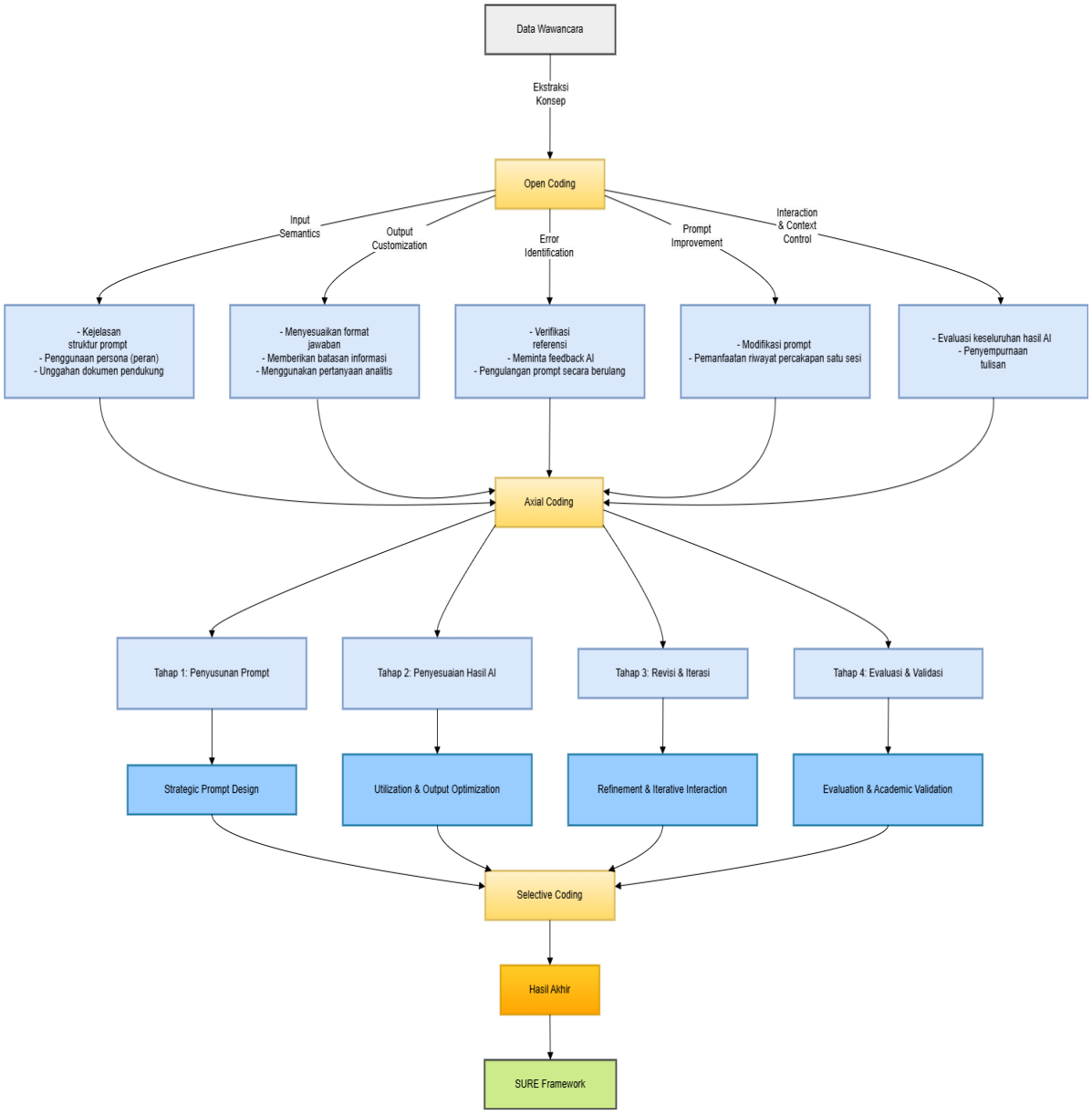


Figure 2. Coding Grounded Theory

Open Coding

The open coding stage aims to identify key concepts that emerge from the interview data. In this stage, the data is analyzed by grouping interview quotes into smaller categories, so that recurring themes can be found.

Table 1. Results of Open Coding Analysis

Aspects of the Classification Framework	**Keyword**
Input Semantics	Clarity of prompt structure, use of personas (roles), uploading supporting documents
Output Costumization	Adjusting the format
Error Identification	of answers, providing information boundaries, using analytical questions
Prompt Improvement	Reference verification, requesting AI feedback, repeating prompts repeatedly
Interaction & Context Control	Modifying prompts, utilizing conversation history of one session

Source: Author Analysis, 2025

These results show that students not only give commands to the AI directly, but they also actively adjust and refine the prompting to obtain answers that are more relevant to academic needs.

Axial Coding

The Axial Coding stage aims to find relationships between categories that have been identified in the previous stage. From the analysis conducted, it was found that students go through four main stages in using AI for academic writing:

a) Students compile prompts with a clear structure and according to needs → Strategic Prompt Design
b) Students adjust the AI results to the required format, such as a table or bulleted list → Utilization & Output Optimization
c) Students make adjustments and improvements to the AI answers through gradual prompt revisions → Refinement & Iterative Interaction
d) Students evaluate the AI results before using them in scientific articles → Evaluation & Academic Validation

Selective Coding

In the Selective Coding stage, the integration of relationships between categories that have been found in Axial Coding is carried out to form core concepts that are the main findings in this study. From the results of the analysis, it was found that student prompting patterns can be summarized in the SURE Framework, which consists of four main components:

a) Strategic Prompt Design → Students design effective prompts.
b) Utilization & Output Optimization → Students adjust the AI output to be more academic.
c) Refinement & Iterative Interaction → Students correct and refine AI answers gradually.

d) Evaluation & Academic Validation → Students verify the accuracy of references and academic validity of AI answers.

This pattern suggests that students are not simply using AI to obtain information, but are actively developing more effective prompting strategies, optimizing output, and evaluating results before using them in academic contexts. This finding confirms that the use of AI in academic research is cyclical and iterative, with students continually adjusting prompts, correcting results, and ensuring the validity of answers before using them in academic writing.

CONCLUSION

This study examines the prompting behavior of postgraduate students at Universitas Negeri Malang in using Generative AI (GenAI), especially ChatGPT, for writing scientific articles. The results of the study show that postgraduate students apply a systematic and iterative pattern in interacting with GenAI. First, students compose prompts with a clear structure and specific context, including information about the role of the researcher, academic goals, and target audience. Second, students adjust the AI output format to suit academic needs, such as requesting results in the form of tables or bullet points. Third, students verify references and correct errors to ensure the accuracy of the information generated by AI, including checking sources through Google Scholar or Scopus. Fourth, students refine prompts iteratively by making gradual revisions based on previous AI responses. Fifth, students control interactions and contexts to maintain the relevance of AI answers to research topics. These findings are summarized in the SURE Framework (Strategic Prompt Design, Utilization & Output Optimization, Refinement & Iterative Interaction, Evaluation & Academic Validation), which emphasizes prompting patterns in the use of GenAI. This framework illustrates how students do not just use AI passively, but actively develop strategies to optimize results and ensure academic validity.

This prompting pattern emerged as a response to the various challenges faced by students in using AI, especially in reference accuracy, answer relevance, and feature limitations in the free version of AI. The results of this study indicate that although AI can be a very effective tool in the academic process, its use still requires digital skills, an understanding of research methodology, and a systematic prompting strategy so that the results are academically reliable.

SUGGESTION

Based on the results of this study, there are several suggestions that can be put forward. First, for students, it is recommended that they not only use AI practically, but also understand effective prompting strategies, especially in compiling instructions that are specific, logical, and academically relevant. In addition, students need to manually verify the results produced by AI, especially in terms of references and citations, in order to ensure the validity and credibility of the sources used in scientific writing. Students also need to have adequate information literacy and basic understanding of the topics discussed, in order to be able to critically assess the relevance and quality of the answers given by AI. Second, for higher education institutions, it is important to provide training or workshops related to prompt engineering techniques as part of strengthening students' digital competence. Furthermore, academic institutions also need to formulate ethical guidelines and policies for the use of AI in research and scientific writing, to ensure that this technology is used responsibly and in accordance with the principles of academic integrity. Third, for further research, it is recommended that the scope of the study be

expanded by involving students from various institutions and disciplines, so that the findings obtained become more representative. Exploration of various other Generative AI platforms can also be carried out to understand the differences in effectiveness and suitability of each platform in supporting scientific writing.

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