Learning with Artificial Intelligence: How Students Decide and then Use AI

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A Thesis
In
The Department
of
Marketing

Presented in Partial Fulfillment of the Requirements
for the Degree of
Master of Science (Marketing)

at
Concordia University
Montreal, Quebec, Canada

July, 2024

CONCORDIA UNIVERSITY

School of Graduate Studies

This is to certify that the thesis prepared

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Entitled: Learning with Artificial Intelligence: How Students Decide and then Use AI

and submitted in partial fulfillment of the requirements for the degree of

Master of Science (Marketing)

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Abstract for Masters

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This thesis investigates the use of generative artificial intelligence (AI) in education, focusing on how and why students incorporate AI tools like ChatGPT into their studies. While AI's impact on the workplace has been extensively researched, its role in education remains less understood. This study addresses this gap through a qualitative analysis of 27 students' experiences with AI in their academic pursuits.

The research reveals that students engage in complex ethical decision-making when choosing to use AI, balancing its potential for educational advancement against concerns about skill development and managing academic pressures. Two primary patterns of AI usage emerge: replacement and support.

By comparing AI use in education with its application in the workplace, this thesis highlights the unique challenges and opportunities presented by AI in academic settings. The findings have significant implications for students, educational institutions, and society at large, emphasizing the need for responsible AI use, clear guidelines, and the importance of preparing students for an AI-driven future while maintaining core educational values.
This research contributes to the growing body of knowledge on AI in education.

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Introduction

Artificial Intelligence (AI), broadly defined as the simulation of human intelligence in machines (Banh & Strobel, 2023), is transforming various sectors, including work and education. This thesis focuses on generative AI, which creates new content like text, images, or music by learning patterns from existing data. Examples include ChatGPT for text and DALL-E for images.

In the workplace, AI is recognized as transformational, primarily aiming to save costs (Chui et al., 2015) and boost productivity by automating tasks and assisting with complex cognitive processes (Umachandran, 2021). However, these goals do not align with those of students, who prioritize academic competence, personal development, and social engagement (Kristiyani, 2020). This disparity indicates that existing research on AI in the workplace is insufficient to inform how students use AI in education. My research aims to fill this gap by exploring how and why students use AI. I use a qualitative approach to examine a dataset of 27 students, who use generative AI tools (like ChatGPT) in their studies.

Through my study, I answer two research questions: (1) How do students decide to use AI? and (2) How do students use AI? For the first question, my analysis finds that students engage in ethical decision-making, weighing AI's potential for educational advancement and alleviating pressures. They evaluate whether AI supports core skill development or merely replaces them in the tasks, and consider its role in managing internal and external pressures. For the second question, my analysis finds two patterns emerge: replacement and support. Replacement involves AI taking over tasks like reading and structuring essays, which may hinder essential skill development. Support involves using AI to enhance engagement and understanding, such as seeking alternative explanations and practicing with mock quizzes.

With my findings, I compare AI in the workplace with AI in education. Finally, I offer implications for students, educational institutions, and society, emphasizing the need for responsible AI use, clear guidelines, and preparing students for an AI-driven future while preserving core educational values.

Literature Review

Broadly speaking, artificial Intelligence (AI) is the simulation of human intelligence in machines designed to think and learn like humans (Banh & Strobel, 2023). More specifically, my research concentrates on generative AI, which is understood as a type of artificial intelligence that creates new content, like text, images, or music, by learning patterns from existing data (Banh & Strobel, 2023). It uses advanced machine learning models to generate outputs that are similar to, but distinct from the original data it was trained on. Examples include ChatGPT for text and DALL-E for images.

Generative AI is transforming both work and education (Chintalapati & Pandey, 2022). I begin by examining the integration of AI in the workplace. While insightful, such work falls short of explaining how students can use AI. The key issue I identify with work on AI in the workplace is that it focuses on the primary goals of cost-saving and boosting productivity. Students are unlikely to strive to achieve such goals, which impedes the capacity of studies in this first category to inform my research question.

Following this, I explore how the education sector is being impacted due to AI. I explore the objectives and expectations of students. We know that students are optimistic about integrating AI into their academic lives (Chan & Hu, 2023) and that there are more positive perceptions than negative ones regarding the usefulness of ChatGPT in education (Emdada & et al., 2023). However, this does not explain whether and how students decide to use AI, and how they do so once they make this decision. Moreover, while there are concerns about accuracy, ethics, and the broader impact on education (Chan & Hu, 2023), and very little work has been done from a student's perspective. I aim to help address this gap through my findings by exploring how students use AI and when they use it.

I now turn my attention to each category of studies.

AI at workplace

Organizations recognize AI as transformational (Poba-Nzaou & et al., 2021), and have long used technology to automate tasks (Raisch and Krakowski 2021). Recently, new techniques have allowed the use of AI for increasingly complex cognitive tasks, for example, deciding which trades to execute on Wall Street or optimizing inventory management (Brynjolfsson & McAfee, 2017). However, other types of tasks, such as relational tasks, which are centred around building, maintaining, and leveraging professional relationships are harder to replace (Huang and Rust 2018).

When using AI, organizations typically have one of two key goals: The first one is to save costs, and the second is to boost productivity.

First, organizations save costs to boost profitability, maintain financial health, and stay competitive in the market. By reducing expenses, they can allocate more resources to growth initiatives and innovation. Saving costs involves streamlining operations, optimizing resource usage, and minimizing waste. AI can help organizations save costs by automating their business processes, and the cost of implementing AI is less than the savings it generates (Chui et al., 2015).

The second key goal of integrating AI in the workplace is to boost productivity. One of the ways AI can boost productivity is by taking over more routine aspects of the job (Chui et al., 2015). For example, AI can streamline the recruitment process by objectively assessing the candidates and providing quicker feedback to them (Umachandran, 2021).

Differences between work and educational goals have implications that make prior work not fitting. Unlike organizations that primarily aim to save costs and boost productivity when

integrating AI, students' goals in using AI for their education are fundamentally different. Students engage in their education to become academically competent, self-develop, ensure success in their future, and engage socially and spiritually (Kristiyani, 2020). They also have social engagement goals that they try to achieve through classroom interactions. This could be both academic and non-academic, which enhances their overall classroom experience (James, 1986).

For example, in a workplace, using AI to automate tasks would be a way to boost productivity but in education, if students replace themselves with AI to perform educational tasks, it would likely hinder the learning process and impede knowledge development, which are arguably core drivers for getting a degree. Similarly, in the workplace, using AI to automate certain tasks can be seen as a way to save costs but this concept may not hold for students: Students pay for the learning process, and getting the most value out of their money would likely mean increasing their involvement in the learning process. Therefore, the distinct structure and purpose of the student learning experience make the established organizational objectives of cost reduction and productivity enhancement an ill-fit.

Impact of AI at the workplace on education

The transformative role of AI in the workplace is an important driver for my research question because it reshapes the required skillsets for employees. Moreover, since students join the workforce ultimately, this impacts the education sector, too. Due to AI, employees now need to focus more on executing higher-value tasks that require human skills like creativity, empathy, and emotional intelligence (Chui et al., 2015; Huang & Rust, 2018). Consequently, students must be trained in these emerging skills to ensure they are prepared to join the future workforce. Aiding in this, arguably a key skill for students will be to understand when and how to use AI, which are key aspects of my study.

Let us take an example of how AI is transforming workplaces by looking into how it has evolved tasks involved in the marketing sector. AI is generating valuable marketing insights, and continuously learning from what it is doing (Wirth, 2018), thereby saving costs by substituting the human expertise required to do the same. Moreover, AI is personalizing emails, analytics, and 'sending time' optimization (Roberts, 2017), thereby boosting productivity by automating the overall email marketing aspect of marketing. These goals are also achieved in the digital marketing aspect of marketing by the use of automation and de-complexifying (Dumitriu & Popescu, 2020). Therefore with this increasing integration of AI in marketing offices, the required skill sets for successful marketers are evolving, consequently altering the training needed to educate students. One way of altering the training is to integrate AI into marketing education so that it allows the students to thrive in a digital society (Elhajjar et al., 2021). This is where my research is going to answer this gap by asking two questions - (1) How do students decide to use AI? and (2) How do students use AI?

Integrating AI into education

When it comes to using AI for educational activities, there is a lack of concrete specialized guidelines for the ethical deployment of AI (Ghimire & Edwards, 2024). This leads to problems in integrating AI into education because students are left to make their own decisions. I argue that this is insufficient, as students may not be adequately equipped to make these decisions independently. Moreover, where such policies do exist, they often overlook crucial issues, including student privacy and algorithmic transparency (Ghimire & Edwards, 2024). This is a matter of concern because it affects the quality of the future workforce. My research intends to help universities find more concrete ways to address this issue.

Importantly, there is also an absence of appropriate programs, curricula or faculty members to train the students on AI. Popenici & Kerr (2017) imply that teaching in higher education

requires a reconsideration of teachers' roles and pedagogies. They suggest that now is the time for universities to rethink their function and pedagogical models and their future relations with AI solutions. Universities should collaborate with future recruiters to ensure that the curriculum remains relevant and practical. Faculty members need to become more interdisciplinary to acquire knowledge associated with complex technology (Ferrell & Ferrell, 2020) and to use innovative teaching methods (Elhajjar et al., 2021). Moreover, they also need to understand how students use AI for education which will not only help them gauge the use of AI by the students but also help them inform better curriculum and hire appropriate faculty members. Thus, my research is relevant because it answers how students use AI, which can help universities better integrate AI to be able to provide their students with an enhanced learning experience (Firat, 2023).

Theorizing AI integration

Lastly, to understand how students use AI, it is important to understand the theorization behind the integration of AI into the workplace. One such key theorization puts two central AI uses—automation and augmentation—into a productive paradoxical relationship (Raisch & Krakowski, 2021). Automation substitutes human tasks with technology for efficiency and cost savings, whereas augmentation refers to using AI to assist humans in managerial tasks, thereby viewing machines as partners rather than substitutions (Davenport and Kirby, 2015).

Overemphasizing one over the other can lead to negative outcomes for both organizations and society (Raisch & Krakowski, 2021). This is because prioritizing automation leads to the loss of human skills and expertise in automated processes, whereas focusing on augmentation requires extensive resources and may lead to failure due to complexity and human biases. Therefore, they suggest balancing both automation and augmentation and putting them into a paradoxical productive relationship for a virtuous cycle of selective deskilling and strategic requalification, enhancing human and machine capabilities. A

"paradoxical productive relationship" refers to a situation where two seemingly contradictory elements or concepts are not only coexistent but also mutually beneficial and interdependent.

While organizations have goals widely different from students when using AI, the paradoxical productive relationship between automation vs. augmentation might be helpful in illuminating how students make sense of AI use and thus help answer the research questions. However, it is also likely that because of differences in students' goals, my research may illuminate how these two mechanisms, or others, explain the use of AI by students.

Method

Research Context

AI tools have become more powerful and popular due to several factors. The advancements in computing and data processing, coupled with the vast amount of data generated by the internet and social media, have provided the AI tools with the necessary training they need (Lampinen, 2024). This led to the development of Generative AI tools like ChatGPT. These tools enable users to generate new content based on the input given and provide quick responses in real time.

ChatGPT, developed by OpenAI, was released on November 30, 2022, and quickly gained widespread popularity. Today, it has more than 150 million users (Lacy, 2024). Academic research has extensively demonstrated how generative AI tools such as ChatGPT can enhance workplace productivity and quality (Dell'Acqua et al., 2023). Additionally, it has been shown that with the right prompts, generative AI significantly increases the variety of ideas produced (Meincke et al., 2024).

ChatGPT is transformative for the education sector, forcing educational organizations to reevaluate their approach (Williams, 2023). The use of AI carries certain risks, such as those related to academic integrity, where it can impact learning and contribute to plagiarism. Moreover, no sophisticated tools are good enough to catch AI-generated content (Roose, 2023). Even with the risks associated with AI, students continue to use it for their education (Smith, 2019).

While the prevalence of generative AI tools like ChatGPT introduces new dimensions to the learning experience, it also underscores the importance of fostering a culture of responsible

usage and ethical conduct. The objective of my research is to understand how students use AI tools and how it affects their educational experience.

Data Collection and Analysis

To investigate how students make the decision to use AI in their studies, and how they use AI once they decide to do so, I collected qualitative data between June 2023 and May 2024. My dataset comprises 27 interviews and archival data in the form of 79 newspaper and magazine articles.

I started my research journey by looking into articles to understand how AI tools are affecting the education sector. This helped me build the contextual understanding necessary to make sense of the phenomenon. To do so, I collected articles published in these two sources: First, I collected articles from the Times Higher Education to obtain an educational-centric perspective. Second, I collected articles from the New York Times to complement this perspective with a wider, societal one. I searched for articles using keywords related to the phenomenon, such as Artificial Intelligence, education, university, and ChatGPT. I ended up analyzing 79 articles that helped me develop an understanding of how AI tools are perceived in the field of education.

During the early phases of collecting and analyzing archival data, it became clear that further research was required to obtain a deeper and more holistic understanding of students' use of AI. While there was a large amount of reporting on how AI tools are being perceived in the field of education, not much informed the perspective of students, who are ultimately the most affected and one of the most important stakeholders in the education sector. I further explored this gap by expanding my search to academic articles. Similarly, academic articles rarely treated students and usually concentrated on employees. Therefore, I decided to explore students' perspectives.

I continued my research journey by conducting one-on-one interviews with students. Conducting interviews allowed me to talk to each student personally and to get an in-depth understanding of their AI use for their studies. It also allowed me the flexibility to adapt to their unique journey and explore any new concepts and nuances that arose. I interviewed 27 undergraduate students at the Concordia University in Montreal, Quebec, Canada. I conducted these interviews through a mix of in-person sessions and online interviews via the Zoom platform. Interviews had an average duration of 50 minutes.

The interviewees represented diverse cultural and ethnic backgrounds. The eligibility criteria were that the interviewees should be active undergraduate students and should be taking at least any one course in marketing. Initially, I interviewed a few students who have not used AI in their studies but the data from those interviews did not yield anything. This is because none of the participants refrained from using AI due to a conscious decision or belief that it would not contribute to their academic growth. The primary reason for not using AI tools was a lack of awareness about its existence. If students had deliberately chosen not to use AI tools, then it would have been meaningful to explore this aspect. However, ignorance of the tool's availability was the sole factor influencing their decision not to use it. Thereafter, I decided to impose another eligibility criterion that students should have used AI in their studies.

I conducted the in-depth interviews in two waves. Initially, I used a semi-structured interview protocol around three areas of inquiry. These were the interviewees (1) views on education, technology, and generative AI tools; (2) goal after graduating; and (3) reason for getting an educational degree. After conducting a few interviews, I realized that a student’s use of AI interacted with how they saw their educational degree and what they wanted to get out of it.

Thereafter, I conducted a second wave of interviews focusing more on these aspects. I deep-dived into situations wherein students took the help of AI to study and paid special attention to the reasoning they had for that use. This second phase of data collection gave me rich data on the decision-making process of students to use AI. The eligibility criteria were still the same because I wanted to interview undergraduate students taking marketing courses to focus more on the use of AI in marketing.

I audio-recorded the interviews and subsequently transcribed them. Thereafter, I used open coding which involves brainstorming to explore all potential meanings in the data, after which researchers apply interpretive labels, reducing the data volume and providing a language to discuss it (Strauss & Corbin, 1998). I employed this by performing idiosyncratic analysis, where I analyzed each interview in and of itself. I identified 235 codes co-occurring across participants. I followed this by performing axial coding and identifying concepts or constructs in the data that relate to the central phenomenon being investigated (Strauss & Corbin, 1998). I employed it by reviewing the codes and associated data to identify patterns and connections, grouping similar codes into broader abstract themes.

This process led to a progression in our analysis from descriptive codes to higher-order constructs. For instance, when analyzing the data, I coded instances in which students talked about their uses of AI and their justifications. I tested emergent findings with my research supervisor and regularly engaged in extensive discussions to consider alternative interpretations and to ensure the validity of my conclusions.

Eventually, I grouped all the codes into 5 abstract themes. Thereafter, I reorganized these 5 themes into two categories, consequently formulating the findings section of my research and answering the research questions.

Findings

This section explores two research questions: (1) How do students decide to use AI? and (2) How do students use AI?

Regarding the first question, when deciding to use AI, students consider AI's potential for advancing their education and alleviating pressure. They evaluate whether AI supports developing core skills or merely replaces tasks and whether it can manage internal pressures (e.g. stress from self-expectations) and external pressures (e.g. stress from heavy workload). For the second question, I identify two patterns: replacement (using AI for replacing learning tasks like reading or essay planning, which may hinder skill development) and support (using AI for enhancing engagement, e.g. alternative explanations, validating knowledge, practicing quizzes). While support uses are beneficial, I caution against replacement undermining important learning activities. I also emphasize the need for instructors to guide students in leveraging AI's strengths while preserving the development of core competencies and deeper understanding. I now expand on each question.

How do students decide to use AI?

When choosing to use AI, students engage in ethical and moral decision-making around AI use. This is salient in my context, perhaps given that the university at which students were completing their studies had yet to draft a comprehensive policy on AI usage. Instead, it responsibilized students for making decisions as to when, how, and why they should be using AI. My analysis finds that students' decision-making process is multifaceted, centering on two key themes: evaluating AI use for educational advancement and pressure alleviation.

First, I explore how students assess AI's potential to enhance their educational experience. This involves evaluating whether AI tools can genuinely support the development of core skills and knowledge, or merely replace tasks without contributing to deeper understanding. A central belief among students is that education should foster the core competencies associated with their degree and the ethical use of AI hinges on its ability to contribute to this process. Second, I investigate how students perceive AI's potential to alleviate various pressures they experience, both internal and external, and the ethical considerations that arise in this context.

The first theme is **Recognizing AI's Potential for educational advancement**. A core belief among the students I interviewed is that their educational experience should support their development of core skills and knowledge associated with their field of study. Hence, one of the important factors through which they evaluate the ethical use of AI is whether it can play a role in this process. I find that students decide whether AI can be used to advance their education by evaluating (a) how it can support the development of core skills and knowledge and (b) how it can replace certain educational tasks that are not recognized as contributing educational value.

Students believe that AI can play a central role in improving their skills and getting a deepening understanding of course concepts and theories. To assess AI's role in developing core skills and knowledge, they evaluate whether AI supports or replaces their learning process—whether it is a teaching aid or a replacement for studying.

P12 offers a salient example of how critical and reflexive students are when considering the value of AI in education:

> *Okay, so I feel there should be some regulations. For example, if you teach your child to use a calculator at the very beginning, like when he is one or two, then that kid will never know*

> *counting… Same thing with the AI, if you teach AI at a very entry level, for example, to a high school student, they will finish the study, but they will have only 40% knowledge of their course, which is not a good sign for students. ... So in our education, there should be some limits. So for example, like the basic things that a student should know about the course, and they should not use AI for it. For example, if you ask me what is programming and if I ask chatgpt, it will say something. Therefore, if I get that answer, without learning then, surely, that is not a good sign for the future. If I actually know what programming is, and then I ask chatgpt what is programming, then it gives me some more information about it, then it is alright, I believe it is gonna enrich my knowledge about the topic. So I would say, we should teach our future students how to use AI…so that they can improve their knowledge and solve their problem at the same time, rather than just depending on the AI*.

P12 discusses the importance of being careful about how AI is used in education. With no official regulations on how to use AI, he makes his own decisions while keeping in mind how it affects his learning in the long run. Comparing AI to the use of a calculator early on when learning mathematics, he explains how it can be viewed in two ways: as a crutch or as a tool. For him, using AI as a crutch is concerning, because it may hinder the development of fundamental skills. This highlights a key consideration for students: ensuring that AI is used to enhance understanding and the development of core skills and knowledge, not replace them. As a result, he calls for limitations as to how AI is used in higher education.

Next, I explain that students are agentic participants in their education (Dolbec et al. 2022). They feel equipped to identify whether the tasks assigned to them by their instructors contribute to their learning. Then they want to spend more time on tasks that lead to the development of their core skills and knowledge. As a result, at times, students reflect on whether AI should be used to replace educational tasks that they perceive as having low educational value—those with little to add to their educational advancement.

An important proxy for students to evaluate the educational value of tasks is the potential impact on their GPA, probably as achieving a high GPA can contribute to their future employment and earnings. They become efficient in recognizing actions that affect their GPA as they progress through college (Nelson, 2003). They tend to devalue tasks with low course weightage as they have minimal impact on the overall GPA. Many of my participants feel that the replacement of these tasks is warranted because it will not impede their educational objectives. Take for example, how P14 uses AI to finish a book report:

> *I kind of did not want to use it (ChatGPT) for essays because I realized how easy it was to like for, like to get it to do all the work for me. But I do not know, I think is really interesting. And especially for as I was mentioning earlier, like I had to read a book report. And I needed a bunch of quotes from an author from this book. And so I like went into ChatGPT and I was like, 10 quotes about this topic from this book. And it just boom, I was like, Well, I mean, I have read the book. So I don't really feel guilty about you know, not doing this but I did not want to like go and cycle through all of these pages to try and find the thing and it just worked flawless!.*

P14 says he did not want to use ChatGPT for writing an essay because he realized how easily ChatGPT would do all the work for him. This way of using ChatGPT for replacing him in the task will take away the learning opportunity from him and hinder his educational advancement. At the same time, P14 had to work on a book report and required several quotes from a specific author in the book. He considered that going through the book manually just to find the quotes was a task with low educational value, deciding instead to use ChatGPT to generate ten quotes on the assignment topic. Since he had already read the book, he evaluated that finding the ten quotes was a menial and tedious task solely undertaken for the sake of creating the book report. It did not add to his understanding.

Additionally, many college students find the academic experience highly stressful (Swick, 1987), prompting them to develop time management strategies to balance academic

performance and stress (Macan et al., 1990). Time management is a crucial self-regulatory process that allows students to actively decide when and how long to engage in necessary activities to achieve their academic goals (Wolters & Brady, 2021). The replacement of learning tasks using AI helps students with time management by supporting their efficient allocation of time to tasks requiring personal attention and effort. However, this need for time management stems from the pressure faced by the students to get the tasks done. As a result, students evaluate whether AI can alleviate pressure by assessing its capacity to manage (a) internal pressure, and (b) external pressure.

Internal pressure may manifest in stress that originates from within an individual's mind or emotions. For students, it can be because of various aspects of students' academic life, such as tests, papers and projects, the competitive nature within one's chosen field, and financial worries about school and future employment prospects (Rana et al., 2019) and often stems from standards they set for themselves.

The self-imposed standards drive them to strive for excellence in various aspects of their academic and personal lives. These standards are not necessarily imposed by external factors such as parents, teachers, or society, but rather are internalized by the students themselves. Students assess AI's potential to help manage pressure from these self-imposed standards. Let us take an example of how P14 decides to use AI while still wanting to get something out of the education process:

> *I think they should just be a support thing. I do not think it (ChatGPT) should be used as a main tool, especially as a student. I think it should be a last resort…maybe if it is, like, teachers using ChatGPT to help students better understand a topic that would be useful, but I feel like as a student, you are paying so much money to attend this, you know, institution. Using AI, kind of is just like cheating yourself a little bit…..Yeah, yeah. Because I feel like there were, I have been in a couple of classes where, I write an essay that gets a 100. And*

then somebody else gets the same mark, but they use ChatGPT. And I was like, that kind of sucks. But I feel really good about my 100. You know what I mean? I feel better about my mark because I wrote it. Whereas somebody else who uses ChatGPT to get that would be happy about the 100 but they would not be as happy, they probably feel a little guilty being like, oh, man, I cheated.

P14 sets self-imposed standards and discusses a key tension related to the decision of whether to use AI to achieve these standards. He wants to obtain a perfect mark. On one side, using AI can help him meet this self-imposed standard by substituting certain educational tasks. On the other hand, it might impede the achievement of self-imposed standards since obtaining high marks on assessments through the use of AI leads to feelings of inadequacy or guilt, as it diminishes the sense of personal accomplishment derived from independent work. He has another self-imposed standard of getting his money's worth but using AI may also diminish the perceived worth of the money invested in pursuing their education. Students therefore face competing demands, which they negotiate through deciding when and how using AI is the morally right choice.

External pressure comes from outside sources and influences. This can stem from expectations set by parents and educational institutions or professors. For example, educational institutions establish specific criteria to assess students' academic proficiency and to enforce accountability. This adds pressure on the students to perform in a certain way because adherence to these criteria is imperative for students to obtain their academic degrees (Kirk & et al., 2010). These criteria typically include achieving satisfactory grades in assignments and submitting original, plagiarism-free work. Students may use AI tools to help answer these external expectations. Thereby, making a decision determining whether and how to use AI in answering external expectations. Take for example, how P17 uses AI to finish her essay:

> *For me as a comms major, and journalism and marketing, there is a lot of writing, right? So I see it (ChatGPT) as a tool. But I think it is easy to leap into a more or less like, replacement, you know, like writing our essays and whatever. Like I have done like, it is my first semester….As a student that kind of uses AI. I mean, I do use it a lot, but I try not to use it as a replacement, but it is hard. You know, it is sometimes like, you are sick of working and after like, after six hours of writing, you are like, come on, like, I just want to finish this essay. And you know, that if you just asked GPT to just write your conclusion. And it is well thought, well, written, like everything is just so well done, and you just want to use it, you know?*

As she indicates, P17 has to do a lot of writing for her courses. Despite her intention not to use AI as a complete replacement for her writing tasks, she admits to occasionally feeling tempted to do so, especially when fatigued after long hours of work. This quote shows how a student faces time constraints along with the pressure to complete the task efficiently. This workload pressure set up by the university leads to her prioritizing speed and convenience over the deeper learning outcomes associated with independent writing and critical thinking. The student wants to do independent work and use AI tools only for assistance but she uses AI tools as a replacement when she is fatigued and just wants to get done with the work. This highlights a tension between the convenience and efficiency offered by AI and the desire to maintain academic standards.

To summarize, internal pressure may lead to students not using AI for educational activities. This is because they derive satisfaction from obtaining high marks through independent work and they want to get their money's worth by developing knowledge from the educational process. Whereas, external pressure may lead to students using AI for educational activities. This is because they may opt for speed and convenience when they are under workload or academic pressures.

<u>How do students use AI?</u>

Students' uses of AI in an educational environment reveal two distinct patterns: replacement and support. Replacement occurs when AI tools are used to execute tasks integral to the learning process itself, such as reading assigned articles or structuring essays. Conversely, AI support involves using these tools to enhance engagement and understanding, as seen in seeking alternative explanations or validating knowledge through cross-referencing. In this section, I delve into how students navigate these two modes of AI interaction and highlight the potential pitfalls of replacement, where AI may inadvertently supplant important learning activities, while also showcasing the nuanced ways in which AI can genuinely bolster the learning process.

The first theme is **how students use AI to replace learning activities.** A learning activity is any task or experience designed to help the learners. The goal of the learning activity is to acquire knowledge and enhance understanding (Jonassen, 2002). For example, performing problem-solving exercises, writing an essay, reading educational content, and attending lectures, all constitute learning activities. P5 explains how he approaches one such learning activity, that of reading articles:

> *P5: If I ever use it (ChatGPT), I never use it to do my work but to help me learn how to do my work…Not everyone has the time to read every article, they have to identify every single point they want to use in their essay. So the rule is just like, it (ChatGPT) should just help you study. I have had so many teachers, tell us like, I am not banning you from using it. Like I am just telling you do not use to do your work. Just use it to help you do the work.*

P5 sees his use of AI as a help for him to study under time constraints. Aligned with ethical decision-making and the decision to alleviate time pressure, he discusses how "not everyone has the time to read every article," drawing from his belief that his behaviour is 'normal and

expected'. However, I see potential drawbacks from the implications of their decision-making process.

Conceptual knowledge is acquired through repeated exposure to examples that are similar in some respects and dissimilar in others and therefore, it is attained by learning how to extract commonalities (Farnham-Diggory, 1994). Reading articles helps in building conceptual knowledge on a specific subject. It enables the students to understand interrelationships among the basic elements within a larger structure that enables them to function together (Anderson et al., 2001). Reading the articles assigned within a class is thus an important part that enables the student to acquire knowledge and illustrates the commonalities in the essay that he produces. Therefore, a pernicious aspect of using AI may be to appear as a support while it replaces important learning tasks fundamental to the student's learning process, despite students believing they are acting ethically and making the right moral decision.

While reading relates to knowledge acquisition, other learning activities engage students in using different skills and knowledge and developing their expertise in doing so. P17 discusses how she undertakes the activity of planning and structuring an essay, and her use of AI to assist in this task:

> *P17: I definitely think I use it (ChatGPT) a lot for my plans for my essays. I know that, like for me, essays are like, well written if you do a good, thorough plan. And I asked him (ChatGPT) what to do, and to write my plans. So like, I will ask him to like, I will put it in my sources, I will say like, this is my primary source. This is my secondary source, I need to use both of them in my essays, how can I incorporate it (data sources) in the plan that like my teacher gave me so I will put like, also the method that our teacher asked us to use, just like write the plan. And I usually, like read it (plan) again. Or write on a piece of paper to make sure that is really what I want to write about. But, um, yeah, yes. Yeah, I guess it (ChatGPT) does a lot of my planning for sure.*

P17's use of ChatGPT for essay planning reflects a strategic approach to leveraging AI for academic support. Arguably, it could be that her use of ChatGPT frees up cognitive resources to focus on critical analysis and writing, potentially leading to a more thoughtful and well-developed essay. Therefore, AI could be seen as a scaffold (Hammond 2001), providing support to assist P17 in achieving a complex task. Scaffolding is a teaching method that provides temporary support to help students progressively achieve greater independence and mastery of new concepts or skills.

However, as with P5, a more critical interpretation is that P17 is delegating the task of deciphering how to effectively utilize the knowledge obtained from these sources. Planning an essay provides the roadmap and structure for a long-form argument, while writing brings those ideas to life. Both learning activities are essential to develop writing skills. Arguably, it also leads to the development of logical knowledge—a mental model of what is connected to what and what leads to what (Farnham-Diggory, 1994). Using AI for planning the essay might thus hinder the development of the kind of competencies associated with completing a higher studies degree. Despite the result of the ethical decision-making of students, I interpret this approach to learning as using ChatGPT to do the work for the student because they are replacing an essential learning activity.

P5 and P17 both highlight the educational challenge of using AI: ensuring that it enhances rather than supplants critical learning activities. Importantly, in both cases, students may hinder their learning despite believing that they are making the right and ethical choice. While AI can undoubtedly assist in reading articles and essays, it is vital for students to critically evaluate and engage with the texts and plans produced by the technology. P17's practice of reviewing and potentially rewriting the AI-generated plan on paper is a positive step, indicating an awareness of the need for personal input and validation. Arguably, a new task

for educators will become to guide students to balance AI support with active engagement, ensuring that AI serves as a tool to enhance, not replace, essential learning activities.

The second theme is **how students use AI to support learning.** In contrast to replacing learning, students at times use AI in ways to increase their engagement with course material and learning activities. Examples of supporting learning activities include practising questions, solving mock quizzes, and seeking feedback.

First, I explain how students use AI tools to seek alternative explanations and enhance their understanding. For example, P6 explains how he uses AI to seek additional explanations for a topic -

> *P6: Because there is a lot of teaching, teachers have their own lectures they stick to, and I feel like those teachers have like concepts and stuff that they teach,...a specific part where they teach…For example, a teacher might explain what is a graph and like marketing, maybe the teacher explains the terms in one specific way, while ChatGPT explains in another way. So I feel like at that point, you should just mostly rely on the teachers, the lectures and stuff. But if it is like, for example, you do not understand what secondary data is. I feel like ChatGPT, it will be fine...If you say, can you explain to you what secondary data is? And what uses it can be of?*

P6 highlights the diversity among teachers in how they convey concepts and information. Just as each teacher brings their unique style and approach to explanations, constructivist theories of learning emphasize the importance of multiple representations and perspectives in building robust understanding (Ainsworth 2006).

ChatGPT can thus be an additional source of explanation for enhancing understanding. I see at least two potential benefits from using AI to offer alternative ways to explain concepts and

theories. On one side, P6 is balancing the value of human instructors for their depth of understanding and tailored explanations with the use of AI in a supplementary role to address specific challenges or gaps in understanding. This balanced approach creates a virtuous cycle because it recognizes and leverages distinctive benefits of both AI and human help separately (Raisch & Krakowski, 2020). On the other hand, P6 underscores how, by turning to ChatGPT for clarification on concepts like “secondary data,” he is engaging in self-regulated learning, actively seeking to fill gaps in understanding and reinforce knowledge gained from lectures. Self-regulated learning is a critical aspect of effective educational practices, as it involves students taking responsibility for their own learning process, seeking out resources, and actively engaging with the material (Cassidy 2011). This combination of lecture-based learning and AI-supported clarification may lead to a deeper and more comprehensive understanding of the subject matter. However, educational outcomes such as learning may greatly benefit from engagement by instructors to provide monitoring and guidance in performing these two activities conjointly (Griffin, Wiley, and Salas 2013).

Let us take another example of a student P9, who uses ChatGPT to enhance her engagement with learning activities:

> *P9: Yeah, so I use the AI mainly for the segmenting, because I had a hard time for that. Because there was a lot of like, How are you going to segment your product? So who are you going to target? ….So I asked, like, first of all, umbrellas are for everyone. So it is a very wide product. So anybody can use it. But since it is (fictional product) a very tech product, like give me the feedback of maybe it could be useful for university students, for students that are on like, on the go people that are busy stuff like that. Yeah, gave me feedback based on lifestyle, psychographics…using ease factors. So geographic, behavioural, psychographic, it is (ChatGPT) going to give options for all of them. So I mainly when we as a team, like we mainly use that as a base point. And from there, we can add on.*

P9 uses AI to help with her marketing project wherein she had to launch a fictional product in the market. She needed to come up with a segmentation strategy so that she could identify and potentially target specific groups of consumers with tailored messages and strategies, ensuring more effective and efficient marketing efforts. By leveraging AI, she was able to refine her segmentation strategies to understand how the product better suited the university students, above all. This use of AI emphasizes the collaborative relationship between humans and AI, and the concept of ’mixed-initiative’ scaffolding where both humans and machines collaborate to aid learning and problem-solving (Pea, 2004). The market segmentation was a smaller part of the overall assignment of building the marketing plan for launching the fictional product. I interpret this approach of using ChatGPT as a means to support learning activities. In this example, P9 explains how generative AI provided ’feedback’ from a university student perspective, offering segmentation options. While this may have removed tasks such as performing research online to gather this information, it also supported P9 in the continuation of the rest of the marketing plan. Since this was a difficult task for her, it could have simply stopped her efforts in the project. However, using AI helped her pursue the overall goal of the project, and she integrated insights from ChatGPT’s segmentation, to build a comprehensive marketing plan for the fictional product. Thereby, still learning in the process. Here, replacement and support seem to be working concomitantly, painting a rather complex picture of AI use and its potential consequences on learning.

Moving on, let us look at a second way students increase their engagement with course material and learning activities when using AI: validating their knowledge. Validating knowledge is an important part of the process of understanding a phenomenon and the following example illustrates how ChatGPT supports it:

> *P9: I was targeting the Canadian population. So at first, I did research on the type of values that Canadians want in a product, like what do they value in a product? So I did research on that. And on that, I actually use ChatGPT, I asked it the exact same question. And I got a*

bunch of answers as well, that corresponded with my other research that I found. So then, from there, I started writing my text. And that is it. Like, I had to write a big paragraph. So from the arguments that both my research and ChatGPT verified, that was fine.

P9 uses ChatGPT to validate their own research. She compares ChatGPT's response to the information she gathered independently from other sources. This cross-referencing of information reinforces the accuracy and strengthens the credibility of the information, and represents a shift between the 'building' and 'holding' approaches (Fyrenius et al., 2007). Firstly, the student 'builds' their knowledge by doing their own research and integrating new information with their existing knowledge. Next, to move on to the 'holding' approach, students need to believe that they have acquired the "correct" understanding of a concept. This is where ChatGPT helps by providing validation. Throughout the process, P9 is still doing her own research, applying their knowledge and therefore, learning in the process.

The last way students use AI to validate knowledge is by testing their own skills and knowledge. Take, for example, how P10 explains his use of AI to create mock tests:

P10: I have created my own, like mock quizzes before. And I sort of asked it (ChatGPT) to quiz me on or like, give me five questions on whatever topic. And it will print out five questions. I will go back, I will answer it. And I will try and I will sort of give it my best understanding. And then I will ask it if this was the correct answer. And sometimes it is right, sometimes it is wrong. Sometimes I will ask it to print out both the right and the wrong answer. Like with an answer, and without an answer. And it has helped, it has helped me.

P10 discusses his proactive approach to utilizing AI as a study aid by creating mock quizzes. Mock quizzes help him in learning because they actively recall the subject matter and further provide him with immediate feedback. Using AI enables the student to get both right and wrong answers. This leads to them learning from their mistakes and understanding the

reasoning behind the correct responses. This reflects a ’moving’ approach, wherein students continuously reevaluate and refine their understanding through engagement with different perspectives and learning modalities (Fyrenius et al., 2007). Therefore, taking quizzes and practising mocks reinforces the specific skills and content being covered and are activities in which AI tools like ChatGPT can play a vital role.

Discussion

The integration of Artificial Intelligence (AI), particularly generative AI, is transforming the workplace and education sector. While organizations primarily aim to save costs (Huang and Rust, 2018) and boost productivity when integrating AI, students have different goals. Productivity and efficiency are not the driving goals of students. Rather, students pursue goals such as acquiring knowledge and skills (Kristiyani, 2020). Therefore, prior findings that explain AI's role in boosting productivity or saving costs are less likely to apply to an educational context. Additionally, the transformative role of AI in the workplace is reshaping the required skillsets for employees (Chui et al., 2015, Huang & Rust, 2018), necessitating a shift in educational programs to prepare students for their future employment. Overall, the integration of AI in education presents unique challenges and opportunities that require a deeper understanding of how students perceive and use AI for their academic pursuits.

My research addresses such questions by exploring how students decide to use AI and their specific usage patterns. I answer how undergraduate students use generative AI tools like ChatGPT for their studies, how it affects their educational experience, and more precisely how they decide to use AI and then use it. The findings of my study revealed nuanced perspectives and decision-making processes surrounding the responsible use of AI in education.

Regarding the decision to use AI, my findings highlight that students consider AI's potential for advancing their education and alleviating pressure. They evaluate whether AI can genuinely support the development of core skills and knowledge or merely replace learning tasks without contributing to deeper understanding. This evaluation is driven by the belief that education should foster the core competencies associated with their degree and the ethical use of AI hinges on its ability to contribute to this process. Furthermore, students

assess AI's potential to alleviate various pressures they experience, both internal (e.g., stress, self-imposed standards) and external (e.g., workload, institutional expectations). The internal pressures stem from the standards and expectations students set for themselves, often based on personal aspirations and values. In contrast, external pressures originate from outside sources, such as parental expectations or institutional criteria for academic performance and accountability.

When it comes to how students use AI, my findings reveal two distinct patterns: replacement and support. Replacement occurs when AI tools are used to execute tasks related to the learning process, such as reading assigned articles or structuring essays. On the other hand, support involves using AI tools to enhance engagement and understanding, as seen in seeking alternative explanations, validating knowledge through cross-referencing, or practicing mock quizzes. Students rely on their decision-making skills to strike a balance between using AI for 'replacement' or 'support'. However, their evaluation of what constitutes a task with low educational value may be flawed. Tasks perceived as menial or tedious by students may, in fact, hold significant learning value that should not be replaced. However, on the positive side, students' initiative to use AI demonstrates their ability to take ownership of their learning journeys and engage in self-regulated learning. This self-directed approach fosters the development of crucial skills such as problem-solving, critical thinking, and adaptability, which are highly valued in the rapidly evolving job market.

One key theme that emerged was the tension between the perceived benefits of AI tools for enhancing productivity and learning, and the potential risks of misuse or overreliance on these tools. Students acknowledged the power of AI in generating content, expanding idea variety, and improving efficiency. However, they also recognized the challenges it poses to academic integrity and the importance of fostering a culture of responsible usage.

I now summarize and compare insights from my findings about AI in education with prior work on AI at the workplace, which I summarize in Table 1.

Table 1 - AI at Workplace vs AI in Education

Point of Comparison	AI at Workplace	AI in Education
Goals	Saving cost and boosting productivity	Supporting the development of core skills and knowledge, and alleviating pressure
Integration Process	Automation and Augmentation	Replacement and Support
Negative Impact	Employees facing layoffs	Learning may be compromised
Positive Impact	Economic productivity and shaping the future of work	Personalized learning

In the workplace, the primary **goals** of using AI are to (i) save cost by automating business processes and (ii) boost productivity by taking over more routine aspects of the job (Chui et al., 2015). On the other hand in education, students use AI (i) to support the development of core skills and knowledge by seeking additional explanations or by validating their existing knowledge, and (ii) to alleviate pressure when they are under time constraints or expectational pressures. Moreover, students use their decision-making skills to evaluate whether the use of AI for a particular educational task is ethical.

Automation and augmentation are used to integrate AI in the workplace. Employees utilize AI both for automating tasks through technology and for augmenting their capabilities by

assisting in managerial tasks (Davenport and Kirby, 2015). In contrast, in education, students use AI to replace learning tasks like reading or essay planning and to support learning tasks by seeking explanations and practicing quizzes. However, at the workplace, automation and augmentation can be interdependent over time (Raisch & Krakowski, 2021), whereas in education, replacement and support are independent but may happen concomitantly.

The integration of AI in the workplace is anticipated to drive a shift towards higher-order cognitive and socioemotional skills, as well as advanced information and communication technology skills. Highly educated workers, who possess these skills, are less likely to be adversely affected by new technologies. Conversely, individuals in low-skilled jobs are at a higher risk of job displacement due to AI adoption, highlighting the negative impact on this segment of the workforce (Poba-Nzaou et al., 2021). Additionally, with 4.2 billion people without internet access, there is a potential for an increased gap between developed and developing countries (Poba-Nzaou & et al., 2021).

In education, AI adoption by students may them to compromise their own learning. While my findings demonstrate that students have developed ways to evaluate the ethical use of AI, a critical analysis reveals potential flaws in this approach which may compromise their learning. There were instances where students replaced tasks they deemed as having low educational value, such as finding quotes for a book report or planning an essay. However, these tasks arguably possess significant learning value, as they contribute to the development of cognitive skills, logical knowledge, and competencies associated with higher education. By replacing these tasks, students may inadvertently hinder the development of vital cognitive processes and deprive themselves of opportunities to practice and refine these crucial skills. Consequently, this may further impair their performance and readiness for the workforce.

The integration of AI in the workplace has positively impacted economic productivity and is shaping the future of work. As AI automates tasks, employees must increasingly focus on developing human skills (Chui et al., 2015; Huang & Rust, 2018) while also learning to leverage AI tools effectively and ethically as they become more prevalent in the workplace. In the education space, the findings reveal that students demonstrate initiative and a proactive approach to utilizing AI. AI helps in personalizing the learning process by aiding students with on-demand alternative explanations for concepts they find difficult to understand. It also creates practice questions on specific topic, and gives immediate feedback. All this allows students to learn at their own pace, without having to wait for a professor. Moreover, this proactive engagement aligns with the growing significance of AI in various professional domains. This will also help students gain practical experience and develop the necessary AI literacy skills that will be invaluable in their future careers.

To summarize, AI integration in workplaces aims to save costs and boost productivity, while in education it supports skill development and alleviates pressure. The workplace focuses on automation and augmentation, whereas students employ their decision-making skills to evaluate whether using AI might replace or support their learning. Despite concerns like job losses and learning gaps, AI is shaping the future of work and helping students get ready by personalizing the learning process, necessitating a balance between leveraging AI and preserving core educational and workplace values.

Implications

The findings of my study have significant implications for multiple stakeholders, including students, educational institutions, and society as a whole. I will now explain each in turn.

Students need to develop critical skills in evaluating when and how to use AI effectively in their learning process, while also reevaluating their current use of AI. For example, students

face ethical dilemmas when deciding to use AI for tasks like essay writing. They must learn to balance the efficiency AI offers with the need for genuine learning and skill development. This implies a need for students to cultivate a nuanced understanding of AI's role in their education, using it as a support tool rather than a replacement for core learning activities. Moreover, this will help students use AI for better self-regulated learning abilities. This includes actively seeking out resources, filling gaps in understanding, and reinforcing knowledge.

Educational institutions must develop comprehensive policies and guidelines for AI use in academic settings, moving beyond simply responsibilizing students. For example, the findings highlight that students are making their own decisions about AI use in the absence of clear institutional policies. Universities need to proactively address this by creating guidelines that outline appropriate AI use in various academic contexts, such as distinguishing between using AI for replacement or support.

For society, my insights contribute to the broader conversation around responsible AI use. By understanding how students navigate the ethical considerations of AI, society can better appreciate the challenges and develop frameworks to promote responsible AI adoption across various domains. Moreover, as AI continues to permeate various aspects of life, the findings highlight the importance of preparing the next generation to navigate an AI-driven future effectively and ethically. This preparation is crucial for mitigating potential risks and unintended consequences.

Limitations

My study, like any other study, has a few limitations. Conducting a longitudinal study rather than a cross-sectional one could have provided more dynamic insights into how students' use of AI evolves over time. Another limitation is the presence of motivated reasoning and

post-hoc rationalization in students. For example, students' motivations and preconceived notions about AI could influence how they incorporate these tools into their studies and how they interpret the outcomes. Moreover, when interviewed students could create post-hoc justifications or explanations for actions or decisions that they made, which may not reflect their actual rationales but one that helps them appear ethical or help maintain their sense of self.

In conclusion, my study offers valuable insights into how students navigate the decision to use AI and the distinct patterns of AI usage in educational settings. While AI undoubtedly holds promise in supporting and enhancing learning, it is essential to strike a balance between leveraging its strengths and ensuring students' engage in learning. By providing guidance, fostering critical reflection, and integrating AI literacy into the curriculum, educational institutions can help students harness the potential of AI while safeguarding the integrity and quality of their educational experiences. Moving forward, it is also important to foster a culture of open dialogue and critical reflection around the use of AI in education.

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