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# What Do University Students Say About ChatGPT? A Topic Modeling of Perception on GenAI in Academic Writing

**Lingxi JIN, Kyuwon KIM, Hyo-Jeong SO* & Ga Young LEE**
*Department of Educational Technology, Ewha Womans University, Republic of Korea*
*hyojeongso@ewha.ac.kr

**Abstract:** This study explores the student perceptions of Generative AI (GenAI) tools, such as ChatGPT, on academic writing across different educational levels in higher education. Using topic modeling, this study analyzed open-ended responses from 189 university students in Korea to identify the dominant themes related to these tools. The findings reveal that students across all education levels generally recognize the potential of ChatGPT to enhance writing efficiency, idea generation, and organizational structure in their academic work. However, concerns vary by educational level, with graduate students expressing a more cautious and critical attitude towards the use of GenAI tools. These insights provide a deeper understanding of the impact of GenAI on academic writing from a student perspective and offer valuable considerations for instructional support in higher education.

**Keywords:** Academic Writing, Generative AI, Student Perceptions, Topic Modeling

## 1. Introduction

The rapid development of Generative AI (GenAI) technologies, such as ChatGPT, has introduced a transformative dimension to academic writing in higher education (Kumar, 2023). GenAI systems have demonstrated the potential to increase the efficiency of writing tasks (Su et al., 2023), facilitate idea generation (Zhao, 2022), and assist with text organization, feedback provision, and problem identification (Lund et al., 2023). As GenAI systems are increasingly integrated into educational contexts, they offer solutions to some of the challenges associated with academic writing, particularly for students who face language barriers or struggle with organizing their ideas for writing (Kim et al., 2024).

The integration of GenAI tools into academic writing, while offering significant benefits, also presents notable challenges. Concerns about academic integrity, such as the risk of plagiarism (Tai et al., 2023), the potential erosion of creativity, and the danger of over-reliance on AI-generated content, are central to current discourse (Albayati, 2024; Yan, 2023). These concerns vary depending on the educational stage of the students, as they hold differing views on the use of AI in writing (Kim et al., 2024). For instance, undergraduates often view GenAI as a helpful tool with minimal threat to academic integrity (Shoufan, 2023), whereas graduate students critically engage with AI-generated content, rejecting inaccuracies to maintain high standards (Koltovskaia, 2024).

Despite the increasing use of GenAI tools in educational settings, previous studies of student perceptions have focused narrowly on specific learner groups (Kim et al., 2024; Lund et al., 2023), leaving broader perspectives unexplored. To address this gap, this exploratory study analyzes open-ended responses from undergraduate and graduate students regarding GenAI-assisted academic writing. Using a topic modeling approach to efficiently extract topics from the collection of documents, the research aims to uncover the key benefits students associate with GenAI tools and the challenges they face in integrating these tools into their writing processes. The findings will deepen our understanding of the role of GenAI in higher education and provide valuable guidance for the development of AI tools that effectively support academic writing while maintaining academic integrity.

## 2. Methodology

### *2.1 Data Collection*

We administered a web-based survey from May to June of 2024, aiming to gather a broad understanding of students' views on the use of Gen AI in academic writing across different educational levels. Data includes responses from 189 students (female: 159; male: 30). Regarding education level, the largest group consisted of 84 undergraduate students, followed by 72 master's students and 43 doctoral students. We conducted an in-depth analysis of responses to the open-ended question: “What do you think about the use of ChatGPT in the academic writing process?” This question was designed to elicit personal opinions and provide insight into students' attitudes toward generative AI in their academic work.

### *2.2 LDA-based Topic Modeling*

Latent Dirichlet Allocation (LDA) is a widely used machine learning algorithm that automatically detects the semantic structure of topics from textual data sources (Ekin et al., 2023; So et al, 2024). In this study, LDA-based topic modeling was performed using Python to identify the topics embedded in the textual data. First, tokenization was performed using KoNLPy, and then LDA topic modeling was performed based on the TF-IDF matrix. In the topic modeling process, coherence scores and perplexity scores were used to evaluate the optimal number of topics that were generated. Our analysis indicated that four topics provided the best balance between coherence (0.45) and perplexity score (-6.38), suggesting that this model produces the most cohesive and well-defined topics.

## 3. Results

Table 1 provides four topics and associate terms regarding student perceptions of ChatGPT's role in academic writing, segmented by educational level. The high-TF-IDF terms offer insights into the specific concerns and focal areas for each student group. To further clarify these findings, we used a Venn diagram (see Figure 1) to visually represent the topics commonly considered by both groups, as well as those distinct to each group.

The Venn diagram shows that common topics between the two groups include fundamental aspects such as "provision," "information," "thought," "sentence," and "content." Moreover, two key themes emerge from this analysis. First, the positive impact of AI on enhancing writing efficiency and providing academic support is evident across both groups. Second, the groups showed distinct topics related to negative concerns such as ethical implications and academic rigor. Undergraduate students particularly focused on issues such as "plagiarism," "copyright," and "summary," reflecting their concerns about basic writing skills and ethical considerations. In contrast, graduate students prioritize topics like "thesis organization," "translation," and "time management," demonstrating a more strategic and critical approach to using AI tools for advanced academic tasks. This visualization effectively highlights the differing perspectives and usage patterns of ChatGPT among students at various educational levels.

Table 1. *Topic labels and high-TF-IDF score terms*

| Educational Level | Topic | High-TF-IDF Score Terms |
|---|---|---|
| Undergraduate Students | Topic 1 | Plagiarism, Material, Provision, Information, Thought, Concern |
| | Topic 2 | Information, Writing, Summary, Idea, Ability, Thought |
| | Topic 3 | Content, Writing, Properly, Flow, Copyright, Sentence |
| | Topic 4 | Thought, Writing, Academic, Opinion, English, Utilization |
| Graduate Students | Topic 1 | Concern, Thesis, Organization, Writing, Provision, Ability |
| | Topic 2 | Information, Thought, Writing, Problem, Content |
| | Topic 3 | Thought, Sentence, Information, Translation, Assistance, Utilization |
| | Topic 4 | Time, Thought, Information, Search, Response, Reduction |

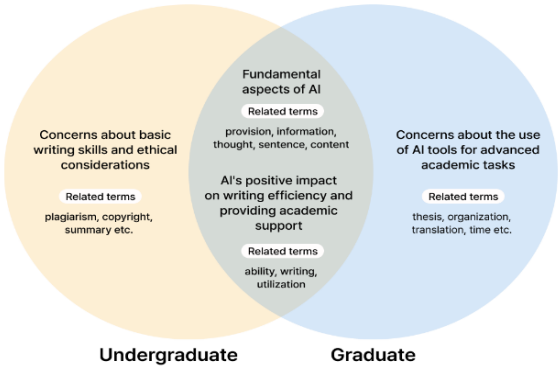


*Figure 1*. The Venn Diagram Shows that Common Terms

## 4. Conclusion, Limitations and Future Work

In conclusion, students broadly acknowledge the advantages of generative AI in enhancing writing efficiency and providing academic support. Nevertheless, their concerns vary by educational level: undergraduate students emphasize ethical issues, such as plagiarism and copyright infringement, while graduate students focus on AI's application in advanced academic tasks and its potential effect on academic rigor. The limited sample size of this study restricts the generalizability of the findings. Future research should incorporate a larger and more diverse sample to gain a deeper understanding of these perceptions and examine how they evolve across different academic disciplines and cultural contexts.

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