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# Who Does the Thinking? Undergraduate Students' Decision-Making and the Potential Displacement of Cognitive Processes in Writing by GenAI

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**Abstract**

Since the release of OpenAI's ChatGPT in November 2022, Generative AI (GenAI) has been rapidly integrated into applications capable of producing texts, images, and sounds that simulate human output. While students generally view this technology positively, writing scholars voice increasing concerns, particularly regarding its impact on critical thinking and learning. Current discussions often focus on the perceived benefits of GenAI (e.g., improved writing efficiency and ease of task completion), highlighting an urgent need for research that examines students' actual decision-making and practice to better assess the pedagogical implications.

To address this need, we conducted a mixed-methods study investigating undergraduate students' use and perceptions of GenAI tools in academic writing. We analyzed interview data (N=213) collected through purposive sampling, targeting undergraduate students with active writing assignments across 14 universities in Canada, Europe, and the United States. Frequency analysis provided an overview of the tools' integration across writing stages, while thematic analysis detailed students' rationales for using or refraining from GenAI. The findings indicated that the dominant efficiency-driven approach to GenAI use might pose a significant potential risk of displacing writing processes and reducing cognitive engagement in the writing classroom. This study contributes a deeper, more nuanced understanding of students' decision-making around GenAI and its potential impact on writing development and higher education learning outcomes.

**Keywords**: undergraduate students, writing process, GenAI, artificial intelligence

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## Introduction

Since the release of OpenAI's ChatGPT in November of 2022, we have witnessed a rapid growth of the capabilities of generative AI (GenAI) and its integration into various applications that allow computers to process and generate texts, images, videos, and sounds as well as to simulate products from humans (Sengar et al., 2025). The heightened interests from the public have been quickly captured by a dramatic increase in the number of popular press articles (e.g., Lieberman, 2024; Plain, 2023; Shimek, 2023), editorials (e.g., Delios et al., 2025; Tlili et al., 2025), academic journal articles (e.g., Barrett & Pack, 2023; Chan & Hu, 2023; Moorhouse et al., 2025), and more recently systematic literature reviews (e.g., Crompton & Burke, 2023; Wang & Dang, 2024; Yin & Chapelle, 2025).

The emergence of GenAI tools has also generated significant impact on education, and particularly the teaching and learning of writing. Their role in the writing classroom has gradually become a point of contention. While many published studies have shown that most students had positive reactions to the use of these tools in writing (e.g., Chan & Hu, 2023; Jin et al., 2024; Wang et al., 2024), an increasing number of scholars have expressed concerns over the performance issues of GenAI tools and the potential risks they may present to student learning (e.g., Anson, 2024; Kumar, 2023; Lubowitz, 2023; Warschauer et al., 2023). Thus, many scholars and educators have been working on updating assignment types and creating guardrails to prevent irresponsible use of GenAI tools and the erosion of learning opportunities (e.g., Foung et al., 2024; Fyfe, 2023).

Another key issue is how students actually use GenAI tools in the writing process and their perceptions of how these tools facilitate or disrupt critical thinking, learning, and growth. Existing research on students' engagement with GenAI has predominantly drawn on questionnaire data or brief follow-up interviews (e.g., Chan & Hu, 2023). As a result, they provide limited insight into the nuanced yet important ways these tools may reshape the dynamics of writing and learning and the complex considerations students navigate when deciding how to use them during the writing process. Therefore, we analyzed interview data from 213 undergraduate students across multiple universities in North America and Europe to examine their use of GenAI tools in writing and their perceptions of the impact of these tools on their writing development and learning experiences.

## Literature Review

### Previous Research on GenAI in the Writing Classroom

Although there are no unambiguous technical definitions of GenAI (Ronge & Maier, 2025), it is often used in public discourse to refer to a technology that can produce new multimodal content that seems to be meaningful (e.g., Feuerriegel et al., 2024). In this study, we focus on GenAI tools that are powered by large language models to produce texts upon receiving prompts from users. The role of GenAI in the classroom and its potential impact on teaching and learning have been widely discussed (e.g., Crompton & Burke, 2023; Wang & Dang, 2024), with many researchers and educators indicating the need for more empirical studies on students' use and perceptions of GenAI to shed light on the potential use and misuse of these tools and to contribute to the development of classroom guidelines and educational policies (e.g., Chan &

Hu, 2023). Despite the growing body of research on students' use and perceptions of GenAI, important questions about its impact on writing and learning remain unanswered.

Most empirical studies used surveys or brief interviews to gauge students' use and perceptions of GenAI (e.g., Barrett & Pack, 2023; Chan & Hu, 2023; Hostetter et al., 2025; Jin et al., 2024; Johri et al., 2024; Sumakul et al., 2022), and they found that GenAI tools were frequently used in the writing process but their perspectives on using these tools in writing were largely mixed. More specifically, research suggested that students were more likely to view GenAI as a multi-functional writing tutor or assistant that could offer valuable help in generating ideas, organizing, and improving overall writing efficiency; meanwhile, there were concerns over academic integrity, overreliance in learning, and disruptions to potential skill development. However, surprisingly, the impact of GenAI on learning did not seem to be among the top concerns. For example, in Dang and Wang's (2024) analysis of publicly available policy statements on the teaching of writing and GenAI usage from 100 U.S. universities, the researchers identified eight main areas of concern, with the top three being academic integrity, inaccuracies and fabrication, and bias and stereotypes, while critical thinking and learning development was only ranked as number six (pp. 3–4). Another frequently discussed concern involves GenAI's performance issues, including producing inaccurate references, lacking personal perspectives, and inappropriate and/or biased AI-generated content due to limitations in training data (Kumar, 2023; Harrer, 2023; Lubowitz, 2023). Given the significant role of writing in shaping students' learning and development of critical thinking (Garver, 1985; Quitadamo & Kurtz, 2007; Yeh et al., 2023) and the potential impact of GenAI on students' writing behavior, we argue that the impact of GenAI on writing and learning deserves more focused investigations.

Meanwhile, studies with a comparative perspective (e.g., Barrett & Pack, 2023) or richer qualitative data (e.g., Wang, 2025) provide more insights into students' use of GenAI in writing and their decision-making process. For example, Wang adopted a phenomenological research design to examine six students' writing practices with ChatGPT, drawing on their writing samples, screenshots of interactions with the tool, written reflections, and semi-structured interviews. The researcher found that the students were confronted with two dilemmas: balancing the use of GenAI to strengthen their writing while maintaining an authentic voice, and weighing the benefits of learning to use GenAI against the potential risks of learning loss resulting from its use. Barrett and Pack's (2023) comparison of students' and teachers' perspectives on the appropriate use of GenAI in the writing process showed that students' and teachers' views might be affected by specific uses of GenAI in different stages of the writing process.

Thus, while studies based on surveys and short interviews reveal broad trends in students' use and perceptions of GenAI in writing, they do not provide enough empirical evidence to explore the complex and often contested issues underlying GenAI-assisted writing practices. Qualitative research grounded in rich and contextual data is needed to bridge this gap and bring greater clarity to the continuing uncertainties surrounding GenAI's impact on writing and learning.

One issue that seems to have received overwhelmingly favorable support is students' use of GenAI to brainstorm ideas for writing (Chan & Hu, 2023; Hostetter et al., 2025). Chan and Hu (2023), for example, surveyed 399 undergraduate and graduate students and found that most

participants viewed GenAI as a valuable and helpful tool for generating ideas during the writing process because students sometimes "find it difficult to generate ideas or find inspiration" (p. 9). In another survey study, Hostetter and colleagues (2025) created nine scenarios describing how students used GenAI in writing (i.e., to write a paper, to look up a concept in Google and copy and paste it, to use AI for writing a section of a paper, to use AI but cite it, to use AI to expand a paper, to use AI to make an outline for a paper, to use Grammarly, to use citation helper, and to use spell check) and invited students and faculty to indicate the extent to which these activities might compromise learning. The researchers found that the students perceived using GenAI to generate ideas to be "less problematic for learning" in comparison to using it to produce texts (p. 9).

However, there is growing recognition of the need for more nuanced perspectives. For example, Barrett and Pack (2023) asked students and faculty to evaluate the appropriateness of using GenAI across different stages of the writing process (e.g., brainstorming, outlining, drafting, revising, feedback, and evaluating). Their study further distinguished these ratings by context, considering factors such as the user's ability to complete the task, the degree of reliance on GenAI, and whether its use was disclosed. The results showed that both students and faculty generally viewed the use of GenAI for brainstorming as acceptable if users were already capable of completing the task or when AI-generated text was used only as a model. In other words, the impact of GenAI on learning largely depends on the user's competence in completing the task and the specific ways in which GenAI tools are used.

### Theoretical Perspectives on GenAI and Writing

The potential risks of GenAI for learning have been noted in some empirical studies and technology review articles (e.g., AlAfnan et al., 2023; Barrot, 2023; Gillissen et al., 2022), and several researchers have further examined such risks based on theories and conceptual frameworks of learning. Warschauer and colleagues (2023), for example, analyzed and discussed the potential risks of GenAI on learning in the context of second language (L2) writing. Specifically, the researchers highlighted the contradiction between students' need to develop foundational literacy skills necessary for effective use of GenAI tools and the temptation for students to become overly reliant on them and thus lose opportunities to learn and acquire those skills, as shown in the following quote.

> Unfortunately, the foundational writing skills required to use AI effectively and the actual use of AI-assisted writing can be in contradiction to each other. Premature exposure to AI writing tools can inadvertently teach students to extensively and exclusively rely on these tools, robbing students of opportunities to develop the foundational writing skills that they will need to best use them in the future. For second language writers, for example, early introduction to AI writing tools like ChatGPT can present students with an all-too-tempting opportunity for easy assignment completion, rather than effortful learning. But failure to also learn how to effectively leverage AI tools in their writing could leave them ill-prepared for a future that requires the sophisticated use of AI tools (p. 3).

Anson (2024) provided a more thorough analysis of the impact of GenAI on students' literacy development using Lea and Street's (1998, 2006) academic literacies framework, which aims to

understand how university students engage with disciplinary language. The framework conceptualizes the acquisition of academic literacy in three layers: the first layer emphasizes the learning of basic skills such as spelling and grammar in academic writing, the second layer emphasizes academic socialization or the learning of the general practices in academic reading and writing, and the third layer emphasizes the learning of the different practices between different disciplines. Anson (2024) argues that the literacy development described by the academic socialization approach is the most likely to be disrupted by GenAI. With this view, literacy development refers to the acquisition of an understanding of the general practices in academic reading and writing, and to develop this understanding, students' cognitive effort of reading and writing is a prerequisite. Therefore, if reading and writing tasks are delegated to GenAI because students are not motivated to or do not have enough time to critically engage with these tasks, they will lose the opportunity to learn and grow (pp. 1471–1472). However, instead of arguing to avoid using GenAI tools, Anson (2024) focuses more on ways to guide students to use these tools to benefit their learning. Specifically, the researcher believes that in thinking about the impact of GenAI on learning, we need to consider if and how it affects "students' critical and nuanced engagement with texts" (p. 1469) and argues that students should be provided with time and space to develop their reading and writing skills without GenAI tools before they begin to learn to use those tools as part of their literacy practices (pp. 1473–1474), echoing the concern over students' premature exposure to GenAI tools expressed by Warschauer et al. (2023).

Therefore, to further explore these nuanced perspectives and understand the potential contradictions regarding students' use and perceptions of GenAI tools (i.e., the need to teach students to understand and use GenAI tools, the need to help them develop critical thinking and autonomy, the temptation for efficiency and effortlessness in completing assignments, and the need to experience and overcome challenges in order to learn), we carried out a mixed-method study to examine undergraduate students' use and perceptions of GenAI tools in the writing process. Specifically, the study was guided by the following two research questions.

1. How frequently did the students use GenAI to complete academic writing tasks?
2. How did the students use and perceive GenAI in writing?

## Methodology

A mixed methodological approach was adopted to understand undergraduate students' use and perceptions of GenAI tools in academic writing (Creswell & Plano Clark, 2007). Specifically, interview data from a larger project titled Partnership on University Plagiarism Prevention (PUPP, n.d.) were coded to provide an overall picture of the extent to which GenAI tools were integrated into students' academic writing. Qualitative analysis of the interview data was used to deepen our understanding of how and why students used GenAI in academic writing, to identify subtle yet critical issues, and to account for relevant contextual factors and their impact.

### Participants

To address the two research questions, we analyzed the interview data collected from 213 undergraduate students in 14 universities in Canada, Europe, and the United States. Among the

participants, about 54.5% were females, 41.3% were males, and 4.2% preferred not to disclose or identified as non-binary. Their average age was 24 years old (ranging from 18 to 62 years of age), and they were in the second year of their study program on average. They also studied a multitude of disciplines, among which social sciences and humanities (38.5%) represented the largest share, followed by sciences (28.6%), business & administration (18.3%), and education (11.7%). The disciplinary affiliation of about 2.8% of participants could not be clearly determined from the data.

### Instrument

The interview guide was divided into five sections: (a) sociodemographic data; (b) informational skills; (c) writing skills; (d) referencing skills; and (e) general knowledge about plagiarism. This guide included 35 key questions for students, in addition to suggestions for follow-up questions. There were four key questions about GenAI tools at the end of the interview guide (See Appendix); however, many interviews contained unprompted discussions on GenAI tools as the participants discussed different stages of their writing process.

### Data Collection

The interviews were not conducted by researchers in their own universities. Instead, after ethics approval was obtained in the lead institution and all the partner institutions, undergraduate students from different disciplines and levels of education were recruited following a purposive sampling approach. Nine researchers from the PUPP project visited other members' institutions to conduct the interviews. This approach minimized the potential risks as a result of the researchers' undue influence. Moreover, participants were compensated with $25 CAD in cash or a gift card equivalent to this amount to facilitate recruitment. The incentive value was considered reasonable for the circumstances, without it influencing the consent of the participants. The interviews were conducted between November 23, 2023 and May 3, 2024, and the majority of them were conducted in person, but to facilitate the involvement of some participants, a small number of participants were interviewed online using the Zoom videoconferencing platform. Seven participants were interviewed individually, and the rest of the participants were interviewed in groups of two to six, with a total of 48 focus group interviews. Focus-group participants may have varying levels of prior familiarity with one another, and the duration of these interviews was 42 minutes and 37 seconds on average. All interviews included in this study were conducted in English. They were recorded and the audio files were transcribed by professional services and analyzed using NVivo.

### Data Analysis

We adopted a mixed-methods analytical approach to examine students' use of GenAI in academic writing. The interview data were analyzed in two sequential but complementary phases. First, we conducted a quantitative content analysis to summarize participants' reported frequency of GenAI use. We then conducted an inductive thematic analysis to examine when and how students used GenAI tools during academic writing and how they perceived the impact of these uses on their writing, learning, and critical thinking. Integration occurred during interpretation, with the thematic analysis providing contextual explanations for the trends identified in the frequency analysis.

In both phases, we followed a shared collaborative process and analytical procedures. We independently read and reread the full set of interview transcripts to become familiar with the data and to identify recurring references to GenAI use in academic writing. During this familiarization stage, we wrote analytic memos, discussed emerging patterns, and noted passages that appeared to be particularly relevant to students' descriptions of when, how, and why they used GenAI tools. Following data familiarization, we inductively generated initial codes in an exploratory review of a small sample of the interview data. We then selected a subset of the data consisting of nine focus-group interviews and one individual interview drawn from three universities (about 10% of the dataset) to pilot and refine codes through independent coding followed by collaborative discussions. All disagreements were resolved through discussion until consensus was reached. Most disagreements involved participants who provided inconsistent accounts of their GenAI use or whose explicit statements conflicted with descriptions of their writing practices. In these cases, we jointly reviewed the transcripts and assigned the coding that best represented the participants' overall pattern of use. After the coding schemes were finalized, the first author applied it to the rest of the dataset, with the results reviewed and verified by both authors.

To answer the first research question of how frequently students used GenAI in completing their academic writing tasks, we summarized the interview data by coding the frequency of use in the students' reports. Each participant served as the unit of analysis and was assigned a single frequency category based on their reported use or description of GenAI use for academic writing. We decided to use the individual-level analysis because the students were reporting their individual uses of GenAI tools, and there were typically noticeable variations between group members. An initial list of five codes was generated in the exploratory phase that included the frequency categories of never, rarely, occasionally, regularly, and always. As coding progressed, we added an additional category (not clear) for participants who did not provide sufficient evidence to determine their frequency of use. Table 1 below provides a summary of the frequency codes and their definitions and a sample quote for each.

The frequency coding was based on the entire interview transcript rather than isolated responses. We relied on participants' reports of how frequently they used GenAI. When participants did not directly report their frequency of use or when their self-reported frequency appeared to be inconsistent with their descriptions of how they actually used the tools, we assigned the category based on the evidence that most accurately reflected the reported practices and the overall evidence across the interview.

To answer the second question of how students used and perceived GenAI in writing, we conducted an inductive thematic analysis (Braun & Clarke, 2006, 2021) to identify and summarize the specific uses of GenAI tools and the students' perspectives. For focus-group interviews, the primary unit of analysis was the group, although we remained attentive to individual perspectives that diverged meaningfully from the group's emerging consensus. For individual interviews, the participant served as the primary unit of analysis. An initial list of codes and subcodes were generated regarding students' different uses of GenAI tools in the writing process. During the pilot coding stage, we iteratively refined the codes by comparing and reviewing codes and their definitions, merging overlapping categories and differentiating

**Table 1**

*Frequencies of GenAI Use*

| Frequency | Definition | Sample quote |
|---|---|---|
| Never | Participant reports never having used GenAI for writing | I've heard of ChatGPT, but I've never used it (FG021, P3). |
| Rarely | Tried once or twice; use is infrequent or experimental only | Going back to the AI thing, it is also really weird because it is a new tool. I personally do not really use it. But profs have different expectations of that tool…I had a class last semester that he encouraged the use of it and loved it (FG034, P3). |
| Occasionally | Uses it in some writing tasks but not a regular practice | *Sometimes*. If it sounds better, I will go with it. Or if I have a word count and it gives me some more words, I'll probably go with it (FG088, P1). |
| Regularly | Uses it for most writing tasks, but with specific purposes | I appreciate it, I love that. I love using... it helps me start ideas…I *usually* go for that, and then I will use some of the topics that they've talked about, and I will go and use those, and I will find research papers and start reading (FG088, P2). |
| Always | Uses it in nearly every writing task; integrated into their workflow | Actually, my system has changed…because of the GPT, ChatGPT, you know…Actually, in the past…I was alone. There's no one for me to ask,…But these days, I use ChatGPT for checking my answers, after the subject *always* (FG005, P3). |

conceptually distinctive uses, resulting in ten descriptive categories representing students' use of GenAI (described in the Results and Discussion section and summarized in Table 3). In this phase, the coding focused on meaning units describing students' use of GenAI during academic writing, particularly their decision-making processes and reflections on how these practices influenced their learning and writing development.

We then grouped related codes into broader categories representing students' different perspectives on how GenAI use might affect their writing and learning and examined recurring

patterns. Through constant comparison within and across transcripts, these categories were further refined into themes that captured common areas of concern and uncertainty regarding the impact of GenAI on learning. The themes were iteratively reviewed and discussed to ensure that they accurately represented participants' accounts and were supported by adequate evidence. Representative quotations were selected both to illustrate the theme and to capture meaningful variation across participants' experiences.

## Results and Discussion

### Frequency of GenAI Use in Academic Writing

Table 2 shows that among all the students interviewed (*N*=213), slightly over 60% reported using GenAI to varying degrees in completing academic writing tasks. Although only 1.9% of the students indicated that they integrated GenAI in their writing process and were always using these tools, 32.9% of them reported regular use of these tools, and 27.7% indicated occasional use. There were also a small number of cases (about 6.5%) where information was not enough to assess the frequency of use of these tools.

This finding confirms the observation that GenAI has been increasingly integrated into students' writing processes. In classroom experiments carried between fall 2022 and spring 2023, Cummings and colleagues (2024) found that most students decided not to use GenAI because they preferred to develop their own voices through writing and that AI-output at that stage was unreliable and thus was too time-consuming to review AI suggestions.

Although other earlier studies reported higher adoption rates (e.g., Alharbi, 2023; Črček & Patekar, 2023), there is evidence that the frequency of GenAI use in writing has increased dramatically. In their study of the evolving usage of GenAI among computing students, Hou and colleagues (2025) used a repeated cross-sectional survey and found that the percentage of students reporting never using ChatGPT for learning assistance dropped sharply from 34.1% in 2023 to 6.3% in 2024, indicating that ChatGPT has become a commonly used help resource among the students. In our analysis of L2 students' use of GenAI in writing, we observed a similar pattern with the percentage of students reporting some or frequent use of GenAI in

**Table 2**

*Students' Frequency of GenAI Use in Writing*

| | Frequency (*N*) | Percentage (%) | Cumulative percentage (%) |
|---|---|---|---|
| Never | 33 | 15.5 | 15.5 |
| Rarely | 33 | 15.5 | 31.0 |
| Occasionally | 59 | 27.7 | 58.7 |
| Regularly | 70 | 32.9 | 91.6 |
| Always | 4 | 1.9 | 93.5 |
| Not clear | 14 | 6.5 | 100.0 |
| Total | 213 | 100.0 | |

writing increased dramatically from about 30% between 2022 and 2023 to over 80% between 2023 and 2024 (Li & O'Reilly, 2025). Stranges and MacNutt (2025) reported a more positive outlook, with only 33% of the students reporting using GenAI in writing. However, this study focused specifically on reflective writing assignments and relied on students' reports. Johnston and colleagues (2025) analyzed 30 students' writing process using screen-recorded data and found that about 70% of the students used GenAI tools for different purposes during the writing process.

### Students' Use and Perceptions of GenAI in Writing

The fairly high adoption rate of GenAI in writing by students, as evidenced by our finding for the previous research question, is not inherently problematic. Rather, recent research highlights that the key concern lies in the extent to which students engage in meaningful cognitive processes when using GenAI to support and improve their writing (Anson, 2024; Yang et al., 2025). Based on Hall's (1973) classification of the ways in which audiences may interpret media messages (i.e., dominant, negotiated, and oppositional), Anson (2024) analyzes students' potential use of GenAI in reading and writing. The author theorizes that if students engage in a dominant reading, or accepting and using AI-generated output without critical evaluation of its validity and/or accuracy, they risk losing the opportunity to learn and grow; but if they use GenAI as a tool to strengthen their critical and nuanced engagement with texts, they can benefit from new learning opportunities brought by GenAI (pp. 1469–1470). Empirical studies add additional weight to theoretical perspectives emphasizing the importance of students' engagement with GenAI. Yang and colleagues (2025), for example, investigated students' patterns of engagement with GenAI during writing and the connections between the engagement patterns and writing quality through an analysis of 1,445 GenAI-assisted writing sessions in the CoAuthor (n.d.) dataset. The researchers found the writers who frequently modified AI-generated output consistently improved the quality of their writing in terms of lexical sophistication, syntactic complexity, and text cohesion; whereas those who frequently accepted AI-generated output without changes were often linked to a decrease in writing quality. Therefore, to further explore students' use and perceptions of the different uses of GenAI in the writing process, we identified ten descriptive categories representing the primary ways in which students reported using GenAI in academic writing (Table 3).

#### *To Brainstorm Ideas for Writing*

The most salient category regarding the students' use of GenAI tools in academic writing is their reliance on these tools to generate ideas at different stages of the writing process. Students in the majority of the interviews (56.4%) indicated that they used GenAI to get ideas for writing or for brainstorming purposes. It was also one of the most frequently mentioned uses of GenAI (22.6%) among all the instances of discussions on GenAI use in writing.

This finding is consistent with prior studies showing that students frequently use GenAI to brainstorm ideas in both first language (L1) and L2 contexts (e.g., Barrett & Pack, 2023; Cummings et al., 2024; Wang & Dang, 2024; Wang, 2025). However, whether or not GenAI tools play a beneficial role in the process of brainstorming is debatable. Wang (2025) observed

**Table 3**

*Students' Use of GenAI in Writing: Purposes*

| Purpose | Explanation | Number of interviews | Percentage of interviews | Number of instances | Percentage of instances |
|---|---|---|---|---|---|
| To brainstorm | To get ideas for writing at different stages of the process | 31 | 56.4 | 54 | 22.6 |
| To edit | To generate edits for spelling, punctuation, mechanics, or formatting | 25 | 45.5 | 42 | 17.6 |
| To understand | To interrogate and understand sources, writing instructions, and subjects or topics | 25 | 45.5 | 38 | 15.9 |
| To search | To help locate sources | 19 | 34.5 | 30 | 12.6 |
| To revise | To get suggestions on how to revise the paper | 17 | 30.9 | 23 | 9.6 |
| To identify word choices | To identify the most effective words for communication | 11 | 20.0 | 14 | 5.9 |
| To paraphrase | To generate paraphrases | 10 | 18.2 | 13 | 5.4 |
| To get examples | To generate examples to learn about a new genre or to critique | 9 | 16.4 | 11 | 4.6 |
| To summarize | To summarize sources while screening | 7 | 12.7 | 9 | 3.8 |
| To generate papers or other written assignments | To rely entirely on GenAI to complete a writing assignment | 3 | 5.5 | 5 | 2.1 |
| Total | | 55 | 100.0 | 239 | 100.0 |

that while students often relied on GenAI for idea generation, they also recognized a dilemma between the potential loss of learning opportunities and the new learning opportunities that GenAI brings. Our analysis of students' accounts of how they used GenAI to brainstorm ideas revealed a strong tendency to treat these tools as an easy fix to bypass fundamental challenges in learning academic writing. This pattern suggests that the potential risks of diminished cognitive engagement and missed learning opportunities may outweigh the benefits. This pattern is illustrated in the following excerpt, where a student described how they used GenAI to generate ideas.

> P2: I appreciate it, I love that. I love using... it helps me start ideas. If I really have no idea where I want to go with it, it really helps me to like... if I want to write a research paper on the effects of technology on children, or whatever. I usually go for that, and then I will use some of the topics that they've talked about, and I will go and use those, and I will find research papers and start reading. So, I'm not getting all the information that I'm learning about from A.I., but I'm getting it from an actual source. (Focus group interview, FG088, 2024, p. 16).

The student explained that they would use GenAI to generate topics for subsequent research and writing. In other words, the student took suggested topics from GenAI and used them to start their writing assignment. The student emphasized at the end that they went to the "actual source" to get the information rather than relying on AI, suggesting that they might be aware of some potential risks of using AI-generated output. One possible reason students frequently rely on GenAI at the beginning of the writing process is the difficulty they experience in generating topics and ideas for their assignments. These struggles contribute to the perceived "benefits" of GenAI, which appears to offer helpful "inspiration" or direction when students feel unsure about what to write or how to begin (e.g., Chan & Hu, 2023). However, a closer examination of how students used GenAI to generate ideas and the fundamental goals of learning to write raises important questions about whether such assistance should indeed be considered beneficial. To further consider this question, we have identified two representative excerpts where the students provided a more detailed account of how GenAI was used to generate ideas for writing.

In the following excerpt when the student (P5) was asked about how GenAI was used, they described using GenAI to "turn the wheels" in their brain and to add more details and "depth" to the writing.

> P5: I use it for outlines sometimes, like, to help me, like, get the, like, what I want to talk about. It gives me ideas how to do my outline and points to go off of.
>
> Interviewer: So when you put it in for an outline, do you have a thesis or do you have a question? What do you have that you put in?
>
> P5: Usually, I just say, like, give me an outline of the topic, like, whatever topic I'm choosing, and then it'll give me... And then options, if I don't like that option or if I want some of it from that one, and then I'll regenerate it, it'll change it.

> Interviewer: So can keep on regenerating and getting your different outlines till you get the one that you like? And why do you like that?
>
> P5: Because it helps turn the wheels in my brain. It helps me, you know, like, oh, I should do this instead, and, like, helps me think of more ideas to add to it and to add more depth into my paper. (Focus group interview, FG089, 2024, p. 22)

The student described using GenAI for idea generation by asking it to "give" a topic or outline and requesting more options when the initial result was unsatisfactory. The student's account offers little evidence that this process supported deeper thinking. Rather than prompting the student to explore ideas or consider alternatives in a meaningful way, the interaction appeared largely transactional: the student requested an outline, GenAI produced one, and the student regenerated results until finding an acceptable option. In effect, the cognitive work of brainstorming, thinking through possibilities, and planning would be outsourced to GenAI, thus reducing the complex processes of idea generation to the much simpler tasks of reviewing and selecting.

Furthermore, students' emphasis on efficiency over meaningful cognitive engagement may heighten these risks when they use GenAI to generate ideas. In the following quote, a student explained how GenAI condensed hours of "unproductive" work into "insights of how to start" or a list of important points to write about and by doing so, it made students' lives much "easier."

> P2: So I remember my first assessment in this group, this was my first year. So I was, like, I was confused. I don't know how to start. So I went on Google Scholar. Everything was just, like, in bulk and had limited word counts for everything. I read them, Google, Wikipedia, everything was just in bulk. So as I was going through, I saw A.I.. Oh, please answer (00:12:39) something. Because, you know, some A.I. can talk to (00:12:45) A.I.. So it gives you back your words and it writes in. But please, I am confused, how will I start this? And if you just give me insight of how to start. And with this, you bring everything together with words. You know, some of that, like, it gives you, like, referencing. You go back to that site, read through, check what A.I. is talking about, you bring everything together. If you have textbooks, or you know some of those things yourself, like in the classrooms and everything, you know to bring them together. We just like... Something that makes our study, the students more easier. Not like... You bring audio, textbook, words, go to sites. So some of us, we don't even know have to search for all these things, you just go. I will be reading, like, two hours without making progress. But if it's A.I., A.I. will just take points, things that you needed, like things that are more important for you to know and to write about. (Focus group interview, FG015, 2024, p. 5)

The student quoted above described the initial stage of the writing process where they were expected to conduct preliminary research on a potential topic and to narrow it down to a sufficiently specific research question for an undergraduate paper. In this process, the student encountered an overwhelming amount of information using traditional search engines and thus needed time to read and evaluate the information. Admittedly, many undergraduate students need stronger information literacy skills and additional support in developing them (Morgan et

al., 2022). However, relying on GenAI to "bring everything together" and generate a list of important topics bypasses the essential cognitive work of *doing*, *thinking*, and *learning*. As a result, for these students, using GenAI for idea generation may be more detrimental than beneficial. Unfortunately, this troubling pattern of potential risks of GenAI being considered beneficial by students is quite common in the students' discussions of using GenAI to brainstorm ideas for writing in our interview data. It's particularly disconcerting to see that GenAI appears especially appealing to students who struggle the most. For these students, the ease of GenAI can be difficult to resist, because they may lack the information literacy skills needed to recognize the potential issues of using these tools and/or time and space to fully develop these skills to use the tools responsibly and productively.

In addition to the misconception, there is further risk when students use GenAI to obtain necessary information about an unfamiliar topic or subject, as reported by quite a few students and illustrated by the quote below.

> P5: …and actually, artificial intelligence really helps me in that way, because when I need to write a really long article about (00:50:16), and about taste in general, some (00:50:20), and so on, I can ask artificial intelligence to help me in that way because I am not really great in this sphere. In this way, it really helps me. (Focus group interview, FG082, 2024, p. 15)

The student in this quote found GenAI to be helpful because it allowed them to write "a really long article" about taste which they might not really have much knowledge about. The immediate concern over this use of GenAI is the student's ability to properly evaluate and source the AI-generated content without adequate subject knowledge. More importantly, by enabling students to adopt and use AI-generated content, GenAI can create the false impression that they possess sufficient knowledge to write about topics with which they are only superficially familiar. A recent qualitative study of L2 postgraduate students' use of GenAI in academic writing raises this concern. Moorhouse and colleagues (2025), drawing on a critical digital literacies perspective, argued that students' perception of GenAI as empowering may in fact constitute "a false sense of empowerment" (p. 10). Such misplaced confidence may lead to further reliance on GenAI, generate confusion for readers, and contribute to the corrosion of the broader information ecosystem (Claros & Dalkir, 2023).

A related issue is the possibility of students losing sight of nuanced perspectives and contextual information as GenAI accelerates the speed of text retrieval, processing, and generation, as shown in the quote below where the student shared how GenAI was used to generate research questions.

> P2: I used it recently. I needed to create my research question, but I didn't know what to write about. I knew I wanted to write about finance and technology. I asked ChatGPT, I used it, and it said something about mobile payments. And then, on the next question, because I asked it six or seven different questions, it talked about consumer behavior. And, using those questions, I did my question, and it was something like, how do mobile payment devices or software help or change consumer behaviors? But that's the beauty of ChatGPT. It gives you so much of everything and then at the end, you can synthesize

> and create your own things. Or maybe just use that research question. (Focus group interview, FG074, 2024, p. 19).

In this example, the student began by requesting ideas from ChatGPT and then developed their research questions by simply combining suggested topics. Even if the information provided by ChatGPT is accurate, the student may still lack a substantive understanding of the topic, the existing research, and the relationships among relevant studies. Without this foundational knowledge, it is unlikely that they can effectively identify or evaluate current work in the area. Although GenAI enables students to generate research questions quickly, it also encourages a shift away from reading and understanding ideas in context toward skimming and reducing complex issues to simplified lists. This tendency is especially concerning for students developing research skills, as a solid grasp of existing scholarship is essential for identifying research gaps and crafting meaningful research questions. The differential impact of GenAI on students and experts has been noted by an increasing number of researchers who argue that the potential risks of GenAI for learning may come from students' exposure to GenAI tools prematurely (Anson, 2024; Warschauer et al., 2023).

### *To Edit and to Understand*

The next two main categories regarding students' use of GenAI for writing are *to edit* and *to understand*. Students' reports of using GenAI for spelling, punctuation, mechanics, or formatting were coded as *to edit*, while instances in which they used GenAI to clarify writing instructions or to better understand sources, subjects, or topics were coded as *to understand*. Students in nearly half of the interviews (45.5%) described using GenAI for these two purposes, and *to edit* (17.6%) and *to understand* (15.9%) were also among the most frequently cited reasons for using GenAI in their writing tasks. This finding aligns with previous research showing that students commonly rely on GenAI for editing and revision support (Kim et al., 2025; Wang, 2025). Using GenAI for *editing* is generally viewed as less controversial or risky, partly due to the long-established practice of working with automated spelling and grammar checkers before the emergence of GenAI and that such use poses fairly low risk of outsourcing substantive learning (Anson, 2024; Rowland, 2023). Therefore, the discussion below focuses on students' use of GenAI for *understanding*.

In most cases, the students' reported use of GenAI was clearly classified into one of the categories in Table 3. However, we observed some interesting overlap between using GenAI to brainstorm ideas and using it to understand writing instructions, as illustrated in the quote below.

> P3: …And sometimes when I want to start some assignments and I don't understand what is going on. And sometimes, like, every lecturer, they kind of expect you to, like, do it yourself. Yeah. Because I mean, I don't know, so sometimes I just go to, like, A.I. that, okay, if I give you this type of question, how are you going to start it? Because sometimes I just need, I just need, like, a prompt of where to start from. Then I can kind of, like, move on from there. So I can go to the A.I., oh, give me a prompt, or give me a standard for this type of assignment. Okay, if I want to write this scientific lab report, how is it meant to look like? What is going to get me, like, a very good grade? So give me,

> like, like a plan so I can kind of follow the plan, write it in my own information. So that is how I do my assignment most of the time. (Focus group interview, FG015, 2024, p. 3)

In the first part of the quote, the student described using GenAI to begin a writing assignment. However, as the explanation continued, it became clear that the student was using GenAI to clarify the assignment instructions, instructor expectations, and grading criteria. Although the student may still draw on AI-generated topics when starting the writing process, their primary goal was to understand the task, therefore, we coded this instance as using GenAI *to understand*. This distinction illustrates that even when students describe their use of GenAI tools similarly, their underlying purposes may differ; and those differences can lead to significantly different learning outcomes.

Individual variations in how students used GenAI to understand source materials were also identified. Initially, we assumed that students who reported using GenAI for this purpose would generally benefit from it. However, further analysis revealed substantial variation. A small number of students engaged productively with GenAI by asking targeted questions about specific parts of a text, but most relied on it to provide a shortcut to answers rather than a tool for deeper understanding and learning. The following quote illustrates the same pattern of students treating GenAI as an easy fix to bypass fundamental challenges in learning academic writing.

> P3: …Or like, it aids me and it saves time of going through, like, a lot of materials sometimes. And most of the time, because we're just starting, I didn't understand, like, what's in the journal. Sometimes I ask the A.I. to, like, pick out the main points for me that is going to, like, help me. And sometimes I ask A.I. to, like, read through the journals. I like the good point because, like, some of it, I don't need the information, some of the information. So once I light it, I just pick it from there, compare it to the textbooks. If they're, like, compatible and good enough, sometimes I combine, and sometimes I just use, like, information from the journal. That is how I do my... (Focus group interview, FG015, 2024, pp. 3–4)

In this quote, the student described using GenAI to better understand published journal articles. Initially, this seems beneficial, as academic articles can be overwhelming to inexperienced readers. However, the student continued to explain that they relied on GenAI to "pick out the main points" which "saves time". Therefore, instead of using GenAI to digest the detailed information in the published article and help improve academic literacy skills, the student used it to bypass the reading and thinking process. This illustrates that although students may report that GenAI aids comprehension, many may use it to outsource learning, and such individual variations can lead to significantly different impact of GenAI on learning.

### *To Search*

Using GenAI to search for information is another main category of GenAI use, appearing in 12.6% of relevant comments and referenced by participants in 34.5% of the interviews. The students reported shifting from traditional search engines to GenAI primarily because it offered more interactive guidance throughout the search process and enabled them to identify the

information they believed they would not have located independently. The following excerpt illustrates how the students described this difference.

> P1: Yeah, and the information you have on Google, it is available on ChatGPT. You can have a conversation with a ChatGPT. I think that's what's very helpful. Because you could probably get the same information from Google, but you would know specifically how to look for it and you don't normally get there. So, if you're having a conversation, you can...
>
> P2: Direct it.
>
> P1: Yes. It's easier. (Focus group interview, FG074, 2024, p. 19)

As explained by the students in the excerpt above, for Google to work well, the user had to be able to specify what they were looking for, including being able to know the specific terms and the specific ideas involved. However, with ChatGPT, the user can start by having "a conversation" that functions as a bridge and provides support to help the user better describe what they are looking for and then locate that information. In other words, the students' preference for GenAI is due to its user-friendly interface. Interestingly, about two decades ago, students chose Google over Open Public Access Catalog (OPAC) also because of Google's clean and user-friendly interface (Fast & Campbell, 2004).

Moreover, to be able to use GenAI tools to help specify search terms have been indicated by quite a few students as a benefit. Although they did not clearly identify formulating search terms as a challenge in the early process of writing and research, it was clear that many students had problems locating, learning, and using specific search terms. As Google requires specific search terms to generate accurate and useful results, GenAI uses locational relationships between words and phrases to help students identify a list related to their general ideas, the students who needed assistance would find GenAI to be more helpful and valuable. Previous research suggests the need to improve students' information literacy in this regard (Nasir et al., 2024) and the students' reports of preferring GenAI over Google for searching might add some empirical evidence for the need to teach students to formulate search terms and refine the search process. We believe using GenAI to learn to use search keywords could be a potential benefit, along with teaching students to locate search keywords from reading published articles, glossaries, references, and other sources.

This bridge function of GenAI and the assistance it offers during search seems to be more important when the students are looking for academic sources, and quite a few students commented on their preferences of using GenAI over academic databases, as illustrated in the following excerpt.

> P2: Like, for me, I go on the websites to search for similar journal about these and go to the library for textbooks. So I use textbooks. I use websites like PubMed, Google Scholar. And sometimes I go to A.I.. So some A.I. gives me, like, insight of what I'm looking for. Also it gives me, like, links me to sites where I can get some information. Some links me to PubMed, so from there I can go directly to the PubMed site.

> I: So you're using A.I.. How does it take you from where you are to these sites? What do you do with it?
>
> P2: When you get the information from the A.I., so it gives you, like, a reference. So the link of that site is there. So once you click on that site, you... it takes you to where the journal is so you can read through. It's not that you copy directly from the A.I.. It just tell you what you're looking for, the similar topics and everything. You go to the website and check...read about it.
>
> I: And you found that useful?
>
> P2: yeah, because it's...there's some assignments I'm not used to, I don't know how to start. So you are looking for different journals and sources to gather all your information. So sometimes going on directly to PubMed or anything, I may feel confused, because some of them are just bulk, too much for me. So if I go to A.I., it's an actual similar (00:02:52). So there's a possible A.I., once you go there it tells you, like, some of those things you're looking for, and link, and gives you some references. Like if you go to... some take you to Wikipedia, some take you to PubMed, some take you to maybe NHS, something, sites like that. So I just go there. So from that site, you'd be able to read out what the A.I.'s sending you, so you have to read through to get that and pick your points beneath them. (Focus group interview, FG015, 2024, pp. 1–2)

In the excerpt above, the student (P2) describes conducting preliminary research using GenAI. As explained by the student, the information from academic databases was typically dense and their user interface looked overwhelming, particularly to a novice researcher. But GenAI could partition the information and present the results interactively step by step which made it much easier to understand and digest.

However, not all the students agreed. Among the students who commented on using GenAI to search, a small number of them believed traditional search engines such as Google were more useful and effective because of their accuracy and reliability, as argued by the student in the quote below.

> P2: I don't think it will make much of a difference, to be honest. I think it can help you, obviously, educate yourself about things, I don't know what separates ChatGPT from Google. You could just google the same information and probably get a more reliable answer with more information that has the specifics of what you're asking, versus just a summary. But I don't really see it helping me that much as a teacher, to be honest. (Focus group interview, FG076, 2024, p. 14)

Unlike the majority of the participants, the student in the quote above preferred to use Google over GenAI because Google would produce more reliable results and detailed information. Therefore, the difference in their preference for different tools during search may stem from their abilities to locate, understand, and evaluate the information, or their information literacy skills. Not surprisingly, students with weaker information literacy skills probably need more scaffolding and thus prefer more general information and the interactive format provided by GenAI tools whereas students with stronger information literacy skills will be more likely to appreciate the

detail and reliability of information offered by traditional search engines and academic databases.

Additionally, the students also reported using GenAI *to revise* (9.6%), *to identify word choices* (5.9%), *to paraphrase* (5.4%), *to get examples* (4.6%), *to summarize* (3.8%), and *to generate papers or other written assignments* (2.1%). We put *to revise* and *to identify word choices* into two categories to highlight the students' frequent use of GenAI for word choices. Similarly, we further differentiated students' comments on using GenAI to summarize sources during screening (i.e., *to summarize*) and those on using GenAI to summarize for understanding purposes (i.e., *to understand*). Lastly, despite it being a small percentage, some students did report using GenAI to generate papers and/or complete a written assignment.

## Conclusion

GenAI tools have become increasingly integrated into students' writing practices, yet their effects on students' writing and learning remain only vaguely understood. To contribute to this emerging area of inquiry, we conducted a mixed-methods study examining how undergraduate students used GenAI tools while completing academic writing tasks and exploring their perceptions of using these tools throughout the writing process. We found that GenAI tools were increasingly integrated into undergraduate students' writing processes, with the students reporting much higher frequencies of using GenAI tools for a wide range of purposes in the writing process, including brainstorming, understanding, searching, summarizing, getting examples, drafting, paraphrasing, revising, identifying word choices, and editing. Our analysis of the interview data indicated potential risks of GenAI in the writing classroom, particularly for students with emerging academic literacy skills. A key concern is that the students' reports of the benefits of GenAI might be misguided by the perception that improved writing efficiency and the ease of completing writing tasks were equal to enhanced learning of writing. The findings showed that for many undergraduate students, their use of GenAI for idea generation might lack evidence for meaningful cognitive engagement; instead, such use seemed to be motivated by the efficiency and ease provided by GenAI. Moreover, GenAI could give students the ability to produce writings on unfamiliar topics rapidly and thus create a false sense of knowledge and confidence. This may lead to further reliance on GenAI and broader risks to the information ecosystems. Furthermore, the findings revealed that while most of the students used it to improve efficiency in writing, a few students leveraged GenAI as a learning tool. This indicates potentially large individual variations in using GenAI and the significance of focusing on *how* it is used. Additionally, although students expressed concerns over the use of GenAI and the uncertainties, they did not seem to fully understand the mechanisms behind the tools or the possible risks they may present. Therefore, the potential risks of GenAI may outweigh its benefits in the writing classroom.

The study highlights the need to combat current discourses pushing for the integration of GenAI in the writing classroom based on concepts including innovation, efficiency, and individualized feedback. As research on educational technology shows, the integration of technology in the classroom needs to be guided by sound theoretical frameworks and/or pedagogy (Fan & Jiao, 2021; Lodge et al., 2023). However, this does not mean GenAI should be avoided in the writing classroom. In order to help students better understand the potential risks and the class policies

regarding the use of GenAI in writing and learning, we will need to teach students about the tools, the underlying mechanisms, and the controversial issues surrounding their use. Open and focused discussion on those topics will help students better understand these tools and prepare them to critically evaluate if and how their specific use of GenAI tools might be beneficial or detrimental to learning.

While the study provides a more nuanced understanding of how students use and perceive GenAI in writing, several limitations should be acknowledged. First, the interviews were conducted by multiple researchers. Although a common interview protocol was used, differences in interviewing styles and follow-up questioning may have introduced some variation in the data collected. Second, the study relied on students' self-reports primarily in focus-group settings, and thus participants may have over-reported or under-reported certain aspects of their GenAI use because of social desirability bias or recall limitations. Finally, the findings should be interpreted within the context of rapid evolution of GenAI technology. Further research on *how* students interact with GenAI in different assignment contexts is needed to better understand its impact on learning. More importantly, there is an urgent need for studies on how to teach GenAI to students: guiding students to use GenAI in an ethical and responsible manner can help them recognize potential issues and risks and make informed decisions about integrating it into their writing practices. Additionally, future research with a longitudinal design and direct observations of students' use of GenAI in writing will provide more insights on how it may affect students' learning of writing.

## Author's Contributions

Jinrong Li and Kathleen O'Reilly collaboratively conceived and designed the study and analyzed the data. Jinrong Li drafted the initial manuscript. Both authors reviewed and revised the manuscript and approved the final version for publication.

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## Ethics Statement

This research was reviewed and approved by the Research Ethics Board of the lead institution, Université du Québec en Outaouais (project No. 2022-1730) and the research ethics committees at all partner universities participating in the PUPP project.

## Conflict of Interest

The authors do not declare any conflict of interest.

## Data Availability Statement

Data will be made publicly available at the conclusion of the funded project.

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## Appendix

### Interview Questions on GenAI Use

| Key Questions | Additional Questions |
|---|---|
| Do you know any artificial intelligence tools? If so, which one(s)? | Have you ever used it? If so, in what context? what did you think of it? If so, did your professor know about it? |
| Will the usage of artificial intelligence change the way you do your assignments (search for information, writing, referencing)? If so, how? If not, why? | For which types of assignments did you or will you use artificial intelligence? |
| Do you think that artificial intelligence represents a benefit or a drawback for learning and evaluating? Why? | Is using artificial intelligence to write assignments considered ethical? Why?<br>Did your professors modify their instructions to allow or prevent the use of artificial intelligence in assignments?<br>How clear these instructions to you?<br>Do you know if your institution has a policy on academic integrity in relation to artificial intelligence. Please explain. |
| Do you think that artificial intelligence, in your discipline, can be useful for doing your assignments, and for your prospective career? | Explain why do you think do? |