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A Precarious Partnership: Student Perceptions of Generative AI in Post-Secondary Learning

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Abstract
Generative AI (GenAI) offers both possibilities and significant risks for learning, making it critical for post-secondary learners to develop skills and competencies for strategically regulating learning with AI. While learner perceptions of GenAI serve as the foundation for strategic self-regulation, few studies have examined learners' perceptions from this lens. As such, this study examined how learners used GenAI to learn as well as how they perceived their use of GenAI. Participants were 125 undergraduate students enrolled in a learning-to-learn course. Results indicated students were confident in their ability to use GenAI for learning; perceived GenAI to be effective for learning; and reported using GenAI in a wide range of academic tasks, particularly when faced with cognition and time management challenges. Finally, access to information, personalized learning support, new learning approaches, and time were considered benefits of GenAI. However, students expressed concerns about academic integrity, information accuracy, and the impact on personal learning. Implications for development of critical AI skills are discussed.

Keywords: artificial intelligence, generative AI post-secondary, self-regulated learning, co-regulation, socially-shared regulation, ChatGPT, human-AI interaction, human-AI collaboration

Introduction

In recent years, generative artificial intelligence (GenAI) has significantly impacted post-secondary education, shifting notions about how we learn, teach, and engage with students (Baidoo-Anu & Ansah, 2023; Pedersen, 2024). GenAI is a subset of artificial intelligence that encompasses a range of advanced algorithms designed to identify patterns and generate new content, such as text, images, video, audio, and code (Chan & Hu, 2022). One notable example of GenAI is ChatGPT, a chatbot developed by OpenAI, that is capable of engaging in human-like conversations on a wide array of topics. After becoming widely available in November 2022, ChatGPT amassed an unprecedented 100 million monthly within eight weeks, underscoring the rapidity in which GenAI technology can both evolve and be integrated into the everyday lives of learners (Alford, 2023).

In post-secondary contexts, GenAI offers powerful possibilities to support learning across a multitude of tasks and disciplines. Students have increasingly reported use of GenAI for a wide variety of learning activities, including research assistance, idea generation, summarizing and synthesizing information, critical thinking, tutoring, feedback, and collaborative projects (e.g., Berg, 2023; Chan & Zhou, 2023; Sharples, 2023). However, GenAI can also pose significant challenges for learning. Not only does GenAI raise concerns regarding privacy, security, ecological impact, and equity of access for all learners (Akgun & Greenhow, 2022; Sijing & Lan, 2018), the impact of GenAI on learning itself needs further investigation. For example, there are concerns that unguided use of GenAI may lead or overreliance and a reduction of critical thinking and creativity (Klingbeil et al., 2024). Furthermore, as GenAI tools cannot assess the validity of content (Lubowitz, 2023), generated information can lack accuracy and reliability as well as reflect and perpetuate historical and cultural biases (Harrer, 2023). Finally, in educational contexts, Generative AI's ability to produce convincingly human-like content has raised significant concerns about academic integrity (Chan & Hu, 2023; Lodge et al., 2023).

In essence, while GenAI offers much promise for learning and teaching, the complexity of its impact paired with its widespread availability means that post-secondary learners must be able to manage their learning with GenAI (Järvelä et al., 2023). Specifically, we suggest learners require critical competencies for partnering with GenAI to plan, monitor, and adapt their learning, that enable them to strategically and ethically use GenAI to achieve their personal goals for their cognition, motivation, emotion, and social learning. Although the capacity of technology to support learning is well-established in the literature, research on how learners interact with Generative AI is emergent (Nguyen & Nguyen, 2024), and we have limited knowledge of how learners perceive and approach GenAI as they regulate their learning. Since learners' perceptions of technology serve as a foundation for regulation of learning, we aim to address this gap in this study by further conceptualizing how self-, co- and socially shared regulation of learning with GenAI unfolds and exploring students' perceptions of using Generative AI for learning at university.

Regulation of Learning with Generative AI

While AI possesses capabilities to interact with students during learning, it does not inherently guide learners toward meaningful or high-quality learning outcomes. Instead, students must take the lead by monitoring, directing, and evaluating the use of GenAI with their own learning processes. From this perspective, engaging with interactive technology such as GenAI requires

learners to engage in multiple forms of regulatory processes. We suggest that theoretical perspectives of self-, co-, and socially shared regulation of learning (Hadwin et al., 2011; 2018) provides an invaluable framework for researching and supporting students to learn effectively and ethically with AI.

Self-Regulated Learning with GenAI

Self-regulated learning (SRL) refers to the processes by which students actively monitor and manage their academic cognition, motivation, emotion, and behaviors to achieve their personal goals within and across tasks (Zimmerman, 1990). Winne and Hadwin's (1998) model of SRL posits that this process unfolds over four weakly linked and recursive phases. In Phase 1 (task perceptions), learners interpret what is required or appropriate for a task. In Phase 2 (goal setting and planning), learners set goals for their learning and make plans about how to achieve them. In Phase 3 (task enactment), learners enact strategies to achieve goals. In Phase 4, learners draw on their evaluation of learning progress and products, to make changes in the current and future tasks as needed to enhance their learning and overcome difficulties.

When learning with GenAI, learners must draw on their knowledge of the task, their unique learning needs, and knowledge of AI benefits and pitfalls to make informed decisions whether GenAI is appropriate or ethical in the task or situation. Furthermore, they must set goals for learning with GenAI and selecting strategies and specific GenAI technologies aligned with those objectives. Finally, learners must consistently monitor and evaluate learning making changes when needed. This might include evaluating whether AI content is incomplete, misleading, or biased choosing to adapt or reject knowledge.

Social Regulation with Generative AI

Furthermore, the regulation of learning is widely acknowledged to be a social and contextualized process (e.g., De Backer et al., 2022; Lobczowski et al., 2021; Zheng et al., 2019). As AI increasingly gains capabilities to support human thinking and decision making (Wang et al, 2019), learning with Gen AI also involves social forms for regulation, including co- and socially shared regulation of learning.

Co-regulated learning refers to a dynamic and interactive process where an individual, agent, or tool provides temporary and transitional support for a learners' self-regulatory processes, including planning, monitoring, evaluating, and adjusting their cognition, behaviour, motivation, and emotions in the learning task (Hadwin et al., 2011; 2018). When GenAI serves as a co-regulator, it serves as a mediator, scaffolder or coach for regulation of learning. For example, it can assist learners with defining specific, personalized, and measurable goals for learning based on prior interactions, creating timelines for the task, or suggesting strategies for achieving personalized goals. Furthermore, it could support learners to monitor and evaluate progress by providing timely feedback relative to personal goals, visualizing progress, or recommending new resources or approaches when needed.

Emergent research has also positioned GenAI as a learning partner. From a perspective of Human-AI collaboration, GenAI can be conceptualized as an agent, working cooperatively with humans leveraging their different capacities to achieve shared goals (Akata et al., 2020; Terveen, 1995; Jarvela et al., 2023). Managing such a partnership would require socially shared

regulation of learning (SSRL). As with SRL, SSRL unfolds over four weakly linked and recursive phases. In Phase 1 (task perceptions), partners work together to interpret what is required or appropriate for a task. In Phase 2 (goal setting and planning), partners define shared goals for the learning task, making plans about how to achieve them. In Phase 3 (task enactment), partners coordinate strategic enactment of the task, drawing on a range of strategies and approaches to achieve goals. Throughout these phases partners continuously monitor and evaluate progress and products, and finally, in Phase 4, partners make strategic adaptations where needed to enhance learning in current and future tasks.

When Generative AI serves as a co-regulator or collaborator, we suggest it is critical that learners also simultaneously engage in self-regulated learning if the use of GenAI is to ethically and effectively support learning. Engagement in a parallel process of SRL is because the assistance provided by Generative AI may not always be helpful or harmless. As such, learners must ultimately be responsible for continuously monitoring, interpreting, and evaluating support provided by GenAI, strategically managing interactions with GenAI in ways informed by the affordances and limitations of the technology. By strategically planning, monitoring, and adapting use of GenAI in learning tasks and situations, learners can boost the potential for GenAI to support learning while mitigating some risks involved in uncritical or passive use of AI.

Student Perceptions of Generative AI

Drawing on a wealth of existing research of intelligent systems over the past decades, recent research has examined how AI can be developed and implemented in the classroom to support learners to plan, monitor and adapt their cognitive, motivational, emotional, and social learning processes (e.g., Järvelä et al., 2023; Winne, 2017). For example, Molenaar (2022) conceptualized how learners can interact with AI-powered technology to gain timely feedback and support. Furthermore, in a recent study of secondary student science learning, Ng et al. (2024) compared the effectiveness of an AI-based (SRLbot) and rule-based (Nemobot) AI chatbots. Findings indicated that the SRLbot effectively enhanced students' science knowledge, behavioural engagement, and motivation. However, GenAI is rapidly evolving, and has become increasingly publicly available and marketed to learners outside of the purview of the instructor or institutions. As such, we suggest SRL is particularly relevant for learners as the choices and avenues for engaging with GenAI as a coach or collaborator multiplies.

A central issue in self-regulation of learning with GenAI is learner perceptions of AI. Specifically, learners strategically select and use AI in ways guided by their personal beliefs, their prior knowledge (e.g., of the task and GenAI), and their individual goals and needs. Both Winne and Hadwin's (1998) model of SRL and Hadwin et al.'s (2011; 2018) conceptualization of co- and socially shared regulation of learning posit an underlying cognitive architecture, COPES, that situated regulated learning and both deeply personal, inextricably contextual, and socio-historical in nature. *Conditions* comprising individual differences in internal and external inputs inform and shape each phase of regulation. Individuals act on what they perceive about themselves, the task, characteristics of the support available, and the current situation. *Operations* refer to the cognitive work that creates the *products* of each phase (e.g., task perceptions, goals, and strategy enactment). Finally, learners *evaluate* regulatory products to the multifaceted *standards* they hold for each phase of regulation.

In this way, the COPES architecture emphasizes choices and outcomes learners make to regulate learning are informed by their unique needs, the current situations, and inform future strategic decision making (Hadwin et al., 2018). For example, when students select learning strategies for a task, including those that involve use of GenAI, their decisions are heavily informed by at least two types of conditions. *Self-conditions* consist of individual knowledge, beliefs, capabilities, and experiences with GenAI. These may include self-efficacy for using GenAI to learn, perceived utility, and critical knowledge of AI strengths and limitations. *Task and context conditions* refer to external affordances and constraints related to the task and the larger context, such as resources, technologies, time, task difficulty or complexity, and perceptions of external supports, human or digital. In essence, understanding learners' perceptions of GenAI is critical for understanding learner decision making and fostering learners' development of self-regulated learning with GenAI.

Currently, research on the relationship between learner perceptions of use of Generative AI is emergent. However, learners' perceptions about GenAI have been found to impact the ways in which learners use this technology. For example, in a study of students' perceptions of GenAI in post-secondary learning, Chan and Zhou (2023) found a strong positive correlation between learners' perceived value of GenAI and their intention to use GenAI. In another study exploring students' self-reported AI readiness and AI beliefs, Dai et al. (2020) determined that the influence of AI literacy on AI readiness was mediated by students' beliefs about AI, in this case the students' confidence. Several studies to date have suggested learners hold a wide range of emotions and views regarding GenAI for learning, both positive and negative (Al-Samarraie, et al., 2024; Hellmich et al., 2024) as well as varying levels of awareness regarding its role in educational contexts (Zastudil et al., 2023). To date, however, few if any studies have examined learner perspectives from a regulatory lens. Exploration of how learners perceive of AI and the conditions under which they perceive GenAI to be valuable is required to better understand how learners can best be supported to ethically and effectively leverage GenAI in the pursuit of their personal learning goals.

Research Objectives

The purpose of this study was to explore student perceptions of Generative AI for post-secondary learning. Specifically, the following research questions were examined:

RQ1: In what tasks and situations do students report using Generative AI for learning?

RQ2: What are students' beliefs about the use of Generative AI for their learning?

Methods

Research Context

This study took place in the context of a first-year, undergraduate course at a medium-sized university in Western Canada in the Spring of 2024. The course was a "learning to learn" elective course open to all students across a wide range of majors and disciplines. Over the span of 13 weeks, the course focused on theory and practice of self-regulating learning. Topics included procrastination, reading and notetaking, and collaboration. Each week the course included (a) an online, asynchronous module in which learners were exposed to key concepts and completed weekly diary-like self-reflection on their regulation of learning in other courses, and (b) synchronous applied labs in which learners experimented with applying course concepts

in their other courses. Ethical approval for this study was obtained from the institutional ethical review board prior to the beginning of the course.

Participants

Participants in the study were 125 consenting undergraduate students enrolled in the course ranging in age from 17 to 29 (*M* = 19.5, *SD* = 2.26). As the course was open to all students, participants were from a range of disciplines. Participants self-reported gender was 58 men, 47 women, one non-binary, two other, and 17 who preferred not to say.

Data Sources

We explored students' experiences and perceptions of GenAI for learning using a reflective self-report measure. This tool included six items informed by critical processes for the regulation of learning and diary-like self-report measures adapted from previous research prompting learners to reflect on their use of GenAI in the context of key challenges or tasks triggering regulation (Jarvela et al., 2024; Webster & Hadwin, 2015). The reflection tool was administered in Week 11 of the course as part of the weekly asynchronous module. Specifically, learners were provided with a brief introduction and definition of GenAI and were asked to reflect on their use for learning over the past term.

As individual perceptions and previous experiences are critical aspects of future regulation, the first set of questions asked learners to think back on their experiences over the last term across all their courses and learning experiences and rate how confident they were in using Generative AI for learning (e.g. I am confident in my ability to responsibly use generative artificial intelligence to learn at university") on a 5-point scale (1 = not at all true of me, 5 = extremely true of me). They also rated how effective they believed Generative AI to be for learning (e.g. Generative AI is ___ for learning) on a 5-point scale (1 = not effective at all, 5 = extremely effective).

The second set of questions prompted learners to consider what situations they used Generative AI across their courses. Drawing on the notion of triggers for self-regulated learning (Järvelä & Hadwin, 2024), items included (a) what tasks for which learners most recently used Generative AI (e.g., writing, coding, reading, lecture note-taking, translating, etc.), and (b) how frequently different types of challenges triggered the use of GenAI (e.g., motivation, initiating and sustaining engagement, goal and time management, cognitive, metacognitive, and social-emotion factors). Finally, the diary tool also included three open-ended questions prompting learners to reflect on the benefits of using Generative AI for learning, the risks or limitations, and tips and suggestions they would provide to peers about the responsible use of Generative AI. Reflection prompts included (a) what are the benefits of using generative AI tools in my learning?, (b) what are the risks or limitations?, and (c) what specific tools or tips would I recommend to peers for responsible use?

Notably, this tool played a dual role in the course. First, it functioned as a measurement tool capturing learners' perceptions of their self-reported use of Generate AI over the past term. Second, it operated as one reflection of a series that prompted learners to monitor and evaluate their use of generative AI in learning task, with the goal of assisting learners to construct metacognitive knowledge regarding their learning (e.g., Phase 4 of self-regulated learning (Winne & Hadwin, 1998). This approach is characteristic of the third wave of measurement in

self-regulated learning (SRL), where measurement and support for regulatory processes are intertwined (Panadero, et al., 2016).

Analysis

Descriptive statistics, including mean and standard deviation, were calculated using SPSS v29 to examine students' reported use of Generative AI. To explore students' perceptions of using GenAI for learning, thematic analysis was conducted using Braun and Clarke's (2006) six-step process. Initially, two researchers independently familiarized themselves with the data, generated codes for the entire dataset, and identified potential themes in the data. Next, researchers met to review themes and refine them to ensure they accurately reflect data. Finally, the researchers defined each theme and developed a detailed report with illustrative examples. Trustworthiness and credibility of the thematic analysis was ensured by having multiple researchers independently code the data and develop preliminary themes and by reviewing and revising themes, allowing opportunities to consider alternative perspectives. A detailed audit trail of the coding process and theme development was maintained allowing for transparency.

Results

Perceptions of Confidence and Effectiveness of GenAI

Students reported high confident in their ability to use GenAI to learn, with 74% of being very or extremely confident in their ability to use GenAI for learning (Figure 1). Similarly, students reported GenAI to be generally effective for learning, with 76% of students reporting GenAI being moderately or very effective (Figure 2). These results suggest that learners generally felt capable of using GenAI to learn and perceived GenAI to be a useful tool for post-secondary learning.

Figure 1

Student Confidence for Using GenAI for Learning

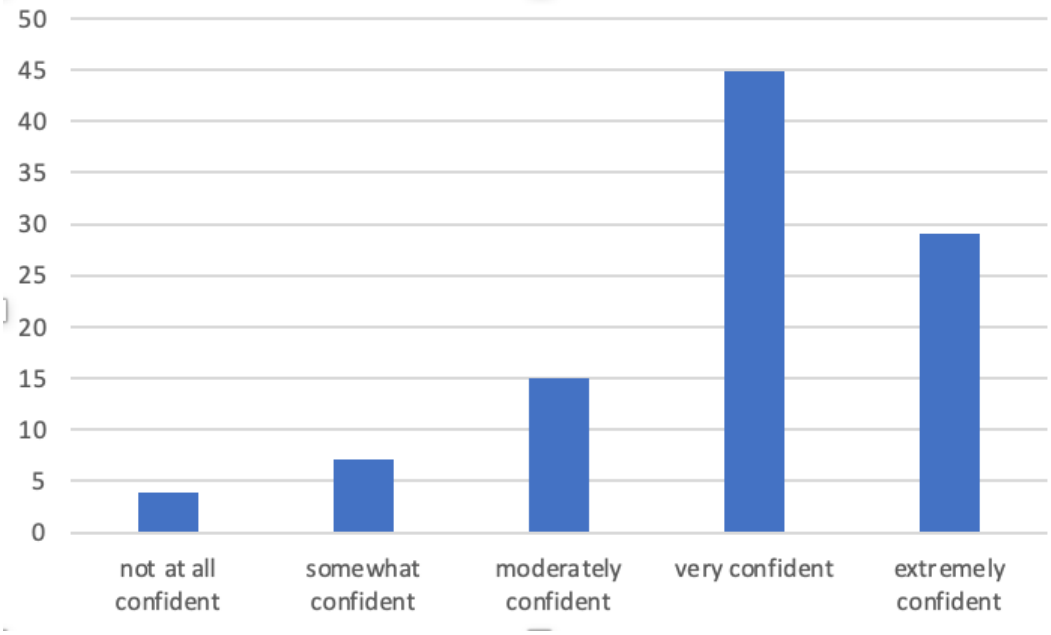
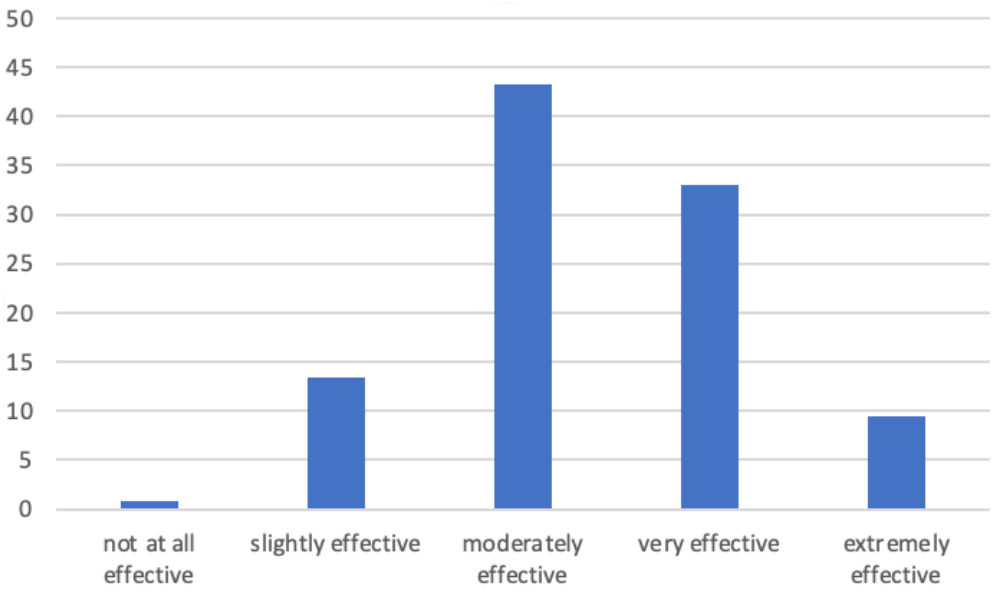


Figure 2

Student Perceptions of GenAI Effectiveness for Learning



Generative AI Use Across Tasks and Academic Challenges

In terms of task contexts and situations, learners reported using GenAI for wide range of tasks (Figure 3). The greatest proportion of students reported they most recently used GenAI in writing, exam prep, and reading tasks. Computational, translation, and collaborative tasks were among the least frequently reported. Notably, 91% of students reported using GenAI in academic tasks, with only 9% reporting no use. These results suggest that GenAI is widely applicable to many types of academic tasks, and most learners have made use of GenAI to learn.

In terms of academic challenges, results indicated learners most frequently reported using GenAI to overcome cognitive challenges, with 51% of students reporting they sometimes or usually use GenAI in this situation (Figure 4). Furthermore, 40% of learners report sometimes or usually using GenAI when experiencing goal and time management challenges. Finally, 41% of leaners reported using GenAI to address challenges with initiating and engaging with tasks. On the other hand, learners reported being less likely to use GenAI for overcoming social-emotional challenges with 52% of learners reporting never using GenAI in the face of this difficulty. Similarly, GenAI was infrequently used for metacognitive challenges, with 30% of students reporting never using GenAI in this situation.

Figure 3

Most Recent Academic Task Supported with GenAI

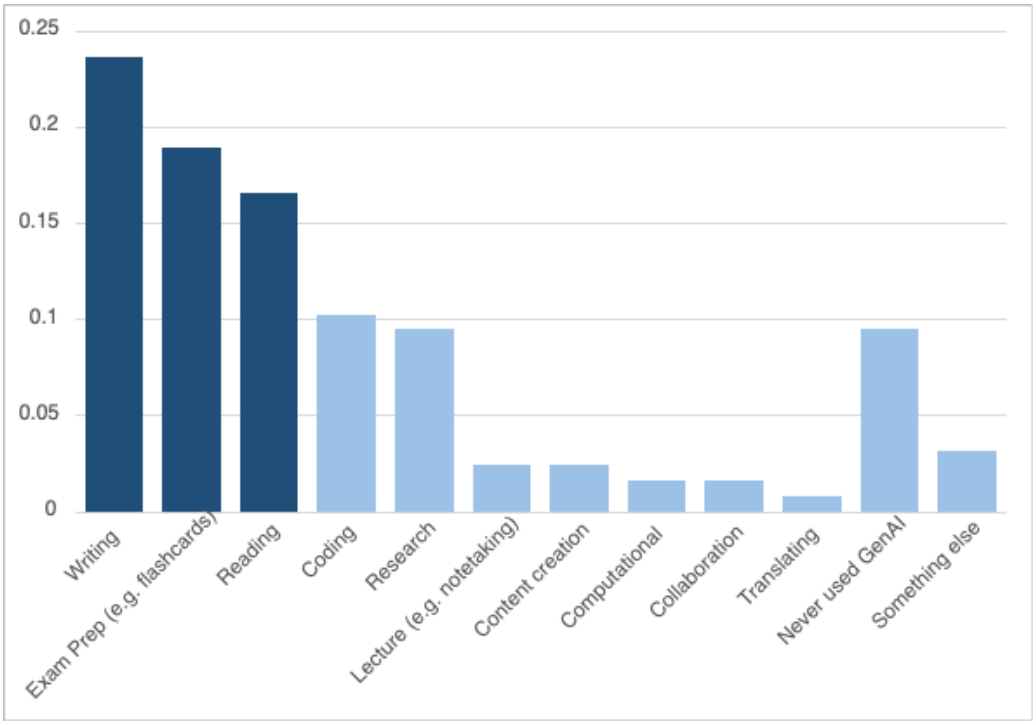
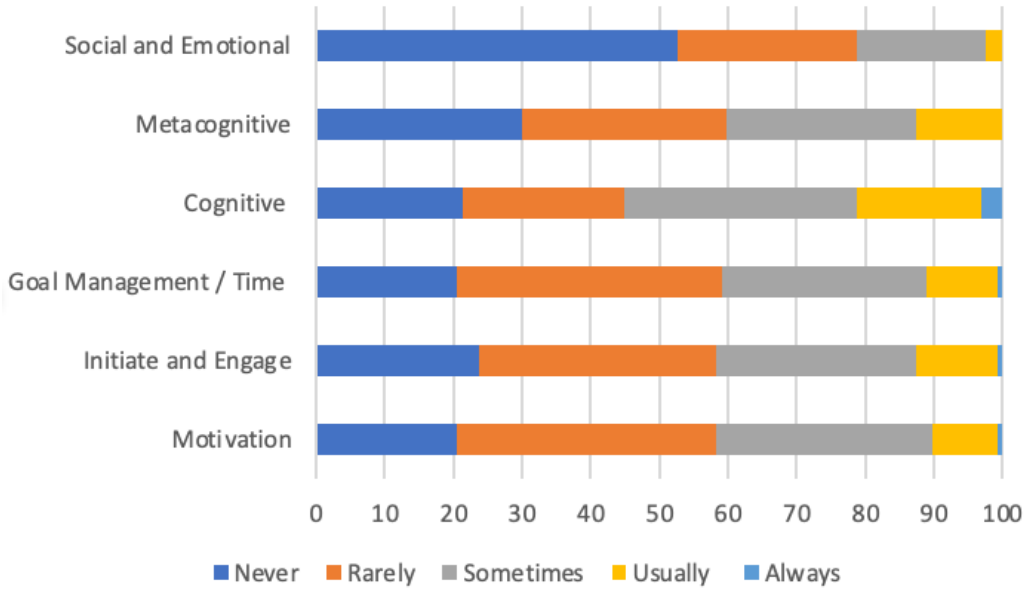


Figure 4

Frequency of GenAI Use for Overcoming Academic Challenges



Perceived Benefits of GenAI for Learning

Four themes emerged as a result of our thematic analysis of learners' reflections on the perceived benefits of GenAI: (a) enhanced access to information, (b) personalized assistance and feedback (c) facilitating studying techniques, and (d) time. These themes are described in detail below.

Enhanced Access to Information

The first theme in learners' reflections concerned access to information. Specifically, learners consistently emphasized that GenAI enhanced learning by providing easy access to information. For example, one participant noted, "It's literally unlimited information at the touch of your fingers and can be used in nearly everything." Learners also described that GenAI served as a straightforward and efficient way of accessing information. For example, other participants described that GenAI tools "make a wide range of material instantly accessible," and "these tools…are faster than searching on Google or other places on the internet." Overall, GenAI was perceived to benefit learning by providing convenient and quick access to a vast store of information. Furthermore, many described GenAI is a superior option for searching for or acquiring information compared to other avenues (e.g., library databases, instructor office hours) that require more effort or more advanced planning.

Personalized Assistance and Feedback

A second theme that emerged was the notion that GenAI benefits learning by providing opportunities for more personalized assistance and feedback. Learners perceived GenAI to be helpful for breaking down complex topics in ways aligned with their current needs. As one student described, "AI is beneficial because it makes learning easier and is accessible to anyone. AI can generate material faster which makes researching easier and you can ask it to simplify its explanations which can make material easier to understand." The interactive experience provided by GenAI was consistently described as an important aspect of providing tailored support. For example, learners said that, "it is great because it can help explain a concept to you in a different way compared to how a professor or someone else may explain it to you," and, "it provides a quick detailed response to a small question or things that I don't know about, even if I still don't understand, I can continue to ask until I understand." Similarly, as another student explained, "using text-generative AI is very beneficial for learning, as you can use them as a personal private tutor that is custom-tailored for your needs." Finally, learners described that GenAI provided useful formative feedback on assignments, including grammar and quality of content. For instance, one student shared, "I use it for refining my essays before I submit them. I ask it what I can do to make it better." Likewise, another student highlighted the impact of feedback on understanding and confidence: "These types of tools, when used responsibly, can help students to gain confidence in their work."

Facilitating Study Practices

A third theme identified in the analysis related to the use of GenAI to enhance study practices. Learners frequently noted that GenAI was invaluable for creating study resources. For example, one student noted "chat GPT is useful for studying for exams, it can create flashcards and practice questions for you." Students also described GenAI to be a powerful tool for creating summaries of dense information. As another student explained, "Being able to have it take notes or summarize passages saves a load of time compared to doing it all on your own without the risk of missing information." A related benefit of GenAI, as described by students, is its role in fostering idea generation and organizing. Many students noted that GenAI was invaluable for getting started on tasks, especially when they felt overwhelmed or lacked motivation. For

example, learners described using GenAI as a starting point (e.g., “I would say that a benefit would be to start you off with some ideas and get the ball rolling for your project or assignment, ….”). They also said GenAI worked as new tool for brainstorming, with one student saying,

> A huge challenge and time waster for me when I am doing writing assignments is the brainstorming process, and usually I have to end up chatting with a friend to come up with ideas and to validate my ideas, but with ChatGPT it is almost like a little helper friend that you can talk with to come up with ideas.

Overall, these responses reflect the common belief among students that GenAI is helpful in its ability to spark ideas and support creativity, particularly during the initial stages of idea development.

Time

A final key benefit learners described was the ability for GenAI to save time. This theme was prominent in learner responses, although there was variation in the specific mechanisms noted by different learners. First, students described that GenAI is a helpful tool for streamlining or automating repetitive and tedious tasks, and as such, enables learners to spend more time on more cognitively demanding or impactful aspects of the task. As one student put it, “the key benefit to these tools, in my opinion, is the depletion of time to complete certain mundane tasks.” Others noted that GenAI saved time by making work easier and less cognitively demanding:

> It benefits students in their learning because it can cut down on timely tasks such as research…where generative AI can easily collect necessary data for you. This way, students can put more time into aspects like the writing quality of an essay.

Finally, learners described GenAI as saving time by helping them organize their study sessions more effectively. For example, one participant described a benefit of GenAI as “creating every schedule. Essentially making day-to-day tasks easier.” Another noted, “I think it can be beneficial in offering guidance on how to study, can aid in setting goals and schedules.” As such, learners described a significant benefit of GenAI for learning as its ability to easily and quickly produce resources that scaffold and support engagement in key studying tasks. For example, one participant shared,

> As mentioned on the other page, it helps with time management. Rough planners can be made in seconds, giving students more time to work on tasks or study. It can also help with task understanding, as problems can inspire students or give them a more profound understanding.

Risks and Limitations of GenAI for Learning

Thematic analysis revealed three major themes in students' perceptions of GenAI's risks and limitations for learning: (a) academic integrity and plagiarism, (b) inaccurate or biased information, and (c) loss of opportunity to learn. These themes are described in detail below.

Academic Integrity and Plagiarism

A central and clear concern for learners regarding the use of GenAI for learning was academic integrity and plagiarism. For example, students commonly voiced concerns that using GenAI can be dishonest and violate academic integrity policies. One student noted, “it is tempting to

want AI to write everything for you since it is so easy and can write papers in whatever style/voice you ask it too." Similarly, another learner described that "students who do not properly use generative AI tools can start plagiarizing without realizing it. Some students might use their generated response word-for-word, which is plagiarism and can get them into serious trouble." While some students emphasized the need to use GenAI carefully, others noted they avoid GenAI as any use may constitute plagiarism (e.g., "plagiarism is a big concern of mine. You can't site [*sic*] AI…This could result in serious consequences, and I don't think it is worth it).

Inaccurate and Biased Information

Another concern for students was the quality of information obtained from GenAI. Specifically, students often described concerns about whether the information produced was accurate. For example, as stated by one participant, "I think the limitations of generative AI tools are the credibility of information source…Generative AI tools will always generate an answer for you and may provide answers to questions that may not be true." Likewise, another participant noted, "I think the limitations are the fact that ChatGPT is only updated with past information and is not updated with current information, as well as the fact that it does not cite sources." Furthermore, other students described the possibility that information provided by GenAI is biased, "AI can also be biased …which can prevent a skewed perspective. People may take advantage of AI which can wreck ethics and harm people." As a result, students often suggested that content created through GenAI requires human review (e.g., "The risk is the tool is not 100% accurate and causes mistakes. It is important to always fact check information from these technology."). Notably, concerns described by students regarding the reliability of information provided by GenAI contrast with the above-described perceptions that GenAI lowers barriers to learning by providing enhanced access to a wealth of information that can be personalized for individuals' unique needs.

Interference with Learning

A final concern noted by learners is that GenAI can undermine the learning process and interfere with opportunities to develop new knowledge or skills, such as critical thinking and problem-solving. For example, one student noted, "although it can serve as a great tool, I think the risks are that you can get AI to solve questions and do assignments for you, which is not good for learning." Another student described concerns about when to use GenAI,

> I think the risks of AI is it's tempting to depend on it too much. Even if you start out only using it for a schedule or outline, it's so tempting to ask it about content problem you're facing, or to write you an answer for one of your assignments. I think it's too easy to start to rely on it and it's easy to fall into depending on it and using it irresponsibly.

Finally, students also noted that perspectives represented in GenAI output may reduce consideration of diverse perspectives in learning (e.g., "generative AI tools, while powerful, carry risks such as perpetuating biases present in their training data, potentially reducing critical thinking by providing ready answers and risking information accuracy.") Again, the concerns described by students regarding the potential of GenAI to harm learning and critical thinking lie in stark juxtaposition to the benefits they simultaneously describe regarding facilitating learning approaches and access to information and feedback.

Discussion

As generative AI has become widely available to post-secondary learners, students require critical skills and competencies for strategically and ethically regulating learning with AI. However, research examining learner perspectives of GenAI as a foundation for regulation of

learning with GenAI is limited. Drawing on a framework of self- and social regulation (Hadwin et al., 2018), we explored learners' personal beliefs and perceptions of GenAI for learning as well as the task contexts and challenge situations that triggered learners' decisions to use AI.

Findings indicated that GenAI is a versatile tool useful for a variety of common post-secondary learning tasks. These included tasks that often involve managing a significant volume of information, including writing, exam preparation, and studying. Furthermore, findings indicated students felt generally confident in their ability to learn with GenAI and generally believed GenAI was useful for learning effectively in these contexts. These findings add to the emergent evidence that the use of GenAI is increasing among post-secondary students for multiple aspects of learning (Baidoo-Anu & Ansah, 2023; Chan & Zhou, 2023; Jiayu, 2023).

In terms of the situation in which learners used GenAI, students most frequently reported using GenAI to overcome cognitive challenges, goal and time management challenges, as well as challenges with initiating and engaging in academic tasks. As such, it appears learners were most likely to turn to GenAI for help when encountering difficulties with both foundational behaviours underlying academic engagement, such as task organization, and higher order thinking, including breaking down course concepts and problem solving. On the other hand, students reported using GenAI infrequently for addressing metacognitive challenges related to task planning and monitoring and evaluating processes and products. Finally, students infrequently reported use GenAI to address motivational and social and emotional difficulties.

It is important to note that while students reported feeling confident in GenAI and using GenAI in a wide variety of tasks to overcome a range of challenges, this may not translate to positive outcomes for learning and performance. From a perspective of self-, co-, and socially shared regulation of learning (Hadwin et al., 2018), learners' beliefs about GenAI should be well aligned with the strengths and limitations of this technology and demands of the task as they provide the foundation on which learners make decisions on how and when to implement GenAI effectively, ethically, and responsibly. As such, when students lack confidence or have too much trust and confidence in GenAI, this misalignment between student beliefs and contextual constraints could be detrimental for learning (Amoozadeh et al., 2024). As the appropriateness of GenAI can vary by task and discipline, this may be particularly difficult for students as the evidence suggests learners may struggle to construct accurate and complete task perceptions to guide task enactment (Miller & Hadwin, 2024). Notably, in this study, students were limited to reflecting on their general beliefs about GenAI and experiences using GenAI during the previous term. As regulation is highly contextualized by task and discipline, further research is needed to closely examine how learners' beliefs and confidence evolve over time as they experiment with GenAI for learning and actively reflect on the results.

Learners in this study also demonstrated mixed perceptions of the benefits and limitations of this technology. Firstly, learners reported a wide array of benefits, including instant access to information, new ways of studying and actively engaging with information, more personalized support for learning, and saving time through potentially automating more tedious low-value aspects of learning and studying. These findings support the findings of emergent research indicating GenAI tools, such as ChatGPT, can support invaluable personalized learning experiences for students (Atlas, 2023; Baidoo-Anu & Ansah, 2023).

However, students also expressed significant concerns about the use of GenAI for learning. These concerns included the potential for GenAI to undermine learning, development of reliance

on AI for learning, the potential for academic integrity violations, and concerns about inaccurate and biased information that GenAI can produce. These findings are in line with previous studies indicating that while GenAI can offer new opportunities for learning, it also brings forth important challenges (Chan & Colloton, 2024; Lubowitz, 2023). Notably, while students were clear in their beliefs that GenAI has risks and limitations for learning, concerns reported by students tended to converge strongly around the three broad themes above. Less consideration was paid to other concerns noted in the related research, such as inequitable access to technology, the perpetuation of bias, the environmental impact of GenAI use, and issues related to privacy and security of student data (Chan & Colloton, 2024). While students described concerns that GenAI could negatively impact their learning, such as by becoming over-reliant, few students mentioned clear ways to prevent this from happening.

Overall, students' perceptions of GenAI for learning appear to be multifaceted with tensions emerging between the associated benefits and the risks. For example, while learners reported that GenAI created more access to information, they reported concerns regarding the reliability of this information. Although students noted GenAI provides invaluable new ways to engage with content and receive personalized feedback, they also noted concerns about the impact of offloading the work of learning to GenAI regarding preventing or delaying the development of new skills and competencies.

Conclusion

Generative AI has repeatedly been identified as transformative for postsecondary education and learning. However, as GenAI tools continue to evolve rapidly, their availability to learners has outpaced support for developing critical skills and competencies for managing its use. By examining student perceptions of GenAI, this study provided critical insight into how learners use GenAI as well as the beliefs that underscore their regulation of learning with GenAI.

However, it is important to note this study had several limitations. First, this study had a small sample size and was conducted within a specific educational context where students were learning to learn through reflecting on their coursework in a range of other disciplines. Therefore, findings may not generalize to other more diverse groups of students in different contexts. Second, this study relied on self-report measures of students' use of GenAI. While self-reports were appropriate for capturing learners' perceptions of GenAI, they can be susceptible to social desirability bias. For example, learners may not have felt comfortable disclosing their use of GenAI or may have felt pressured to report being more efficacious. Moreover, learners may not have accurately recalled the situations in which they used GenAI or the circumstances surrounding its use, especially for items in which learners were asked to consider their perceptions over the course of the full term rather than within a single episode of regulation. Incorporating more observational measures over time would advance understanding of how learners made use of GenAI in different situations. Finally, this study examined students' perceptions of GenAI at one point in time towards the end of an academic term when learners are commonly beginning to prepare for or submit summative assessments, such as papers and final exams. As such, this contextual factor may have impacted learners' reports, especially regarding the most recent task in which they used GenAI. As such, a fruitful avenue of future research would be examination of how learners' perceptions, plans, enactment, and reflection on use of GenAI for learning evolved over the course of multiple episodes over time.

Despite these limitations, this research significantly contributes to the emergent research of learners' beliefs about GenAI and the learning situations in which learners perceive GenAI to be a viable strategy for improving their post-secondary studies. Furthermore, findings emphasize the need to support learners to develop skills and competencies for regulating learning with GenAI. This includes supporting learners to become aware of effective and ethical ways learners may use GenAI in the context of common challenges, while also developing more sophisticated awareness of potential pitfalls, particularly as they relate to knowledge construction and idea generation and task management, where use of AI appears to concentrate. Overall, as this technology continues to evolve, supporting learners to develop skills to flexibly plan, enact, monitor, and adapt their interactions with GenAI is key for equipping students to ethically and effectively leverage GenAI in the pursuit of their personal learning goals.

Author's Contributions

MM: Conceptualization; research design; data collection, analysis and interpretation; writing.
BM: Coding; manuscript revision and editing.
YC: Coding; manuscript revision and editing.

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Ethics Statement

Ethical approval for this study was obtained from the institutional ethical review board prior to the beginning of the course (REB Number H22-01164)

Conflict of Interest

The author does not declare any conflict of interest.

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