What do Learners See in ChatGPT?

Challenges, Benefits, and Writing in the Era of Generative AI Literacy

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Abstract

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Kristen Irvine

This thesis examines the rapid, uncritical adoption of ChatGPT, a widely used generative AI model, by focusing on students' perceptions and use of the tool for writing tasks. The study explores three main questions: how learners use ChatGPT, the advantages and disadvantages they identify, and their awareness of its ethical implications. Using a qualitative approach, semi-structured interviews were conducted with 31 university students and recent graduates, followed by thematic analysis to uncover recurring patterns. Findings show that participants mainly used ChatGPT for drafting, research, editing, and brainstorming, valuing its efficiency and usability. However, they expressed concerns over generic, repetitive outputs, limited research capabilities, and the risk of deskilling, fearing dependence on the tool might erode their own skills. While participants recognized some ethical issues, particularly in education, disinformation, and privacy, awareness of bias, transparency, and sustainability was limited. Despite these drawbacks, participants generally maintained a positive attitude towards ChatGPT, with a strong interest in maximizing its benefits while attempting to manage its limitations. This study underscores the need for promoting critical engagement with AI through Human-Centred AI (HCAI), which emphasizes ethical considerations in technology use. The findings lay a foundation for future research aimed at addressing misconceptions about generative AI and creating educational strategies for ethical AI integration.

Keywords: ChatGPT, Generative Artificial Intelligence (GAI), Human-Centred AI (HCAI)

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Chapter 1: Introduction

The concept of a machine capable of imitating human intelligence started to be explored in the 1950s (Ozmen Garibay et al., 2023; Shih et al., 2021; Tiwari et al., 2023; Tlili et al., 2023). Today, artificial intelligence (AI) is no longer just a theoretical concept, but an undeniable reality. The field of AI has evolved significantly and expanded into various sub-fields such as machine learning and deep learning which mimic human intelligence in a myriad of ways (Deuze & Beckett, 2022; Ng et al., 2021a; Thi, 2023; Tiwari et al., 2023). Although AI technologies have not yet advanced far enough to claim a one-to-one imitation of human intelligence, tasks that previously could only be performed by humans, such as writing and analyzing data, can now be completed by AI (Deuze & Beckett, 2022; Mørch & Andersen, 2023; Ng et al., 2021a; Ozmen Garibay et al., 2023; Southworth et al., 2023; Thi, 2023; Virvou, 2023).

AI is increasingly being integrated in our everyday via driverless cars, smart appliances, and customer service chatbots, for example (Caliskan et al., 2022; Chun-Hung Lin et al., 2021; Gattupalli & Maloy, 2024; Long et al., 2021; Ng et al., 2021a; Sebastien, 2023; Southworth et al., 2023; Tan, 2024). By simply interacting with AI more, people will likely cultivate a positive perception of it (Walter, 2024). This is due to the 'mere exposure effect': a well-documented psychological phenomenon in which repeated exposure to something, like a new technology, induces a positive perception of it (Walter, 2024). Imbibed with unearned positivity, new technologies are adopted uncritically without proper investigation into their effects or the potential harms they can cause (Curtis et al., 2024; Trust et al., 2023; Walter, 2024). Research has highlighted "this pattern - the emergence of new technology and its uncritical adoption", but we have not been able to break it (Adolfi, 2023, p. 6). Unfortunately, we seem to be repeating the same mistakes in our adoption of AI.

While AI technologies are very advanced, they are in no way benign. There are a host of ethical issues concerning AI and many recorded instances in which an AI technology has caused harm. Some of these examples will be explored in the literature review below in relation to a specific type of AI - generative AI (GAI). As GAI technologies have become more prominent, public interest in AI has grown significantly (Barrett & Pack, 2023). A few researchers have responded to the recent AI boom by sounding the alarm and cautioning against adopting these new technologies without proper care or critical thinking (McQuillan, 2019; Park et al., 2021; Qadir et al., 2022; Sharma et al., 2024; Sureth, 2024; Trust et al., 2023; Walter, 2024). There is renewed concern in the mere exposure effect as it could potentially lead to the "underrepresentation of genuine AI safety concerns" (Walter, 2024, p. 2). Without understanding the ethical issues surrounding AI or the harms it has already caused, further uninformed use could "create additional harms" (Trust et al., 2023, p. 15) that may compound and "threaten the well-being of society" (Park et al., 2021, p. 98).

Projections such as these may be dismissed as mere hyperbole or seem like just the next moral panic, but the impact of AI cannot be underestimated. Rapid advancements in AI are disrupting and reshaping the world in dramatic ways (Faruqe et al., 2022; Luttrell et al., 2020; Yue & Shyu, 2023). Industry after industry is being pulled into this wave of change, forced to adapt or be left behind (Ng et al., 2021a; Ng et al., 2022; Rattadilok et al., 2018). By automating tasks and replacing human workers with AI, higher productivity levels can be reached at lower operating costs (Bubeck et al., 2023; Deuze & Beckett, 2022; Ng et al., 2021b; Rattadilok et al., 2018). While this may help industries remain competitive and profitable, it eliminates millions of jobs and, in some cases, entire occupations (Brennan, 2019; Bubeck et al., 2023; Hasan, 2023; Ng et al., 2021b; Sison et al., 2023; Southworth et al., 2023). With shrinking career prospects,

many people may soon find themselves painfully stuck in a perpetual state of unemployment, unable to compete with AI. Employment rates are just one area that AI will likely impact. If AI is used improperly, it could potentially "unleash massive damage ranging from engendering inequality, disadvantaging minorities and destabilizing the basic fabric of society" (Qadir et al., 2022, p. 330).

AI developers and enthusiasts do not tend to share in such bleak projections. They expect a world in which AI is primarily used by humans to transcend our biological limitations, enabling us to do things we were not able to do before (Brennen, 2019). Ideally, AI adoption will not only come in the form of automation but also augmentation. By giving people the opportunity to work with AI instead of being replaced by it, productivity levels can theoretically be boosted while uniquely human characteristics such as empathy and creativity can be preserved and possibly even enhanced (Bubeck et al., 2023). To achieve this, new knowledge and skills are needed (Carolus et al., 2023; Ng et al., 2021b; Southworth et al., 2023; Wheatley & Hervieux, 2022). However, upskilling or reskilling people so they can effectively collaborate with AI is not a simple or cheap task (Bubeck et al., 2023). The few people who can afford to upgrade their skills to work with AI will inevitably come out on top, widening the income gap and exacerbating inequalities (Fui-Hoon Nah et al., 2023; Walter, 2024).

As AI applications become more commonplace, AI literacy is being positioned as a new prerequisite necessary for participating in society (de Freitas & Weingart, 2021; Kong et al., 2021; Laupichler et al., 2022; Ng et al., 2022; Shih et al., 2021). Reacting to AI disruption and framing AI literacy in this way serves to normalize the growing presence of AI in our daily lives. This reaction is not unique to AI. We tend to consider the adoption of a new technology as normal and expected; whereas, resistance or opting out of the new technology is seen as a

problem that needs to be fixed (Brennen, 2019). Mainstream discourse on the AI boom has tended to gloss over the possibility of opting out or resisting AI technologies. It is much easier and more common to talk about the importance of AI and the need to get everyone adequately AI literate.

Many researchers have highlighted the importance of AI literacy and its role in preparing people to work and live in a world increasingly driven by AI (Chan & Hu, 2023; Bae et al., 2022; Ding et al., 2023; Kong et al., 2021; Laupichler et al., 2022; Long & Magerko, 2020; Ng et al., 2022; Shih et al., 2021; Southworth et al., 2023; Wheatley & Hervieux, 2022). It has become a common practice for researchers to recommend AI education after presenting their findings on a problematic aspect of AI or an issue an AI technology has caused (Chan & Hu, 2023; Ding et al., 2023; Fui-Hoon Nah et al., 2023; Hasan, 2023; Mørch & Andersen, 2023; Petricini et al., 2023; Sánchez Reina et al., 2024; Shoufan, 2023; Singh et al., 2023). Likewise, there has been a big push for governments to educate their citizens about AI and ensure their workforce is AI-ready (Southworth et al., 2023). At the international level, the United Nations and the World Economic Forum have prioritized AI literacy at all levels of education (Curtis et al., 2024; Southworth et al., 2023).

AI literacy education is increasingly being treated as a panacea that will alleviate any inequalities or issues caused by AI. While AI literacy education may sound like a decent recommendation, it is too broad a term to hold any real meaning or inspire specific calls to action. There is no simple path to becoming AI literate due to AI's rapid evolution and diverse applications (Ng et al., 2021a; Southworth et al., 2023; Wheatley & Hervieux, 2022). Given AI's complexity, it is difficult to create a lesson or educational program that is both accessible and comprehensive enough to make everyone adequately 'AI literate'. Simply recommending for

there to be more AI education is ambiguous at best and, at worst, wastes resources on a silver bullet solution that will not actually address the systemic impacts of AI disruption or prevent inequality from worsening in the rollout of AI technologies.

We are only just starting to figure out what it means to be 'AI literate'. As a field of study, AI literacy is still in its early stages, struggling to establish itself and keep pace with the technologies' rapid evolution. The field lacks empirical literature and there have only been a few attempts at conceptualizing AI literacy comprehensively (Brummelen et al., 2021; Ng et al., 2021a). So far, Long and Magerko's (2020) definition has been the most commonly cited in research on AI literacy (Casal-Otero et al., 2023; Laupichler et al., 2022). AI literacy, according to Long and Magerko (2020), is "a set of competencies that enables individuals to critically evaluate AI technologies; communicate and collaborate effectively with AI; and use AI as a tool online, at home, and in the workplace" (p. 2). A key part of this definition is the call for the critical use of AI. The term AI literacy should not be mistaken for mere familiarity with AI technology. To be considered AI literate, one should be able to use the technology responsibly and be aware of the potential harm it could cause. Unfortunately, Long and Magerko's (2020) definition of AI literacy and the need for critical thinking has not received much attention outside of academia.

Popular discourse on AI is rife with innovation bias, which encourages the rapid and uncritical adoption of new technologies (Youngman et al., 2023). The dominant narrative forming around the recent breakthroughs in AI is that they are a sign of progress and the next technological revolution (Williamson et al., 2024; Youngman et al., 2023). Fueling this narrative is the belief that while technological revolutions may have uncomfortable transition periods in which some people lose their jobs or need to upgrade their skills; overall, society ends up better

in the end with improved quality of life due to technological advancements (Bazelais et al., 2024; Brennen, 2019; Carolus et al., 2023). This story is attractive to AI developers and other stakeholders as it excuses AI's disruptive impacts in the name of progress and overly optimistic projections of how AI will improve lives.

One only has to look back at the recent rise of social media to see that technological advancements do not automatically guarantee progress. There is now a dearth of studies that link social media to serious issues such as rising depression and anxiety levels; the spread of fake news and hate speech; the manipulation of public opinion and election interference (Brennen, 2019; Polanco-Diges et al., 2022; Radtke et al., 2022; Szakolczai, 2023). It has now become a blanket recommendation for people to monitor and reduce their use of social media whenever possible (Altınay Özdemir & Göktaş, 2021; Beattie & Cassidy, 2021; Brennen, 2019; Radtke et al., 2022). Movements for digital detoxes and the adoption of 'dumbphones' are growing in popularity as more people find social media too toxic to use at all (Altınay Özdemir & Göktaş, 2021; Beattie & Cassidy, 2021; Brennen, 2019; Radtke et al., 2022).

We are playing catch up in terms of discovering the real effects social media and other digital technologies have had on society, and are nowhere close to being able to remedy them. We will repeat the same mistakes again if we do not properly question the need for AI or its effects in every place it is applied.

1.1 Research Problem

This study aims to address the uncritical adoption of generative AI (GAI). This problem will be explored in the context of ChatGPT which, at the time of writing, is the most popular GAI. With ChatGPT coming on to the scene so recently, there is a great lack of knowledge on

various aspects of the tool (Strzelecki, 2023; Woo et al., 2023; Zou & Huang, 2023). Although we have an idea of how many people use ChatGPT, it is much less clear what they are using it for or what draws them to it in the first place (Abbas et al., 2024; Barrett & Pack, 2023; Hasan, 2023; Shoufan, 2023; Strzelecki, 2023; Thi, 2023; Zou & Huang, 2023).

We need to know more about the factors that drive adoption of ChatGPT, especially among students as they are one of ChatGPT's biggest user groups (Abbas et al., 2024; Barrett & Pack, 2023; Hasan, 2023; Shoufan, 2023; Strzelecki, 2023; Thi, 2023; Zou & Huang, 2023). Even though students' use of ChatGPT has drawn considerable attention, there has not been enough research on their specific uses or perceptions of ChatGPT (Abbas et al., 2024; Barrett & Pack, 2023; Chan & Hu, 2023; Ding et al., 2023; Johnston et al., 2024; Kelly et al., 2023; Shoufan, 2023; Singh et al., 2023; Strzelecki, 2023; Thi, 2023; Vo & Nguyen, 2024). Literature on ChatGPT has tended to focus on the perceptions of researchers and teachers (Shoufan, 2023; Singh et al., 2023; Strzelecki, 2023; Tossell et al., 2024). While this research is important, data from the perspective of students are needed to get the full picture of ChatGPT's impacts on education (Shoufan, 2023; Tossell et al., 2024). This thesis addresses this knowledge gap by focusing directly on the perspectives of students.

Students' uncritical adoption of ChatGPT is particularly concerning. The hasty and uncritical adoption of new technologies in education have been shown to cause long lasting harms (Shanks, 2020; Trust et al., 2023; Williamson et al., 2023). ChatGPT may quickly become a substitute for learning rather than an aid (Romero-Rodríguez et al., 202; Tam et al., 2023). Beyond just disrupting learning, there are many other issues associated with ChatGPT which will be explored in the literature review. The standard for AI literacy in the context of ChatGPT should be set toward informed and vigilant engagement, discouraging passive consumption of

the GAI's potentially erroneous outputs (Bearman & Ajjawi, 2023; Bubeck et al., 2023; Siegle, 2023; Sun & Hoelscher, 2023; Tlili et al., 2023; Youngman et al., 2023).

While it is good to set a standard, due to the lack of research on ChatGPT, we do not know how far users are actually from it. To prevent the uncritical adoption of ChatGPT, it is first necessary to understand how it is being used. This study will examine the use of ChatGPT for writing, which is one of the most common but contested uses of GAI. Learners' reported uses of ChatGPT along with their perceptions of its advantages, disadvantages, and ethical issues will help to gauge their level of criticality in their adoption of ChatGPT.

1.2 Research Questions

Qualitative data from the perspectives of learners has been used to answer the following research questions:

1. How do learners use ChatGPT for writing tasks?
2. What advantages and disadvantages do learners identify with ChatGPT?
3. To what extent are learners aware of ChatGPT's ethical issues and impacts?

1.3 Research Objectives

This research takes an exploratory approach with the objective of learning about the use of ChatGPT as a new phenomena. Exploration is a common research objective, especially when little is known about a topic (Corrigan & Onwuegbuzie, 2023; Johnson & Christensen, 2019). Initial exploration of a new phenomena is necessary for additional, confirmatory research to progress (Johnson & Christensen, 2019). In the hopes of building a foundation for further

research, this thesis will provide a preliminary exploration into the experience of learners who use ChatGPT.

As outlined above, there are many gaps in the literature on ChatGPT as it is a new technology that was released without full knowledge of its effects or how it can be used. This thesis answers the recent calls for research on students' perceptions of ChatGPT and offers a fresh view of AI through the eyes of learners. It is important to study the perceptions of students for a variety of reasons. For example, in their research on ChatGPT, Chan and Hu (2023) found that "students' perceptions can provide insights into their level of AI literacy" (p. 14). Although this study does not overtly gauge learners' AI literacy, it can highlight misconceptions learners have about ChatGPT and AI in general.

As the research is exploratory and uses a small sample, its results cannot be generalized to the broader population. Recommendations for how, or even if, ChatGPT should be adopted by learners will not come directly from this thesis. However, the new knowledge this research puts forth via its exploratory approach can be tested using confirmatory, deductive methods. Insights from this study may inspire and inform further research and education efforts to correct users' misconceptions of AI and guide them to use it more ethically.

Chapter 2: Literature Review

2.1 Introduction

This chapter presents the literature that informed my study and research aims. Section 2.2 offers a definition of GAI and provides a comprehensive background on ChatGPT including details on its training, capabilities, public releases, and ongoing development by OpenAI.

Following this, section 2.3 investigates the various issues with ChatGPT. Section 2.3.1 covers the issue of misinformation and inaccuracy in ChatGPT. The model's propensity for bias is explored in section 2.3.2. Then, the problem of disinformation, which is different from misinformation, is defined and linked to ChatGPT in section 2.3.3. Then, section 2.3.4 delves into the privacy, transparency, and sustainability concerns related to ChatGPT. After this, section 2.3.5 briefly touches on the issue of responsibility. While section 2.3 covers a lot of ground, it does not include all the types of problems or incidents ChatGPT has caused as there are too many to list.

The review of literature continues in section 2.4 with an introduction to human-centred AI (HCAI), including an outline of its basic principles and its guidelines for better AI design and governance. Section 2.5 explores writing with ChatGPT, which is one of the most common but contested uses of GAI. This section also discusses the challenges of applying HCAI in the context of writing with AI.

2.2 Introduction to OpenAI & ChatGPT

GAI is a subset of machine learning that is trained to identify patterns in existing data to produce new, high-quality content in various forms such as text, images, video, and code

(Baidoo-Anu & Owusu Ansah, 2023; Chan, 2023; Ding et al., 2023; Mørch & Andersen, 2023; Sison et al., 2023). Advancements in GAI have been led primarily by OpenAI which is an AI research and deployment company governed by a non-profit (OpenAI, 2024a). In November 2022, OpenAI deployed ChatGPT, the largest language model and best AI chatbot ever introduced to the public (Chan & Hu, 2023; Crawford et al., 2023; Gradon, 2023; Thi, 2023; Tlili et al., 2023; Tossell et al., 2024). Before its release, ChatGPT was pre-trained on a wide range of publicly available digital content as well as data licensed by OpenAI (Chan & Hu, 2023; Ding et al., 2023; Gradon, 2023; OpenAI, 2023). ChatGPT's pre-training dataset amounted to more than 175 billion parameters, which is the most data ever used to train a language model (Chan & Hu, 2023; Ding et al., 2023; Gradon, 2023; Thi, 2023). To illustrate this more concretely, the entirety of English Wikipedia was used to train ChatGPT, but this data only made up about 3% of the overall training data (Gradon, 2023). In addition to ChatGPT's extensive pre-training, reinforcement learning with human feedback was used to further optimize the model's analysis of user intent and the meaning of texts (Eloundou et al., 2023; Ingley & Pack, 2023; OpenAI, 2022a; Singh et al., 2023; Thi, 2023).

This extensive training regimen paid off as ChatGPT emerged as the most powerful chatbot capable of performing advanced natural language processing tasks (Yenduri et al., 2023). When users ask ChatGPT a question, it responds instantly with highly relevant information in a tone and style that mimics real human conversation (Chan & Hu, 2023; Gradon, 2023; Shoufan, 2023; Singh et al., 2023; Thi, 2023; Tlili et al., 2023). However, its capabilities extend far beyond that of a mere chatbot (Tlili et al., 2023). It is not only used for conversation or gathering information but also to generate new content (Barrett & Pack, 2023; Ingley & Pack, 2023; Johnston et al., 2024; Pan et al., 2023; Shoufan, 2023; Singh et al., 2023; Thi, 2023; Yenduri et

al., 2023). Users can assign tasks to ChatGPT and it will respond by generating high-quality, original textual outputs such as essays, news articles, poems, stories, reports, and even code (Barrett & Pack, 2023; Ingley & Pack, 2023; Johnston et al., 2024; Pan et al., 2023; Shoufan, 2023; Singh et al., 2023; Thi, 2023). The text ChatGPT generates is "reported to be indistinguishable from content produced by humans" (Singh et al., 2023, p. 2). ChatGPT was trained to detect patterns and statistical correlations in text (Baidoo-Anu & Owusu Ansah, 2023; Sison et al., 2023; Weidinger et al., 2021). This enables it to precisely predict the next word that should come in a text and provide the user with an answer to their prompt that is convincingly human (Sison et al., 2023; Weidinger et al., 2021).

ChatGPT is significantly more advanced than previous approaches to natural language processing and represents a major breakthrough in the field (Ding et al., 2023; Shoufan, 2023; Yenduri et al., 2023). While ChatGPT is still "less capable than humans in many real-world scenarios", it "exhibits human-level performance on various professional and academic benchmarks" (OpenAI, 2023). Since its release, it has been put to the test quite literally and has "comfortably passed some of the most challenging professional accreditation exams, including the Uniform Bar Exam for legal practice and the Certified Public Accountant Exam for accounting practice" (Kelly et al., 2023, p. 1). Not only is ChatGPT generating content that passes as human, it is doing so at tremendously fast rates (Gradon, 2023; Singh et al., 2023; Thi, 2023). As ChatGPT is available for free to anyone with an internet connection, it has drastically lowered the costs of producing text-based content (Barrett & Pack, 2023; Singh et al., 2023; Sison et al., 2023; Tlili et al., 2023). This had a disruptive impact on many industries and society in general (Bian et al., 2023; Pan et al., 2023; Tossell et al., 2024).

Workers are being replaced by ChatGPT as it can generate content faster than humans (Chan, 2023; Gradon, 2023; Kelly et al., 2023; Singh et al., 2023; Thi, 2023). Already, jobs in customer service, data entry, and technical support are being taken over by ChatGPT (Chan, 2023; Fui-Hoon Nah et al., 2023; Haque & Li, 2024; Hasan, 2023; Kelly et al., 2023; Singh et al., 2023). A report by Goldman Sachs estimated that "GAI could substitute up to one-fourth of current work", impacting approximately 300 million full-time jobs (Hatzius et al., 2023). As ChatGPT's capabilities advance, the range of jobs it can take over will expand greatly (Bubeck et al., 2023). While automation through free-to-use tools like ChatGPT can help companies cut costs, it displaces workers and reduces the number of opportunities available in the job market (Bubeck et al., 2023; Fui-Hoon Nah et al., 2023; Haque & Li, 2024; Sison et al., 2023). The more optimistic are expecting GAI to create new jobs or assist workers in their current jobs (Fui-Hoon Nah et al., 2023; Hasan, 2023; Hatzius et al., 2023). If used to augment humans instead of replacing them, ChatGPT can help to increase productivity (Budhathoki et al., 2024; Hasan, 2023; Yenduri et al., 2023) and "unlock vast potential in diverse fields such as healthcare, law, education, and science" (Pan et al., 2023, p. 1).

This has yet to be proven, however, as ChatGPT was released without full knowledge of its strengths, weaknesses, or impacts on society. OpenAI made ChatGPT available to the public, hoping they would help test ChatGPT's capabilities and work through some of its kinks (OpenAI, 2022a). There was no shortage of guinea pigs for OpenAI as ChatGPT "acquired 1 million users just 5 days" after its launch in November 2022 (Duarte, 2024). Instagram, on the other hand, took "approximately 2.5 months to reach 1 million downloads" (Duarte, 2024). In just two months after its release, ChatGPT amassed 100 million users, breaking the record for application user-base growth (Barrett & Pack, 2023; Ding et al., 2023; Sison et al., 2023; Thi,

2023). Its worldwide traffic peaked in May 2023 at approximately 1.8 billion visits with the release of ChatGPT 4.0 (Carr, 2024; OpenAI, 2023). The original ChatGPT 3.0 was capable of working only with text-based inputs; whereas, ChatGPT 4.0 is a multimodal model capable of accepting both text and image-based inputs (OpenAI, 2023). This upgrade initially drew more users, but traffic quickly dropped and did not recover until September 2023 (Carr, 2024). Since then, traffic has been slowly increasing and is set to surpass 1.8 billion visits with the release of ChatGPT 4.o in May 2024 (Carr, 2024). This latest version can accept any type of input including text, audio, image, or video, and generate outputs in any of these formats as well (OpenAI, 2024b). ChatGPT 4.o is significantly more powerful than its precursors, responding to audio inputs in almost the same amount of time it takes a human to do so (OpenAI, 2024b). This is supposed to provide users with even more realistic, human-like interactions (OpenAI, 2024b; Tong & Sriram, 2024).

OpenAI is hoping to draw more users in with these improvements as it struggles to stay ahead of the competition (Tong & Sriram, 2024). While ChatGPT is still the most popular, other similarly powerful GAI chatbots have emerged such as Google's Gemini, Anthropic's Claude, and Microsoft's Copilot (Akpur, 2024; Carr, 2024; Chan, 2023; Chan & Hu, 2023; Crawford et al., 2023; Sison et al., 2023; Thi, 2023; Tlili et al., 2023; Tossell et al., 2024; Tong & Sriram, 2024). This is only the beginning as GAI technologies seem to improve and become more powerful at exponentially faster rates (Yenduri et al., 2023; OpenAI, 2024b). It is important to note that the development of ChatGPT and related technologies relies on user engagement. The data users provide ChatGPT through interacting with it is taken by OpenAI to advance its models (Shoufan, 2023; Singh et al., 2023).

This reliance on user data has led OpenAI to release its GAI technologies to the public without full knowledge of what they are capable of, finding out along with the rest of the world. The company claims that without this data, they would not be aware of key issues with their models (OpenAI, 2022a; OpenAI, 2022b) and this awareness could not have been reached through research alone (OpenAI, 2022b). These claims must be investigated and weighed against the company's need to stay ahead of competition. Their trial and error approach and expectation of fixing things as they go has already led to a variety of issues (Sison et al., 2023). ChatGPT's limitations and potential to cause harm will be explored in the following sections.

2.3 Issues with ChatGPT

2.3.1 ChatGPT and the Spread of Misinformation

ChatGPT is not a perfect tool; it makes mistakes like all AI technologies are known to do (Deuze & Beckett, 2022). OpenAI warns that ChatGPT can generate "plausible-sounding but incorrect or nonsensical answers" (OpenAI, 2022a). This is no minor flaw as it can spread misinformation and mislead people without warning (Bian et al., 2023; Chan & Hu, 2023; Pan et al., 2023; Thi, 2023). Users typically struggle to spot inaccuracies unless they are experts on the topic or they already know the right answer (Sison et al., 2023). So, users cannot rely on ChatGPT like they do calculators which consistently provide responses that are 100% accurate (Sison et al., 2023; Warner, 2023).

ChatGPT lacks reliability as its outputs tend to vary for different users even if the same question is asked (Barrett & Pack, 2023; Sebastian, 2023; Tiku et al., 2023; Tossell et al., 2024). ChatGPT customizes its responses based on users' profiles and session histories (Wu et al.,

2023), giving users what they want to hear (Sison et al., 2023) and creating echo chambers in the process (Tiku et al., 2023). There are no set controls for which sources ChatGPT should pull from when answering a user (Beutel et al., 2023; Thi, 2023). This means that users may receive a different response even when using the same prompt (Beutel et al., 2023).

ChatGPT has also been caught 'hallucinating' in which it just makes up information (Beutel et al., 2023; Bubeck et al., 2023; Pan et al., 2023; Schwartz, 2023; Sison et al., 2023). When users try to ask ChatGPT to cite where it got its information, they often receive a list of sources that is incomplete or totally fabricated (Johnston et al., 2024; Singh et al., 2023; Sun & Hoelscher, 2023; Thi, 2023). If not cross-referenced, these sources may appear legitimate (Singh et al., 2023; Sun & Hoelscher, 2023; Thi, 2023). ChatGPT can copy the structure of an academic source; creating a fictional but convincing author, title, journal, and even URL (Mørch & Andersen, 2023). Its ability to mimic language and produce human-sounding outputs is a double-edged sword. While this is a cutting-edge feature that is useful in many instances, it may also lend an air of believability to its hallucinations and mislead unsuspecting users (Bubeck et al., 2023; Ding et al., 2023; Pan et al., 2023; Sharevski et al., 2023; Sun & Hoelscher, 2023).

Even though it may sound like a human, ChatGPT cannot distinguish truth from falsehood or fact from opinion (Bian et al., 2023; Goldstein et al., 2023; Ji et al., 2023; Sison et al., 2023). It predicts the word that is most likely to come next based on statistical probabilities it learned from its training data (Sison et al., 2023; Wolf, 2023). It has not been trained to verify the accuracy or authenticity of information (Chan & Hu, 2023; Sun & Hoelscher, 2023; Thi, 2023). ChatGPT is merely an "advanced autocomplete function", not an arbiter of truth (Sison et al., 2023, p. 5). It is only as good as the data it is fed (Ding et al., 2023). Since it has been trained

on information from the internet, it has had ample exposure to false information (Bian et al., 2023; Pan et al., 2023).

Like all other GAI, ChatGPT does not have any concept of truth, common sense, or ethics (Ozmen Garibay et al., 2023; Wolf, 2023). Society needs truth in order to function. If false information is allowed to spread, then we risk undermining the institutions we rely on and losing trust in our communities (Pan et al., 2023; Sison et al., 2023; Weidinger et al., 2021). ChatGPT has not been aligned with a concept of truth, and so it is vulnerable to false information (Bian et al., 2023; Pan et al., 2023; Sison et al., 2023). However, there is no foolproof way of aligning AI technologies with a definitive source of truth; to do so would completely bias the model, skewing it toward certain values over others (Mørch & Andersen, 2023). Tech companies also do not want to assume the responsibility of providing single, authoritative answers to users' queries (Tiku et al., 2023). For now, they leave it to the user to decide what is true and what is not. This is an issue as users are not necessarily equipped to spot ChatGPT's inaccuracies or biases.

2.3.2 Biases in ChatGPT

All AI technologies are prone to exhibiting bias in one way or another (Çalışkan et al., 2022; Deuze & Beckett, 2022; Long et al., 2021; Sun & Hoelscher, 2023; Weidinger et al., 2021). GAI, despite their recent advancements, are no better than any other type of AI in terms of perpetuating biases (Bubeck et al., 2023; Fui-Hoon Nah et al., 2023; Sison et al., 2023; Thi, 2023). OpenAI's GPT-3 model, the precursor to ChatGPT, was found to exhibit "anti-Muslim and, to a lesser degree, antisemitic bias, where 'Muslim' was analogised to 'terrorist' in 23% of test cases, while 'Jewish' was mapped to 'money' in 5% of test cases" (Weidinger et al., 2021; p. 11). In addition, fictional stories generated by GPT-3 tended to associate female-sounding names

with “stories about family and appearance”, describing them “as less powerful than masculine characters” (Weidinger et al., 2021, p. 11).

This is not just a problem with OpenAI’s GPT-3, but with all GAI which have been shown to exhibit biases toward particular genders, sexual orientations, races, and occupations among many other traits (Bubeck et al., 2023; Fui-Hoon Nah et al., 2023; Sison et al., 2023; Thi, 2023). By peddling these harmful stereotypes, GAI tools encourage discrimination and exacerbate inequalities between people (Çalışkan et al., 2022; Deuze & Beckett, 2022; Ding et al., 2023; Tossell et al., 2024). OpenAI does not seem to have made any real progress toward removing bias from their models. When announcing ChatGPT 4, OpenAI admitted that “the model can have various biases in its outputs” (OpenAI, 2023). The safety of OpenAI’s latest model, ChatGPT 4.o, has yet to be studied as its release is still pending. However, research on ChatGPT 3 and 4 have uncovered harmful biases in the models’ outputs (Bubeck et al., 2023; Shoufan, 2023; Sison et al., 2023; Thi, 2023; Tossell et al., 2024).

As all versions of ChatGPT are trained on data from the internet which is riddled with biased and discriminatory content (Bubeck et al., 2023; Schwartz, 2023; Siegle, 2023; Tossell et al., 2024), it is unlikely that OpenAI has managed to eliminate bias in its latest model. If there are biases in the data that GAI are trained on, it is likely that their outputs will be biased as well (Chan & Hu, 2023; Fui-Hoon Nah et al., 2023; Hasan, 2023; Johnston et al., 2024; Sebastian, 2023; Sun & Hoelscher, 2023). This issue is expected to get worse as GAI models increase in scale and attract more users (Winograd, 2023). It is not only training data that can bias ChatGPT, users can also introduce bias into the model. Although ChatGPT has been programmed to not respond to overtly harmful prompts, it can easily be coaxed into breaking these rules (Bian et al., 2023; Lam, 2023; Pan et al., 2023; Sebastian, 2023; Sharevski et al., 2023). Users have figured

out how to inject bias into the model by giving it a series of instructions to bypass its safeguards and allow it to create toxic content (Bian et al., 2023; Lam, 2023; Pan et al., 2023; Sharevski et al., 2023).

2.3.3 ChatGPT and the Spread of Disinformation

ChatGPT can be used to create disinformation which is the deliberate distribution of false information to mislead and manipulate people (Pan et al., 2023; Sebastian, 2023; Weidinger et al., 2021). GAI tools like ChatGPT have enabled the production of disinformation on an unprecedented scale and frequency (Pan et al., 2023; Sison et al., 2023). This disturbing trend not only creates confusion but also widespread social harm (Pan et al., 2023; Sison et al., 2023). Disinformation has the potential to "undermine trust, escalate social divisions, and even incite acts of violence" (Sebastian, 2023, p. 2).

The spread of disinformation was a major issue even before the recent GAI boom. For example, in just 9 months, COVID-19 disinformation via social media is estimated to have led to 200,000 additional cases and $300 million in hospital costs in Canada alone (Major, 2023). Even though those responsible for this disinformation had an effective way to distribute it via social media, they had to manually create it first. Now, with sophisticated tools like ChatGPT, bad actors can quickly generate highly convincing false information with a simple prompt (Bubeck et al., 2023; Gradon, 2023; Pan et al., 2023; Sebastian, 2023; Sharevski et al., 2023; Sison et al., 2023; Weidinger et al., 2021). They no longer have to rely on expensive human labour to carry out their schemes (Gradon, 2023; Pan et al., 2023; Sharevski et al., 2023; Weidinger et al., 2021). ChatGPT's impressive capabilities can be easily exploited, turning it into a "weapon of mass deception" (Sison et al., 2023; p. 5).

This is not hyperbole. ChatGPT is free and easy for anyone to use, including organized criminal groups, extremist organizations, and even hostile nation-states (Gradon, 2023; Sharevski et al., 2023). GAI tools have already been used to create fake news such as a hyper-realistic deepfake of the Pentagon exploding that went viral (McGregor, 2023) and deepfakes of terrorism that interfered in Turkey's 2023 election (Atherton, 2023). There is already a lot of evidence demonstrating how harmful disinformation can be, especially to democracy (Gradon, 2023; Sebastian, 2023). Persuasive content generated by ChatGPT can be used to influence public opinion, interfere with decision-making, polarize political ideologies, and disrupt democratic political systems (Gradon, 2023; Sebastian, 2023).

If this was not enough to contend with, ChatGPT and other GAI are also extremely useful to cybercriminals for the production of malware, phishing campaigns, and other types of harmful scams (Gradon, 2023; Sharevski et al., 2023; Sison et al., 2023; Winograd, 2023). Current techniques for AI detection are severely lacking, which makes it nearly impossible to determine if a given piece of content has been created by AI (Capell, 2022; Chaudhry et al., 2023; Gradon, 2023; Pan et al., 2023). This gives criminals that use ChatGPT to create disinformation and scams "a high degree of deniability" as their use of ChatGPT cannot be detected or traced back to them (Gradon, 2023, p. 61).

2.3.4 Privacy, Transparency, and Sustainability Issues with ChatGPT

Another significant issue with ChatGPT has to do with privacy and the handling of user data (Barrett & Pack, 2023; Chan & Hu, 2023; Fui-Hoon Nah et al., 2023; Hasan, 2023; Sison et al., 2023). A massive amount of data was used to train ChatGPT and, as most of it was from the internet, a lot of personal information made its way into the model (Fui-Hoon Nah et al., 2023;

Winograd, 2023). In addition to this, data from users' interactions with ChatGPT are collected and used by OpenAI (Colmenero-Fernandez, 2023; Fui-Hoon Nah et al., 2023; Winograd, 2023). Depending on what a user inputs, ChatGPT could be harvesting "identifying information (e.g., one's name, home address, movements, and social security number), ideological views, personal habits and behaviour, sexual preferences, health information, and other confidential data" (Winograd, 2023, p. 624).

OpenAI is not fully transparent regarding its handling of user data. They have made collecting users' data a default setting in ChatGPT, putting the burden on users to opt out if they do not want their data harvested (Colmenero-Fernandez, 2023). The process of opting out is overly complicated as users must first be aware of the opt out function and then "navigate through two separate links and fill out a form" requesting for data from their future conversations with ChatGPT to not be used by OpenAI (Colmenero-Fernandez, 2023, p. 5). If users had unwittingly been using ChatGPT with the default settings, they would need to go through an additional opt out procedure (Colmenero-Fernandez, 2023). OpenAI does not do enough to get users' informed consent before collecting their data (Colmenero-Fernandez, 2023). This lack of transparency violates users' privacy and leaves them vulnerable to potential data leakages (Ding et al., 2023; Sison et al., 2023; Winograd, 2023).

There has already been a reported incident in which "the chat records of some users" became "viewable to others due to system errors in ChatGPT" (Fui-Hoon Nah et al., 2023, p. 286). While this is an unintentional data leakage, it still could have caused harm if the information exposed was of a sensitive nature. ChatGPT is also vulnerable to intentional data leakages. Researchers have demonstrated that through jailbreaking, a user with malicious intent could gain access to information about another individual, possibly even their social security

number (Winograd, 2023). Other than just information on a specific individual, ChatGPT could also be manipulated to divulge trade secrets which could be damaging to a business, for example (Weidinger et al., 2021). The possibility of privacy and security breaches will only grow as ChatGPT gains more users and access to more data (Winograd, 2023).

Models like ChatGPT are getting more powerful, but not more transparent. Even though ChatGPT may have a user-friendly interface, it is difficult for users to understand how the model actually works (Chan & Hu, 2023; Sebastian, 2023; Sison et al., 2023; Tiku et al., 2023). Its black-box approach conceals the rationale behind its outputs (Chan & Hu, 2023; Ozmen Garibay et al. 2023; Sebastian, 2023; Sison et al., 2023; Tiku et al., 2023). While this is a problem for all types of AI technologies due to their complexity, it is nevertheless concerning as it may lead users to "overtrust or undertrust the system" (Ozmen Garibay et al. 2023, p. 4). To ensure an AI system is trustworthy, it must be transparent and explainable to users.

Another problem with ChatGPT is its impact on the environment. Using ChatGPT comes with an environmental cost (Ingley & Pack, 2023), particularly due to the energy and water it consumes. Enormous amounts of energy are used just to train, let alone run, AI models like ChatGPT (Ozmen & Garibay et al., 2023). For example, the electricity bills for training OpenAI's GPT-3 reportedly cost millions of dollars (Haque & Li, 2024). As this energy likely came from non-renewable sources, training ChatGPT resulted in high carbon emissions (Haque & Li, 2023; Ozmen Garibay et al., 2023). Energy is also spent every time a user interacts with ChatGPT (Haque & Li, 2024). As ChatGPT attracts more users, more energy and server resources are needed to process their demands (Haque & Li, 2024).

To cool the servers that power ChatGPT and ensure their optimal performance, a massive amount of water is consumed (George et al., 2023). Approximately 700,000 liters of water were

used to cool servers during the training of ChatGPT (George et al., 2023). For every 20-50 questions that a user asks ChatGPT, about 500 ml of water are consumed, which quickly adds up given ChatGPT's massive user base (George et al., 2023). While this is a problem for technology in general, "ChatGPT's water consumption may be relatively high compared to other AI models" due to its size and complexity (George et al., 2023, p. 97).

2.3.5 Responsibility Issues with ChatGPT

Unfortunately, there are no straightforward regulations or guidelines for addressing the issues described above. This is not limited to just ChatGPT but is a problem with all AI technologies. When harm is caused by an AI, it is not yet clear who or what entity should take responsibility (Bogina et al., 2022; Budhathoki et al., 2024; Jobin et al., 2019; Ozmen Garibay et al., 2023; Walter, 2024). It does not make sense for users to be solely accountable as they may lack adequate understanding or control over the results AI systems deliver (Ozmen Garibay et al., 2023).

However, AI developers cannot shoulder complete blame either due to the complexity of the systems they create and the number of stakeholders involved (Ozmen Garibay et al., 2023; Sebastian, 2023; Virvou, 2023). This is not to say that developers of AI cannot be held responsible for what they create or how they create it. For instance, bias may be introduced in AI systems due to the decisions AI developers make during the design process (Virvou, 2023). There is a tendency for those developing AI to "view ethics as a responsibility belonging to someone else, such as lawyers or ethicists, rather as an integral part of their own technological work" (Virvou, 2023, p. 102). Tolerance for developers' tech-centric view and indifference to ethics are dwindling as more AI-related incidents are reported (Bogina et al., 2022).

While calls for more responsible technology are a step in the right direction, there is a lack of strong laws and regulations that ensure AI-related issues are addressed (Baldassarre et al., 2023; Bubeck et al., 2023; Fui-Hoon Nah et al., 2023; Hasan, 2023; Sebastian, 2023; Sison et al., 2023). In the face of the current legal and regulatory frameworks, developers may only be incentivized to address an issue if it has the potential to affect their reputation and user base. For example, disinformation that is injected into ChatGPT can affect the model's performance and may drive users away in favour of other GAI (Pan et al., 2023). Likewise, issues related to ChatGPT's security and the handling of user data may dissuade large groups such as corporations or governmental agencies from adopting ChatGPT (Barrett & Pack, 2023; Fui-Hoon Nah et al., 2023; Hasan, 2023). So, in order to grow its user base and stay ahead of the competition, OpenAI must address ChatGPT's problems with privacy and disinformation.

There does not seem to be the same amount of pressure for OpenAI to address other problems such as ChatGPT's impact on the environment. While OpenAI makes sure to mention its efforts, however meager, in mitigating harms related to privacy, bias, misinformation, and disinformation, it rarely ever talks about sustainability (OpenAI, 2022a; OpenAI, 2022b; OpenAI 2024b). Like most developers, OpenAI has focused on maximizing the technical functioning of their models instead of improving human and societal well-being (Sison et al., 2023). This tech-centric approach has led to a myriad of issues. Unless something changes, these issues will only get worse as models like ChatGPT become more powerful and prominent in daily life. Developers need to change their approach so that the technologies they create truly serve human needs.

2.4 Human-Centred AI (HCAI)

Human-centred AI (HCAI) has emerged as a new framework for the development and deployment of AI technologies (Esposito et al., 2023; Lu et al., 2024; Ozmen Garibay et al., 2023; Shneiderman, 2020; Yue & Shyu, 2023). This approach prioritizes human well-being, taking ethical aspects into consideration rather than just the technical performance of AI technologies (Bogina et al., 2022; Gattupalli & Maloy, 2024; Mørch & Andersen, 2023; Schmager et al., 2023; Sison et al., 2023; Virvou, 2023). Under the framework of HCAI, the purpose of AI is to serve the interests and needs of humans above all else (Mørch & Andersen, 2023; Topali et al., 2024; Shneiderman, 2020; Sison et al., 2023; Yue & Shyu, 2023). However, this goal is not fulfilled if only the needs of the few are satisfied. AI should be attuned to wider-reaching goals such as "increasing equality, reducing poverty, improving medical outcomes" and "promoting sustainable communities", to name a few (Ozmen Garibay et al., 2023, p. 2).

The traditional goal post of making sure "humans are 'in-the-loop' around AI" is no longer enough (Shneiderman, 2020, p. 112). Instead, humans should be at the center, with our efforts focused on ensuring that "AI is 'in-the-loop' around humans" (Schneiderman, 2020, p. 112). HCAI shifts to a view of AI as tools that "come into existence to support their users", rather than a means of driving progress for the sake of progress (Schmager et al., 2023, p. 8). If AI was created with this in mind, then there would be less automation and more augmentation to enhance human abilities rather than replace them (Esposito et al., 2023; Fui-Hoon Nah et al., 2023; Gattupalli & Maloy, 2024; Jimenez-Crespo, 2024; Lu et al., 2024; Ozmen Garibay et al., 2023; Schmager et al., 2023). Where there is automation, HCAI stipulates that humans should be in control, monitoring the impacts of AI and mitigating potential harms (Esposito et al., 2023;

Jimenez-Crespo, 2024; Ozmen Garibay et al., 2023; Mørch & Andersen, 2023; Shneiderman, 2020; Sison et al., 2023).

To achieve this, AI technologies must be designed in a more thoughtful manner. Principles of ethical AI such as trustworthiness, safety, fairness, and reliability need to be embedded in every stage of AI development and deployment (Fui-Hoon Nah et al., 2023; Gattupalli & Maloy, 2024; Lu et al., 2024; Ozmen Garibay et al., 2023; Shneiderman, 2020; Yue & Shyu, 2023). More attention needs to be paid to user interfaces, making them easier to understand and control (Ozmen Garibay et al., 2023; Schmager et al., 2023; Shneiderman, 2020; Yue & Shyu, 2023). Doing so may help make the issue of assigning responsibility for the impacts of AI less complicated. If users have more agency in steering AI through more transparent and controllable interfaces, they may be more comfortable with assuming responsibility for their use of AI and the impacts it may have (Ozmen Garibay et al., 2023). Of course, robust regulatory frameworks are still needed to make sure AI is developed and deployed responsibly.

Along with its design recommendations, HCAI provides guidelines for making AI-related laws, regulations, and policies more human-centred (Fui-Hoon Nah et al., 2023; Yue & Shyu, 2023; Schmager et al., 2023). Human-centred in the regulatory sphere means upholding human rights and finding alignment with human interests, needs, and values (Gattupalli & Maloy, 2024; Fui-Hoon Nah et al., 2023; Lu et al., 2024; Ozmen Garibay et al., 2023; Topali et al., 2024). It also involves the translation of AI ethical principles, such as fairness, into comprehensive requirements that developers and users of AI must meet in order to prevent harm or be held accountable if harm occurs (Gattupalli & Maloy, 2024; Mørch & Andersen, 2023; Ozmen Garibay et al., 2023; Sison et al., 2023). HCAI encourages the application of these principles by

as many people and in as many places as possible such as in federal legislation, the internal policies of tech companies, and guidelines for appropriate AI adoption in schools, for example (Schmager et al., 2023).

A common challenge of enacting HCAI in either the design or governance of AI is dealing with the diversity of human needs, interests, and values (Ozmen Garibay et al., 2023; Topali et al., 2024). If an AI model is calibrated according to the needs of a certain individual or group, it may serve them better. However, by doing so, the model becomes biased toward these particular needs and may not serve other users as well (Topali et al., 2024; Yu & Shyu, 2023). There is a tension between contextualizing AI models versus generalizing them (Topali et al., 2024). As models like ChatGPT are used around the world in widely different sociocultural contexts, meeting the needs of each user becomes a very complicated task (Fui-Hoon Nah et al., 2023). In addition, needs and values change over time (Ozmen Garibay et al., 2023). So, adapting an AI model to be more human-centred is not a one-time job. AI models must be continually updated and re-adapted to meet changing needs (Ozmen Garibay et al., 2023).

However, this does not solve the issue of managing competing needs. Realistically, compromises will need to be made and expectations managed (Topali et al., 2024). HCAI as an ideal may not be fully reached, but it is still a worthy endeavor to pursue. If users are involved in both the development and deployment of AI technologies, they can have a say in what is compromised and potentially enrich the problem-solving process (Topali et al., 2024). At the same time, developers can get to know their users better and, hopefully, “cultivate deep empathy” for their needs and values (Schmager et al., 2023, p. 8). This is all to support the real work of negotiating how AI models like ChatGPT should be used.

First, we need to understand better how people use ChatGPT, as this data is lacking (Abbas et al., 2024; Barrett & Pack, 2023; Strzelecki, 2023; Woo et al., 2023; Zou & Huang, 2023). Then, we need to go deeper and investigate the underlying values that shape the development and use of ChatGPT. This is especially important for contested uses of ChatGPT such as writing which will be the focus of the next section.

2.5 Using ChatGPT for Writing

One of the most common uses of ChatGPT is for writing (Barrett & Pack, 2023; Chan & Hu, 2023; Jen & Salam, 2024; Thi, 2023; Tossell et al., 2023; Zou & Huang, 2023). This category of use not only involves the generation of content but also other tasks related to writing such as brainstorming, research, drafting, and editing (Barrett & Pack, 2023; Chan & Hu, 2023; Ingley & Pack, 2023; Johnston et al., 2024; Shoufan, 2023; Singh et al., 2023; Tossell et al., 2024; Zou & Huang, 2023). Asking ChatGPT to perform these tasks is supposed to save people time and increase productivity levels (Budhathoki et al., 2024; Chan & Hu, 2023, Hasan, 2023; Thi, 2023). Given these potential advantages, it is no wonder that students have eagerly adopted ChatGPT and are now one of its biggest user groups (Strzelecki, 2023; Thi, 2023). ChatGPT fulfills students' immediate needs of finishing their writing assignments. However, this clashes with their other long-term learning needs and teachers' expectations that students hand in work of their own.

This highlights the nuance that is needed to properly implement HCAI. Creating AI that is human-centred does not simply mean that it fulfills any request humans give it as they could be asking it to cause harm such as in the creation of disinformation. Since the release of ChatGPT in 2022, there has been a great deal of concern that students will use ChatGPT to

plagiarize their schoolwork (Barrett & Pack, 2023; Haque & Li, 2024; Johnston et al., 2024; Siegle, 2023, Singh et al., 2023; Sison et al., 2023; Thi, 2023). These are not idle concerns. There has been a tsunami of reports of students of all ages, from elementary school all the way to graduate studies, using ChatGPT and other GAI to generate their assignments instead of doing the work themselves (Chaudhry et al., 2023; D'Andrea, 2023; Sison et al., 2023; Tlili et al., 2023).

As a result, education systems around the world have been massively disrupted (Barrett & Pack, 2023; Benuyenah, 2023; Kelly et al., 2023; Mørch & Andersen, 2023; Romero-Rodríguez et al., 2023; Sánchez Reina et al., 2024). Various institutions have tried to ban the use of ChatGPT and similar GAI (Barrett & Pack, 2023; Chan, 2023; Chaudhry et al., 2023; Kelly et al., 2023; Sun & Hoelscher, 2023; Winograd, 2023). However, these bans have not carried much weight as it is difficult to detect AI-generated content and catch students who have used GAI to plagiarize their assignments (Chan & Hu, 2023; Haque & Li, 2024; Shoufan, 2023; Siegle, 2023).

Before the advancement of GAI, plagiarism detectors such as Turnitin were used to validate authorship and ensure the originality of the content students handed in (Chan & Hu, 2023; Chaudhry et al., 2023; Singh et al., 2023). These tools are no longer useful in policing academic integrity as GAI-created content easily passes detection as it is technically original (Chan & Hu, 2023; Chaudhry et al., 2023; Singh et al., 2023). New software for detecting AI have been created, but so far they have not been very effective in distinguishing students' authentic work from GAI-generated content (Chaudhry et al., 2023; Singh et al., 2023). As it is nearly impossible to determine if a given piece of content has been created by AI (Chaudhry et al., 2023; Gradon, 2023; Pan et al., 2023), banning GAI tools like ChatGPT appears futile.

An argument gaining traction is that banning ChatGPT would actually be harmful to students (Chan, 2023; Chan & Hu, 2023; Johnston et al., 2024; Kelly et al., 2023; Singh et al., 2023; Southworth et al., 2023). The logic behind this claim is that students will need to know how to use ChatGPT because it, along with many other AI technologies, will soon be integrated into most workplaces (Chan, 2023; Chan & Hu, 2023; Johnston et al., 2024; Kelly et al., 2023; Singh et al., 2023; Southworth et al., 2023). In order to be competitive in the job market and secure employment upon graduation, students should practice using ChatGPT and gain vital skills such as prompt engineering (Budhathoki et al., 2024; Fui-Hoon Nat et al., 2023; Haque & Li, 2024; Johnston et al., 2024; Singh et al., 2023; Southworth et al., 2023). Those who do not may struggle to find a job or keep one as they get outpaced by others who are more efficient due to their familiarity with GAI tools (Budhathoki et al., 2024; Haque & Li, 2024; Southworth et al., 2023).

A more severe argument claims that the rise of GAI has not only necessitated the addition of a new skill set, but has also made some skills obsolete or, at the very least, less important (Shoufan, 2023; Sison et al., 2023; Tossell et al., 2024; Warner, 2023). Proponents of this view have compared the emergence of ChatGPT to that of the pocket calculator (Barrett & Pack, 2023; Shoufan, 2023; Tossell et al., 2024; Warner, 2023). If GAI becomes as ubiquitous as the calculator is today, becoming practiced with the use of the written word will no longer be a necessity (Barrett & Pack, 2023; Shoufan, 2023; Tossell et al., 2024; Warner, 2023). This view is predicated on GAI tools being completely error-free, which is currently not the case. Whereas calculators are 100% accurate, ChatGPT frequently generates content rife with misinformation and bias (Sison et al., 2023; Warner, 2023).

The nature of writing is vastly different from that of mathematics, and the two cannot be compared, especially in terms of automation. The mathematical operations calculators perform are exactly the same as those done by hand (Warner, 2023). It does not matter who uses the calculator, as it will reach the same result every time. The same cannot be said for the task of writing as there are no exact formulas to follow or a single right answer to arrive at. The results of a writing assignment may differ drastically depending on the writer and the knowledge, personal experiences, and biases they decide to draw on. Due to these various influences, writing cannot be automated to the same extent mathematics can.

Moreover, it is a worthwhile experience for students to practice writing as it gives them the opportunity to express themselves (Sison et al., 2023; Warner, 2023). The process of translating one's thoughts into the written word is an exercise in self-exploration that can lead to fresh insights and a better understanding of oneself (Sison et al., 2023; Warner, 2023). It can also support the cultivation of highly in-demand skills such as critical thinking and creativity (Berdanier & Alley, 2023). While writing essays, students must "evaluate the worth of their assertions and the evidence on which those assertions are based" (Berdanier & Alley, 2023, p. 583). In doing so, their understanding of the subject matter is strengthened (Berdanier & Alley, 2023; Warner, 2023). Students risk missing out on these benefits when they prompt ChatGPT to generate their assignments (Sison et al., 2023).

There seems to be a consensus among educators and researchers that simply copying and pasting what ChatGPT generates is not acceptable (Benuyenah, 2023; Saxena & Doleck, 2023; Sison et al., 2023; Tossell et al., 2024; Zou & Huang, 2023). Instead, ChatGPT should only be used for trivial tasks that do not require a great deal of skill (Barrett & Pack, 2023; Chan & Hu, 2023; Haque & Li, 2024; Singh et al., 2023). But what are trivial tasks when it comes to writing?

Sison et al. (2023) suggest that writing resumes and job applications is routine enough to merit the use of ChatGPT. Another common recommendation is to use ChatGPT to improve a piece of writing in terms of its sentence structure, word choice, spelling, and grammar (Abbas et al., 2024; Singh et al., 2023; Sison et al., 2023).

Even with these simple tasks there is a risk that students may become too reliant on ChatGPT and forget the correct spelling of words, for example (Ingley & Pack, 2023; Singh et al., 2023). While this may be true, spellcheck tools were already ubiquitous by the time ChatGPT was released (Barrett & Pack, 2023; Johnston et al., 2023; Thi, 2023). A more novel use of GAI is for idea generation. Tossell et al. (2024) categorize "the use of AI for initial ideas and inspiration" as low writing automation (p. 10). Students are meant to use the ideas ChatGPT comes up with as a starting point from which they can build their writing assignments (Tossell et al., 2024). Tossell et al. (2024) is not alone in their recommendation. Using ChatGPT to generate ideas and overcome writer's block is commonly seen by scholars as an acceptable alternative to copying and pasting entire assignments (Barrett & Pack, 2023; Chan & Hu, 2023; Ingley & Pack, 2023; Johnston et al., 2024; Shoufan, 2023; Singh et al., 2023; Tossell et al., 2024; Zou & Huang, 2023). But who owns these ideas and the writing that is based on them?

This is a topic of ongoing debate that a few scholars (Baidoo-Anu & Owusu Ansah, 2023; O'Connor & ChatGPT, 2023; Pavlik, 2023) have attempted to navigate by naming ChatGPT as a co-author of their papers. However, the scientific community has predominantly been opposed to this practice (Bhatia & Kulkarni, 2023; Singh et al., 2023; Sison et al., 2023; Thorp, 2023). Sison et al. (2023) argue that attributing authorship to ChatGPT is a "cognitive error, because machines are tools or instruments, not authors" who can knowingly "accept the legal, scientific, moral and social responsibility for their publications" (p. 7). When ChatGPT is

listed as an author, it is humanized and elevated to a scholarly status, which is concerning given the AI's many issues (Akpur, 2024; Bhatia & Kulkarni, 2023; Crawford et al., 2023; Stokel-Walker, 2023; Tlili et al., 2023). AI cannot take responsibility for harm it causes, only humans can (Budhathoki et al., 2024; Sison et al., 2023; Zou & Huang, 2023).

2.6 ChatGPT's Disadvantages & Anthropomorphisms

As AI technologies advance in their capabilities, there is a tendency to anthropomorphize them which involves projecting human characteristics onto inhuman things (Ding et al., 2023; Sison et al., 2023; Weidinger et al., 2021). This is apparent in the discourse surrounding ChatGPT which is frequently talked about like a human who has their own thoughts and feelings (Warner, 2023). This is misleading as ChatGPT lacks consciousness and many other characteristics unique to humans (Haque & Li, 2024; Park et al., 2021; Sison et al., 2023).

We have yet to create an AI that is actually capable of experiencing or expressing real emotions (Park et al., 2021; Sun & Hoelscher, 2023; Zou & Huang, 2023). GAI like ChatGPT do not actually think, they merely simulate the thought process through statistical pattern matching (Warner, 2023). With a lack of true cultural or contextual awareness, it struggles with abstract ideas and analogies (Park et al., 2021; Vo & Nguyen, 2024). ChatGPT is also majorly limited in terms of creativity (Jimenez-Crespo, 2024; Park et al., 2021; Sánchez Reina et al., 2024; Sison et al., 2023). When compared to content created by humans, the outputs ChatGPT generates have been rated consistently as less creative and more generic (Jimenez-Crespo, 2024).

While ChatGPT is definitely not human, its design makes it seem like it is. Optimized for natural language processing, ChatGPT can imitate conversational style and respond to users in a convincing, realistic manner (Hasan, 2023; Sánchez Reina et al., 2024; Shoufan, 2023; Sison et

al., 2023; Tlili et al., 2023; Virvou, 2023; Weidinger et al., 2021). Its human-like responses can lead users to perceive it as warm, friendly, helpful, and capable of forming social connections (Ding et al., 2023; Sison et al., 2023). These anthropomorphic features help to camouflage the AI's inherent flaws and issues in its responses (Ding et al., 2023; Shoufan, 2023; Sison et al., 2023). This can magnify users' expectations of what AI can do, leading to unrealistic notions that AI cares for them and can solve any kind of problem (Ding et al., 2023; Virvou, 2023; Weidinger et al., 2021). People who fall into this trap are not only willing but eager to accept AI technologies into their lives; trusting them blindly, unaware of their potential risks (Ding et al., 2023; Fui-Hoon Nah et al., 2023; Weidinger et al., 2021).

With inflated trust in ChatGPT and a lack of understanding of its true capabilities, users may quickly become dependent on it (Berdanier & Alley, 2023; Bubeck et al., 2023; Chan & Hu, 2023; Ding et al., 2023; Fui-Hoon Nah et al., 2023; Ingley and Pack, 2023; Shoufan, 2023; Singh et al., 2023; Tossell et al., 2024; Thi, 2023). Many researchers have sounded the alarm regarding students potential over-reliance on ChatGPT (Abbas et al., 2024; Budhathoki et al., 2024; Chan, 2023; Singh et al., 2023; Sison et al., 2023; Tiwari et al., 2023; Walter, 2024; Zou & Huang, 2023). With a convenient way to outsource their schoolwork via ChatGPT, students may find it difficult to maintain their motivation to learn (Abbas et al., 2024; Singh et al., 2023; Thi, 2023; Tlili et al., 2023). The convenience of ChatGPT can quickly become a crutch (Berdanier & Alley, 2023; Ingley & Pack, 2023), allowing students to procrastinate working on their assignments until the last minute (Abbas et al., 2024). If students do this instead of engaging with the work themselves, they lose precious opportunities for developing vital skills needed later on in life (Abbas et al., 2024; Singh et al., 2023).

Students who habitually use ChatGPT may diminish their capacity for creativity, critical thinking, and problem solving (Abbas et al., 2024; Chan, 2023; Chan & Hu, 2023; Fui-Hoon Nah et al., 2023; Haque & Li, 2024; Sánchez Reina et al., 2024; Siegle, 2023; Singh et al., 2023). By spending less time practicing these skills, it may be a struggle for students to write coherently on their own (Chan, 2023; Chan & Hu, 2023; Haque & Li, 2024; Ingley & Pack, 2023; Siegle, 2023). As previously mentioned, AI tools for correcting grammar, spelling, and sentence structure were already widely used before the release of ChatGPT (Ingley & Pack, 2023; Singh et al., 2023). As such, the emergence of powerful GAI does not threaten these lower level competencies; but, rather the more complicated tasks of researching, analyzing, and exploring ideas (Warner, 2023).

Researchers are concerned about the impacts GAI can have on students' cognitive functioning and development (Berdanier & Alley, 2023; Mejia & Sargent, 2023; Romero-Rodriguez et al., 2023; Tam et al., 2023; Tlili et al., 2023). Abbas et al. (2024) argue that excessive use of ChatGPT can lead to memory loss as students are not mentally exerting themselves or actively engaging with the content they are supposed to learn. If the use of ChatGPT continues to grow in popularity among students, there may be widespread learning loss and reduction in academic performance (Abbas et al., 2024; Budhathoki et al., 2024; Haque & Li, 2024; Chan, 2023; Zou & Huang, 2023). Researchers and educators fear that, without intervention, over-dependence on technologies like ChatGPT will "deskill" (Sison et al., 2023) and "dull down the population" (Tiwari et al., 2023, p. 3).

To disincentivize dependence, the way in which AI is talked about must change. Popular media tend to spread "speculative, futuristic and tech-industry notions of all-powerful AI" (Deuze & Beckett, 2022, p. 1916). Depicting AI in this way generates hype around it and,

potentially, misconceptions of what it is capable of doing (Long, 2021; Stadelmann et al., 2021). Researchers, developers, and policymakers are also guilty of anthropomorphizing AI and trying to imbibe it with human characteristics (Shneiderman, 2020). Designing AI to be more human-like is a seemingly sound idea but ultimately misdirected as it places people in the position of competing with AI (Shneiderman, 2020). HCAI affirms that the goal of AI should not be to emulate humans but to empower them (Jimenez-Crespo, 2024; Shneiderman, 2020; Sison et al., 2023).

To achieve this, discourse on AI must move "away from portrayals of intelligent autonomous teammates towards descriptions of powerful tool-like appliances and tele-operated devices" controlled by humans (Shneiderman, 2020b, p. 110). This shift must occur not only in popular media but everywhere that AI is talked about, including research. Instead of just passive speculation of what ChatGPT could be used for, which has been an easy thing to publish, research should focus on the experience of real users. Gaining this insight is integral to realizing the goal of HCAI. If we are to empower users in any meaningful sense, we must first understand them and the challenges they currently face.

Chapter 3: Methodology

3.1 Introduction

This research will use data originally collected for Dr. Ann-Louise Davidson's study titled: *Interdisciplinary Innovation Challenges to Improve Ethical AI and Digital Technology for Social Relevance and EDI*. Dr. Davidson is a Professor at Concordia University and the Director of the University's Innovation Lab. Her study is funded by the International Observatory on the Societal Impacts of AI and Digital Technology (OBVIA). As part of the background research for Dr. Davidson's study, interviews with ChatGPT users were conducted from May to August 2023. This thesis will analyze the interview data using Braun and Clarke's (2012) thematic analysis.

Section 3.2 outlines the paradigms with which I align my research. The subsequent sections cover methods for recruitment and sampling (3.3); sample size (3.4); procedures (3.5); participants (3.6); participant protection (3.7); and data analysis (3.8) were selected and conducted.

3.2 Paradigmatic Underpinnings

Data has been analyzed mainly from a constructionist viewpoint. Constructionism "examines the ways in which events, realities, meanings, experiences and so on are the effects of a range of discourses operating within society" (Braun & Clarke, 2006, p. 81). According to this paradigm, there are no universal truths to be found or inherent knowledge within individuals (Pilarska, 2021). Instead, meaning is socially produced and shaped by our interactions with others (Braun & Clarke, 2022).

Constructionism is often compared and contrasted with essentialism. Research based on essentialism tends to accept reality as it is presented in the dataset (Braun & Clarke, 2022). Essentialism assumes a unidirectional relationship between language and meaning (Braun & Clarke, 2006); largely taking what participants say at face value. While essentialism seeks to reflect and give voice to the reality participants report to experience, constructionism tries to unravel reality and uncover how participants' experiences are influenced by social norms and structural conditions (Braun & Clarke, 2006).

To compliment my constructionist approach, I adopted a critical perspective instead of an experiential one for data analysis. The experiential perspective prioritizes participants' lived experiences and aims to "understand what participants think, feel, and do" (Clarke & Braun, 2017, p. 297). While I did not want my analysis to override participants' stories, I opted for a more critical perspective to delve into the factors that might have influenced participants' behaviour.

Like constructionism, the critical approach does "not treat people's talk of experience as a transparent window on their world" (Braun & Clarke, 2006, p. 95). Instead, the language participants use to describe reality is interrogated to understand its latent meaning (Braun & Clarke, 2022). I aim to do this in my analysis by focusing on the latent instead of the semantic meaning of what participants say.

3.3 Recruitment & Sampling

Purposive sampling was used for the first stage of interview participant recruitment. In purposive sampling the characteristics of the population of interest are specified, the individuals who have those characteristics are identified, and then invited to partake in the research (Johnson

& Christensen, 2019; Lopez & Whitehead, 2016). To be included in the interviews, participants needed to be at least 18 years of age or older; a current university student or a recent graduate; and a user of at least one GAI tool, like ChatGPT. Anyone not meeting these criteria was excluded from participating in the interviews. At the time of interviewing, OpenAI offered both a free version of ChatGPT as well as a paid version that was supposed to be slightly more powerful. Participants were not asked if they used the free or the paid version of ChatGPT, and so no distinction has been made between the two in this report. The interview invitation (see Appendix A) was sent out by Dr. Davidson and members of her research team via email and through posts on social media.

Snowball sampling was also used to recruit participants. For this method, participants are asked to identify one or more additional people who meet the specified inclusion criteria and may be willing to participate in an interview (Johnson & Christensen, 2019; Lopez & Whitehead, 2016). If an interview participant knew someone who met the criteria and would be interested in being interviewed, they would give the potential participant Dr. Davidson's contact information. The potential participant would reach out to Dr. Davidson who would confirm they met the inclusion criteria and then start the process to gain their informed consent.

Purposive and snowball sampling are both nonrandom methods and, therefore, may result in a sample that is not perfectly representative of the population (Johnson & Christensen, 2019). It would be better to, after specifying the criteria for inclusion, obtain a random sample of people who meet these criteria from the population (Johnson & Christensen, 2019). Due to probability, random samples tend to be less biased and more representative than nonrandom samples (Johnson & Christensen, 2019). However, it is not always feasible to use random sampling techniques (Corrigan & Onwuegbuzie, 2023; Johnson & Christensen, 2019). For instance, some

people in a population may be easier to access than others and reaching them may take more time (Johnson & Christensen, 2019). While extending the research process and spending additional time sampling may be feasible in some research projects, this was not the case for the current study. There was a great need for efficiency in data collection so as to capture people's initial reactions to the release of ChatGPT. Although random sampling would have provided a more accurate sample, logistical constraints and the need to expedite the research process took precedence.

Balancing feasibility and accuracy is a common challenge in research (Corrigan & Onwuegbuzie, 2023). While trade-offs will always have to be made, researchers should choose a sampling method that can help them meet their research objectives (Johnson & Christensen, 2020). Nonrandom techniques like purposive and snowball sampling are severely limited in their ability to produce results that can be generalized to the broader population, but they can provide rich insights into participants' perspectives (Johnson & Christensen, 2019). If the goal of this study were to create a set of recommendations or a program to guide the use of ChatGPT, a larger sample size and more accurate sampling technique would be needed. For research with exploratory objectives, nonrandom methods like purposive sampling are appropriate (Corrigan & Onwuegbuzie, 2020). As the research was aimed toward exploration instead of generalization, purposive and snowball sampling were both a good fit.

3.4 Sample Size

Qualitative research tends to follow the concept of saturation for determining an appropriate sample size (Corrigan & Onwuegbuzie, 2023; Mason, 2010). Saturation is a point in data collection in which little to no new information relevant to the research is produced

(Corrigan & Onwuegbuzie, 2023; Guest et al., 2020; Johnson & Christensen, 2020; Mason, 2010). Continuing data collection after saturation is reached will not meaningfully help to answer the research question(s) as there already is enough data to do so or, in some cases, the question(s) cannot be answered via the current methods (Johnson & Christensen, 2020; Mason, 2010). While this may seem straightforward, there are no universal guidelines for identifying when saturation occurs or what the ideal sample size should be for qualitative studies (Corrigan & Onwuegbuzie, 2023; Guest et al., 2020).

Many factors can influence sample size in qualitative research such as the feasibility of the research and the context in which it is being conducted (Johnson & Christensen, 2020; Mason, 2010). In the absence of a clear standard, researchers are asked to be transparent in how they conceptualize saturation and determine an appropriate sample size for their research (Guest et al., 2020). In the case of Dr. Davidson's study, from which the data for this thesis comes from, a target sample size of 30 participants was set prior to participant recruitment. This estimation was based on previous qualitative research which commonly has sample sizes between 20 and 30 participants (Mason, 2010).

Researchers rely on their judgment and previous experience when deciding if they have reached the point of saturation in data collection (Guest et al., 2020). While data was being collected for Dr. Davidson's study, the research team met consistently and discussed the initial insights they were gleaning from the interviews. Based on these discussions and Dr. Davidson's expertise, data collection was stopped after 31 participants were interviewed due to saturation.

3.5 Interview Procedures

Interviews were conducted from May to August 2023 on Zoom. The interview followed a qualitative, semi-structured approach. Interview questions were open-ended, probing participants' awareness, use, and perceptions of the field of AI and ChatGPT more specifically. See Appendix B for the full interview instrument. The audio from the interviews were recorded to ensure that they could be properly transcribed and that the participants were accurately represented. There were 24 interviews conducted in English and 7 in French. The interviews conducted in French were translated using DeepL and checked over by a research assistant who is a native French speaker. The interviews lasted on average 56 minutes and 13 seconds. The longest interview lasted 1 hour 27 minutes and 46 seconds. The shortest interview lasted 41 minutes and 13 seconds.

3.6 Participants

A total of 31 participants were interviewed. Participants were not asked to identify their sex or gender. At the time of interviewing, most participants (n=27) were currently enrolled in a program of study. The remaining participants (n=4) were working full time and were not enrolled in any formal education. The average age of participants was 31 years old. All participants were located in Montreal, Quebec. The area of specialization participants either reported to study or work in were as follows: business (n=5), social sciences (n=28), arts/humanities (n=2), computer science/engineering (16 participants), and natural/health sciences (n=2). There were no risks involved in participating in the interview. There was no financial reward for participating in the interviews. However, participants might have benefited from reflecting on their use of AI and its impacts on society more broadly.

3.7 Participant Protection

Consent forms were sent to participants and signed before the interview. See Appendix D for interview consent forms. All information gathered during the interviews has been treated confidentially. The research team, which includes Dr. Davidson and three research assistants, know who the participants were as they conducted the interviews. This information will not be disclosed outside of the research team. Participants are referred to anonymously and their identities are not revealed in published results.

The consent form also explained how participants are free to discontinue their participation in the research without fear of reprisal. At the beginning of each interview, participants were told that there would be no negative consequences for not participating in the research, stopping part way through, or asking for their data to not be used. During the interviews, if participants declared they wanted to withdraw from the research, their data would be removed. After the study's results are published, it will not be possible to remove a participant's data, but they will not be identifiable.

No one has access to the raw interview data, except for people directly involved in conducting the research. Data is stored on password-protected laptops and in an MS Teams folder hosted at Concordia University that can only be accessed by the research team. The principal investigator, Dr. Davidson, will keep the raw data on a password-protected laptop for five years. After this period, all data will be destroyed.

3.8 Data Analysis

Thematic analysis (TA) was used to analyze the interview data. TA is a process of 'theming' qualitative data which helps researchers to identify patterns and find meaning in their datasets (Braun & Clarke, 2012; Maguire & Delahunt, 2017; Morgan, 2022). TA is the most popular method for data analysis in qualitative research (Braun & Clarke, 2012; Johnson & Christensen, 2019; Maguire & Delahunt, 2017). It is a highly flexible method that can be used to analyze any qualitative data, regardless of the type or size of the dataset (Braun & Clarke, 2023).

TA does not require researchers to analyze or summarize the whole dataset if the process does not serve their specific research objectives (Braun & Clarke, 2012). Instead, researchers can focus their analysis on particular phenomena or parts of the dataset relevant to their research question(s) (Braun & Clarke, 2012). This method is appropriate for my thesis as the whole interview dataset will not be used, only parts of it that are relevant to my specific research questions.

Unlike other methods for conducting data analysis, TA is not tied to any particular theoretical or epistemological perspectives (Braun & Clarke, 2023; Finlay, 2021; Maguire & Delahunt, 2017; Morgan, 2022). This allows TA to "straddle three main continua along which qualitative research approaches can be located", including both inductive or deductive; experiential or critical; and essentialist or constructionist perspectives (Braun & Clarke, 2012, p. 58). Researchers should declare where they position their research on these continua as it will influence how they analyze their data (Braun & Clarke, 2012). As previously outlined, this research is aligned with the critical and constructionist paradigms. The data analysis will be conducted primarily deductively.

In a deductive approach, researchers code and interpret data based on existing concepts or theories (Johnson & Christensen, 2019). In contrast, inductive data analysis is a bottom-up approach in which codes are generated directly from the data and the semantic meaning of its contents (Johnson & Christensen, 2019). While researchers may use one approach more than the other, qualitative data analysis usually includes a combination of both deductive and inductive coding (Braun & Clarke, 2012). A predominantly deductive approach with some inductive coding has been used to analyze the interview data. This approach is appropriate given the concepts laid out in the literature review and the specificity of the research questions.

RQ1 was focused on participants' use of ChatGPT for writing tasks. Section 2.5 of the literature review offers a brief breakdown of writing-related tasks such as brainstorming, outlining, revising, and editing. These terms were used as codes to label excerpts in which participants talked about using ChatGPT for writing.

RQ2 sought to understand what advantages and disadvantages participants identify with ChatGPT. Sections 2.2 and 2.5 of the literature review briefly touch on some positive aspects of ChatGPT such as efficiency improvements and time saving benefits. These terms were turned into codes and used to label advantages of ChatGPT that participants brought up in the interviews. Section 2.5 and 2.6 also covers some disadvantages of ChatGPT such as its tendency to deskill users and make them dependent on it. These terms were turned into codes and used to label the disadvantages of ChatGPT participants mentioned.

Finally, RQ3 aims to uncover participants' awareness of ChatGPT's ethical issues and impacts. There naturally is some overlap between what counts as a disadvantage versus an ethical issue. For the purposes of data analysis, a distinction has been made between the two. A disadvantage of ChatGPT is an issue participants raise regarding their personal use of the tool.

This disadvantage primarily impacts only them. In contrast, ChatGPT's ethical issues are much larger in scale and involve more than one person.

To properly answer RQ3, participants' data pertaining to ChatGPT's ethical issues have been split into the following categories: unaware, somewhat aware, and aware. For the issues of misinformation, bias, disinformation, privacy, transparency, and sustainability, participants were deemed fully aware if they appeared both knowledgeable and cautious of the issue. Participants were categorized as somewhat aware if they lacked caution or demonstrated naivety toward the issue. Finally, participants were placed in the unaware category if they held inaccurate beliefs about the issue.

The ethical issue of responsibility and ChatGPT's impacts on education were less straightforward. For example, there are no clear frameworks for assigning responsibility for harms caused by an AI. Likewise, ChatGPT's impacts on education are an area of hot debate. For both of these issues, it is less clear what participants should be aware of. As a result, participants' awareness of these were judged according to HCAI principles which were outlined in section 2.4 of the literature review.

While participants may not have used the exact terms laid out in the literature review, using these concepts as codes provided a starting point and structure for data analysis. Of course, some uses, advantages, disadvantages, ethical issues, and impacts of ChatGPT were not covered in the literature review and came out organically in the interviews. If a participant said something that fit with the research questions, a new code was created and added to the codebook.

To analyze the interview data, I followed Braun and Clarke's (2012) framework that organizes TA into six steps. This is the most commonly cited and used framework for conducting TA (Finlay, 2021; Maguire & Delahunt, 2017). It is important to note, that although these steps

are presented in a linear way, they often occur concurrently (Braun & Clarke, 2012; Finlay, 2021). The first step is to become familiar with the data (Braun & Clarke, 2012). I did this through multiple readings of the interview transcriptions and active listening to the audio recordings of the English interviews.

After data familiarization, the coding process can begin (Braun & Clarke, 2012). A code is a label which is used to assign meaning to a segment of a dataset (Johnson & Christensen, 2019). MAXQDA, which is a qualitative data analysis software, was used to code all the interview data (MAXQDA, 2024). The interview data was first coded deductively with preset codes based on information from the literature review. Then, an inductive approach was used, allowing new codes to be developed through the coding process. Step two is finished once all data relevant to each code has been collated (Braun & Clarke, 2012).

Step three involves organizing the coded data into themes (Braun & Clarke, 2012). To do this, I first reviewed my codebook and identified areas in which codes overlapped or clustered. I then collapsed some codes and organized them into overarching themes. In step four, researchers are meant to review and modify their themes to ensure they fit the data and form a narrative (Braun & Clarke, 2012). I gathered all the data related to each theme and considered how well the data supported the theme. I also thought about the relationship between themes and if they made sense together. Themes were modified to ensure they were coherent and distinct from one another.

For step five, a detailed definition is provided for each theme (Braun & Clarke, 2012). After refining the list of themes, I worked on defining them. I referred back to the theory and concepts presented in the literature review. I also drew from the ways in which participants articulated concepts in the interviews. This helped me to create definitions for each theme that

were both theoretically rich and inspired from the data. Finally, in step six, the themes are incorporated into a written report of the research (Braun & Clarke, 2012). With each theme clearly defined, I wrote the final research report.

In the report's findings, some quotes from participants were paraphrased. According to Polkinghorne & Taylor (2022), paraphrasing data occurs when you "use your own words to replace the data, whilst maintaining the overall meaning" (p. 1). Researchers may decide to paraphrase data when dealing with overly long comments in which participants struggled to articulate themselves in a clear way (Polkinghorne et al., 2023). This was the case for many of the participants in Dr. Davidson's study. Wherever possible, participants' original wording was presented, but for long excerpts that lacked clarity, paraphrasing was used. In paraphrasing, participants' original meaning is preserved while their words are translated into a more concise form, making it easier to compare with comments from other participants (Polkinghorne et al., 2023). By paraphrasing when needed, participants' comments were easier to compare and contrast, forming a rich narrative.

Chapter 4: Findings

4.1 Introduction

This chapter presents the study's findings. In Section 4.2, the sample's demographics will be explored. Then, in Section 4.3, participants' uses of ChatGPT will be discussed. RQ1 - *How do learners use ChatGPT for writing tasks?* - will be answered in Section 4.3.5.

The next Section 4.4 will cover the advantages participants identified in ChatGPT. RQ2 - *What advantages and disadvantages do learners identify with ChatGPT?* - will be partially answered in Section 4.4.4. Following this, Section 4.5 will discuss ChatGPT's disadvantages according to participants. Participants' strategies for mitigating the identified disadvantages are included throughout this section. Section 4.5.5 will summarize these results and relate them to RQ2.

Finally, in Section 4.6, participants' awareness of ChatGPT's ethical issues and impacts will be explored. Participants' comments have been organized according to their awareness level. The first category presented in each subsection will be 'unaware' participants who made incorrect assumptions about the ethical issue or impact. Presented next will be participants and their comments deemed to be 'somewhat aware'. Each subsection will conclude with excerpts from 'aware' participants. The findings from Section 4.6 will be summarized and analyzed in Section 4.6.9. This will answer RQ3 - *To what extent are learners aware of ChatGPT's ethical issues and impacts?*

4.2 Sample Demographics

The final sample included interviews with 31 participants (N=31). Of the 31 interviews, 24 were conducted in English and 7 in French. As all participants were currently living in Montreal, Quebec at the time of the interviews, it is likely that they are bilingual or at least have some level of proficiency in both languages. Their choice of conducting the interview in English or French simply indicates the language they were more comfortable speaking in, not their overall language proficiency.

The average age among participants was 31 years. The youngest participant was 18 years old and the oldest was 47 years old. Participants were not asked to identify their sex or gender. At the time of interviewing, May to August 2023, most participants 87% (n=27) were currently enrolled in a program of study. The remaining participants, 13% (n=4), had recently graduated and were not enrolled in any formal education program but considered themselves to be lifelong learners.

In terms of participants' level of education: 7% (n=2) were at the Undergraduate level, 65% (n=20) were at the Master's level, and 29% (n=9) were at the PhD level. Almost all participants were graduate students. Although participants were not asked explicitly about the jobs they held, graduate students typically work as a teaching assistant and/or teach courses during their studies. So, many participants probably held a dual role of both student and teacher, likely influencing the way they viewed and used ChatGPT.

In order of frequency, participants' areas of specialization included: social sciences 90% (n=28); computer science and engineering 52% (n=16); business 16% (n=5), arts and humanities 7% (n=2); and natural and health sciences 7% (n=2). The majority of participants 74% (n=23)

only reported having one area of specialization and 26% (n=8) reported having multiple specializations.

Social sciences was the most popular specialization with 90% (n=28) of participants with this specialty. Within social sciences, the most popular sub-specialization was education with 55% (n=17) of participants either working or studying in this area. Dr. Davidson and her research team are based in Concordia's Department of Education. Due to the non-random sampling techniques used to recruit participants, a significant portion of participants were recruited from the Department of Education. The overrepresentation of specialty in education may have affected findings, specifically participants' awareness of ChatGPT's impacts on education which is reported in section 4.6.9.

Technical knowledge and skills were lacking in the sample with only 52% (n=16) reporting specialty in computer science and engineering. There was even less computer science specific expertise with only 19% (n=6) reporting specialty in this domain. Even if more participants had a background in computer science, it would not guarantee in-depth technical knowledge of GAI models like ChatGPT or AI in general. The relative lack of STEM representation and GAI-specific technical expertise in the sample may have limited deeper technical critiques of ChatGPT. Consequently, findings related to the advantages and disadvantages of ChatGPT may reflect a broader, non-technical, and user-centric perspective.

4.3 Uses of ChatGPT

4.3.1 Use of ChatGPT for Brainstorming

Among the 31 participants, 48% (n=15) reported using ChatGPT for brainstorming. P11 and P03 both emphasized ChatGPT's usefulness in accelerating the ideation process for their writing projects. P11 noted, "it makes it faster to come up with ideas". Several participants (n=6) claimed ChatGPT helped them generate ideas they would not have thought of on their own. For example, P21 said ChatGPT "helped me come up with things I might not have thought of" and P29 said it was useful for "thinking outside the box". This was particularly helpful for P11 who tends to work alone and "lacks other perspectives". P11 finds it "easier to just ask ChatGPT" for ideas rather than seeking out another person to brainstorm with.

A few participants (n=3) admitted that the ideas ChatGPT generates may not always be good, but used the tool despite this, seemingly going for quantity over quality. P03 said "most of it is going to suck, but then, some of it, I'm like 'oh, yeah, I didn't think about that, that would be cool'". P03's strategy seems to be asking ChatGPT to produce a lot of ideas, and then sifting through them to find one that they like. P09 noted that "it's not necessarily giving me something I didn't know, but something that would have taken a lot of energy" to generate. P09 employs a similar strategy to P03, saying "it's given me [a] list of ideas and then I hit the best idea". Likewise, if P21 "didn't like the idea" ChatGPT gave them, they simply "asked 'have you got another one'", reinforcing the idea that participants value quantity over quality. ChatGPT does not seem to be generating any groundbreaking ideas for these participants, but they are still motivated to use it as it makes the brainstorming process easier and less demanding of their creative energy.

Several participants (n=7) highlighted ChatGPT's role in overcoming writer's block. P13 said "I'll use [it] to try to find inspiration … to come up with ideas… if I'm blocked". P01 "finds

it difficult to start from a blank page" and so turns to ChatGPT "to generate something and then I can use that as a launching pad". For these participants, ChatGPT has become a vital tool to use when they are struggling with starting a writing project or keeping their momentum going. They use ChatGPT as a springboard, claiming to take over writing once it has given them something to start with. For example, when P05 is "stuck with the blank page effect… ChatGPT [helps them] find that first phrase to get [them] going… and then [they're] doing [their] whole writing by [themself]". Similarly, P21 said of ChatGPT, "it's more a first idea thing… just to get the ball rolling". However, the time it takes to get the ball rolling may vary. As P21 noted earlier, they usually have to ask ChatGPT to regenerate ideas until they find one they can build on. Despite this adding time to their brainstorming process, P21, along with other participants, still seem to gravitate to ChatGPT when intimidated by a blank page and unsure of how to start their writing projects. This underscores the effect writer's block can have on students and ChatGPT's usefulness in ameliorating it.

A particularly notable example of ChatGPT being used to overcome writer's block came from P18, who is "in the process of being diagnosed with ADHD". P18 shared, "I suffer from paralysis and starting a new project, and it has helped me to start with my writing, which is something I really, really struggle with". P18 said:

> "I don't use it that much. I would say like, once per month I use it or twice at most. Once I have the idea, I have the starting point, I forget about it. I would say that my life or my work has changed".

P18's comments highlight the difficulty neurodivergent people can have with brainstorming and starting projects. For P18, ChatGPT has been a life-changing tool, even though they do not use it even on a weekly basis. This further highlights how ChatGPT has become an integral part of participants' brainstorming process.

4.3.2 Use of ChatGPT for Research

A considerable number of participants, 71% (n=22), described using ChatGPT for conducting research. Of these participants, several (n=8) reported using ChatGPT for research as it made the process faster. For example, P26 described ChatGPT as "a way of finding information more quickly". P08 shared an instance in which they were "searching for something, [they] couldn't find it after one hour of Googling… ChatGPT told [them] in one minute". Similarly, P15 claimed that ChatGPT "answered [their] question in a few seconds, whereas it would have taken [them] time to go to Google scholar". P24 simply admitted they are "very lazy" when it comes to "searching [through] all the links" Google gives them. P24 now prefers conducting research with ChatGPT because they "don't have to go to any links" and it is "done in one minute". For these participants, ChatGPT has significantly reduced the time they need to invest in the research part for their writing projects.

A few participants (n=3) referenced the 'cognitive load' associated with research and how ChatGPT helped them reduce it, making the research process much easier. P01, a PhD student, said ChatGPT "reduces the cognitive load" when trying to "remind [themself] of a concept". As P01 is working on their PhD dissertation, they likely have a long list of concepts they need to research and understand. With ChatGPT at their disposal, P01 "[doesn't] have to go back to the books or journals that talked about that concept and sift through them". In a similar way, P31 said:

> "ChatGPT helps to address information overload. There's so many different resources on the web. You can sit there and look at 20 different ones and become overwhelmed. ChatGPT helps to break through that".

For P31, the sheer amount of information they receive when conducting research through traditional search engines is overwhelming. While a targeted research plan may have helped P31 deal with this information in a more organized, systematic way, they seem to prefer giving this task over to ChatGPT.

Several participants (n=5) reported receiving better research results from ChatGPT compared to traditional search engines like Google. For example, P22 said they prefer using ChatGPT as it "produces better, more contextual results" than Google which "doesn't give any context, or any big pictures, just data that [you] have to consume". Likewise, P31 praised ChatGPT for providing information that is "reformulated or more tailored towards what you're looking for". So, participants seem drawn to ChatGPT because it gives them a summary on their topic instead of information they would have to summarize themself. P26 pointed this out directly, saying "the reason [they] went to ChatGPT rather than Google was that it [gave them] a summary". Similarly, P01 likes ChatGPT as "it does all the condensing for you" so you "[don't] have to search through pages and pages looking for information". Deciding what information is most relevant to a topic of interest is part of the research process. Participants offload this task to ChatGPT, preferring an easy to digest summary rather than spread out information they would have to condense themselves.

4.3.3 Use of ChatGPT for Drafting

Most participants, 74% (n=23) reported using ChatGPT to generate first drafts or structure content for their writing projects. A common drafting approach, described by 39% of participants (n=12), involved feeding ChatGPT their rough content to generate a synthesis which they would further edit themselves. For example, P08 claimed that ChatGPT "writes a very good

generic draft" which they then "personalize". Likewise, P28 first would "put together a bit of a jumble of sentences, ask [ChatGPT] to do a sort of synthesis, and then rewrite everything that was written". However, P28 noted, "often, I wasn't satisfied with the result, but it helped me to think, a little offloading the part like synthesizing the information". P28 used ChatGPT for drafting as they found it "easier to read a text and then correct it than to write it" from scratch. P08 and P28 are just a couple examples, but their approach was common amongst many participants (n=12). So, similar to the task of brainstorming, participants tended to use what ChatGPT generated for them as a starting point. Once they had the draft, it seemed easier for participants to continue the writing process.

Cover letters were the most common project participants (n=6) used ChatGPT to draft. These participants all described a similar process. To draft a cover letter, participants would first give ChatGPT a description of the job and their qualifications. After it generated a draft, participants would usually edit the cover letter. For example, P06 said they input the job description and their work experience, asking ChatGPT to "write a cover letter" based on that information. Similarly, P10 "paste[d] the roles and responsibilities of the job" they were applying for into ChatGPT and "told it to write [them] a cover letter". P08 used ChatGPT to generate "quick drafts" of cover letters, explaining that it "writes a very good generic draft" which they could then personalize.

A few participants (n=3) expressed greater appreciation for the structure ChatGPT gave to content rather than the actual content it could generate. P16 said their use of ChatGPT is "really more about the structure than the content," as it can "take what [they] have in [their] head" and "put it into a fluid text". In a similar statement Although P06 said they reworked the content ChatGPT gave them so it was more to their liking, they will "keep the structure" as "it's

very good". P13 said, "the content it's going to bring me, that's not really what I'm looking for", instead focusing on the form ChatGPT gave to content.

Several participants (n=4) described the process of getting to a first draft as challenging. For example, P29 explained "I generate my own ideas but it takes extra cognitive power to present those ideas in a nice way…I do my own analysis and for the organization of that analysis I use ChatGPT". Similarly, P25 said ChatGPT "could help you put all your ideas and the things that you know but have difficulty describing in a concise way". Both of these participants have difficulty with translating their ideas onto the page. They claim to come up with their own ideas and simply use ChatGPT to structure them and provide a foundation they can build on. Generating the first idea for a project and coming up with the initial draft are both tasks that occur early on in the writing process. Participants seem to struggle with writing when they do not have something to work off. ChatGPT helps participants bypass these initial difficult steps, springboarding them into the later stages of writing.

4.3.4 Use of ChatGPT for Editing

A considerable number of participants, 68% (n=21), described using ChatGPT to edit content they created. A common edit ChatGPT performed for participants (n=3) was reducing word count, making their writing more concise. For example, ChatGPT was used by P16 to shorten a conference paper, and P20 gave ChatGPT their writing "to make it more concise". A few others (n=3) found ChatGPT to be a sophisticated grammar and spell-check. P24 uses ChatGPT to "filter off all the bugs in [their] writing", asking it to "check the grammar, spelling, [and] tone". After this, P24 says they "copy paste the content ChatGPT has given [them] to Grammarly… to double check [its] writing". P11 pointed out that, while "Grammarly can find

simple mistakes… when I need some more complicated stuff… ChatGPT can help me with that". Both of these participants use ChatGPT in conjunction with Grammarly. Even though they admit that ChatGPT is a more powerful tool, they feel more comfortable passing the content through multiple checks.

A number of participants (n=10) reported prompting ChatGPT to rephrase their content, usually to enhance its clarity and tone. P09 uses ChatGPT for targeted rephrasing suggestions, finding it easier than going to a "thesaurus which will give you a huge list". P28 "wasn't happy with a part of [their] thesis" and asked ChatGPT "to reword" it. P24 said they used ChatGPT "to add more flavor to [their] writing" claiming that what it gives them "is much better than [theirs]". While P24 seemed to prefer ChatGPT's wording to their own for personal style reasons, other participants used ChatGPT to adhere to external requirements. For example, P27 asked ChatGPT to "revise [their] writing… make it more natural and professional… to meet the standards of the journal" they were trying to get published in. Some participants (n=3) found ChatGPT helpful in adjusting the tone of their emails, making them sound more polite and professional. P24, for instance, uses ChatGPT "whenever [they're] writing an email" to make the tone more "formal and polite" and P16 recalled asking ChatGPT to make their email "politically correct". Many participants (n=12) for which English is a second language reported using ChatGPT for translation purposes and to enhance their vocabulary. To do this, P28 simply asked ChatGPT "can you translate this message into English?". Likewise, P30 tends to "repeat the same word over and over again" when writing in English. To solve this, P30 asks ChatGPT to "paraphrase" what they wrote "with better vocabulary".

Additionally, participants (n=5) used ChatGPT to garner feedback on their writing. P11 says they use "ChatGPT for proofreading" and it "really helps [them] to get [to] a better level in

[their] writing". P04 consulted ChatGPT on how to draft an acknowledgement paragraph for their thesis. Based on the outline ChatGPT gave them, P04 composed the paragraph and then asked ChatGPT for feedback to see if they were on the right track. Instead of reaching out to their supervisor when they were unsure of how to write an acknowledgement paragraph, P04 simply went to ChatGPT, treating it as their own personal tutor. Similarly, P26 said they will "write it the way [they] would have written it without using it, then just to check" they will ask ChatGPT to "revise it for [them]". P23 asked ChatGPT to assume the role of a professor. ChatGPT acted as P23's "personal tutor" and gave them "very helpful suggestions" such as "point[ing] out ways that [their] idea can be expanded further". P23's example demonstrates a sophisticated use of ChatGPT. Through giving it a specific role, they were able to prompt it into giving deeper, more nuanced forms of feedback.

4.3.5 Summary & Analysis of ChatGPT Use

The findings in this section answer RQ1: *How do learners use ChatGPT for writing tasks?* Participants described using ChatGPT for brainstorming, researching, drafting, and editing. Drafting was the most common use of ChatGPT, followed by editing, research, and brainstorming. For a full breakdown, see *Table 1: Uses of ChatGPT* in Appendix D. Among participants, 74% (n=23) reported using ChatGPT to generate initial drafts or structure content, with many using it to synthesize rough content for further revision. Research, a use reported by 71% (n=22) of participants, involved leveraging ChatGPT for rapid information retrieval and summarization. Editing was the third most common use, with 68% (n=21), using ChatGPT to refine their writing by correcting errors, rephrasing text, and adjusting tone. Lastly, 48% (n=15) of participants employed ChatGPT for brainstorming, particularly to overcome writer's block.

There were no discernable patterns linking participants' use of ChatGPT to their age, education level, or area of specialization.

4.4 Advantages of ChatGPT

4.4.1 Potential to Improve Efficiency Through ChatGPT Use

The potential to improve one's efficiency was identified by 84% (n=26) of participants as a key advantage of ChatGPT. For example, P29 argued that ChatGPT's time-saving benefits are "where its real strengths are, and that's what [they've] been using it for". P04 similarly noted that ChatGPT enabled them to "better or more efficiently reach [their] goals", while P06 succinctly stated, "it saves time on things". These sentiments were echoed by P11, who found that "with ChatGPT, you really can do your work much more efficiently", and P21, who called ChatGPT "a time-saving thing".

Several participants (n=5) provided specific estimates of how much time ChatGPT saved them. P22 claimed that ChatGPT "cuts task time by 50%". Without ChatGPT, P05's writing process would normally take "a day or two", but now, with the use of ChatGPT, it takes them "two to three hours". Likewise, P08 estimated that writing a cover letter used to take them "2-3 hours" to complete and with the help of ChatGPT, it only takes "30 or 40 minutes". P29 had the largest estimate of time saved, explaining that for a task that used to take "at least a couple hours", with ChatGPT it "took less than a second".

Participants (n=7) most frequently mentioned ChatGPT's time saving benefits when discussing research. These participants said switching from traditional search engines like Google to ChatGPT reduced their time spent conducting research for their writing projects.

Participants (n=6) also linked drafting to ChatGPT's efficiency advantages. For instance, P11 remarked that ChatGPT "makes it faster to create documents", while P03 said they "can save some time" by using it to generate exercises for their students. In regard to editing, two participants (n=2) mentioned ChatGPT's time savings. P16 praised ChatGPT for saving "an enormous amount of time", and P13 commented that editing "didn't take too long" with its assistance. Finally, brainstorming was the least commonly linked ChatGPT's efficiency advantages. Only one participant (n=1), P11, explicitly said that ChatGPT "makes it faster to come up with ideas".

Some participants (n=7) turned to ChatGPT out of necessity rather than preference, driven by external pressures and time constraints. P24 said that "international students", on top of having "tons of work to do", also must "handle the house, finances, job, studies, [and] recreational time". P24 advocated for the use of ChatGPT as "it saves a lot of time, for students especially". In a similar way, P19 highlighted the pressures on school teachers saying "instead of having to do it themselves and taking up a lot of time and resources, which we know are limited and scarce in education, they're turning to ChatGPT". Both of these participants justify ChatGPT use based on how busy a person is.

Recalling the pressures they had as a student, P21 said "I was using it when I was in school because I was so pressed for time, but since I've been at work I've got a bit more time to think about things, I haven't used it as much". With less pressure on them now, P21 says they prefer "to just take the time to use [their] brain". Nevertheless, P21 notes that "in moments of desperation, [they] know [they] could use ChatGPT to write". For P21, ChatGPT seems to be a tool that is most useful in times of need, when they are feeling pressured. Similarly, P18 called ChatGPT "just another tool that you have at your disposal to use when you really need it". When

P13 used ChatGPT to generate content, it was for a task "imposed on [them]" by their supervisor that they "did not have the time for". P13 expressed guilt over their use of ChatGPT, calling it "a form of plagiarism" because the "idea… [didn't] come from [them]". Based on their comments, P13 would have felt better about generating the content themself, but resorted to using ChatGPT due to time constraints.

Several participants (n=5) suggested ChatGPT's time saving benefits could allow people to focus on more meaningful work. For example, P09 suggested that teachers' administrative work could be delegated to ChatGPT, giving them more time to build "relationships with students". P19, a teacher, commented on the time they saved by using ChatGPT and how it allowed them to "actually focus [their] energy on helping the kids". P22 noted that ChatGPT frees up time for them to "do other things at work". Similarly, P18 stated that they can now "be more strategic" with their time. P29 expanded on this idea, proposing that by "saving time" with ChatGPT, people could focus on "more serious issues" or engage in "higher-level work". With ChatGPT "taking on some of the load", P29 felt they had more time to think "outside the box" and develop "better solutions".

4.4.2 ChatGPT's Usability Advantages

Over a third of participants (39%, n=12) emphasized ChatGPT's usability. P15, for example, found only minimal effort was required to get what they wanted out of ChatGPT. P15 described how they could "write freely and just say to ChatGPT, 'translate in English'". Similarly, P04 described ChatGPT as "straightforward and simple to use".

Some participants (n=3) highlighted specific features of ChatGPT's interface they found intuitive and easy to navigate. P31 found it convenient that ChatGPT organizes chats by topic,

stating, “it saves all the different chats on the side, which is really practical”. P16 valued the ability to label their sessions with ChatGPT, delegating a session for just emails and another one for reviewing articles. This feature helped P16 stay organized and manage the tasks they used ChatGPT for. P06 pointed out the benefit of ChatGPT retaining information in their sessions, noting, “even if I ask it a question two weeks later, it still has that information”.

Comparing it to other GAI tools, P31 remarked that “ChatGPT is still the one that [they] find the easiest to access and use”. P08 praised ChatGPT for its superior capabilities in “interpreting language” and “communicating with people”, which they found to be more advanced than other AI tools like Google Home.

A few participants (n=3) said they preferred using ChatGPT over interacting with real people. P02, for instance, thought ChatGPT’s recommendations for choosing a laptop color were more personalized than those a human customer service representative could provide. P24 emphasized the convenience of using ChatGPT instead of seeking human assistance, noting, “if I can do this from home with just a click of a button, I’m not going to waste time with a writing assistant”. Similarly, P17 preferred conducting research with ChatGPT instead of “bothering experts to ask a question”.

4.4.3 Potential to Improve Knowledge & Skills Through ChatGPT Use

About a third of participants, 33% (n=10), claimed ChatGPT can be used to improve skills and knowledge. For example, P11 said ChatGPT “really helps kids… especially if they study a new language, it really helps them very quickly without any tutor”. P24 described how ChatGPT helped them improve their skills in their native language, which they were trying to relearn. P24 practiced writing in their native language and then used ChatGPT to generate

feedback. By analyzing the changes ChatGPT made to their writing, P24 learned to identify common mistakes or better ways to phrase things in their native language, remarking “I can literally improve using what ChatGPT suggests”.

A couple participants (n=2) improved their coding skills through ChatGPT. P08 credited ChatGPT with accelerating their learning of coding. P08 estimated that what they “learned in two months” using ChatGPT for their coding projects “would have taken six months” if they had not used ChatGPT. Similarly, P23 learned how to code by “going back and forth in conversation” with ChatGPT. P23 said ChatGPT provided them “full CSS code that was commented on and then gave a reasoned explanation as to what it put in the code and why”.

Some participants (n=3) felt that ChatGPT helped them improve their writing skills. P11 said “ChatGPT helps me get to a better level in my writing”. While P16 initially “was afraid that maybe [they’d] make less of an effort to write well” when given access to ChatGPT, “on the contrary, when [they] see [ChatGPT’s] answers, it gives [them] ideas for wording”. However, P16 noted - “I’m not saying that I necessarily retain the information”, so it is uncertain if P16’s writing skill improvement lasted long-term. P04 learned to write an acknowledgment paragraph for their thesis by iterating with ChatGPT—using its suggestions, crafting their own version, and having ChatGPT review it to help them understand if they had made any mistakes. Through this process, P04 improved their writing-related skills and knowledge.

Aside from coding and writing, ChatGPT helped participants (n=3) gain other valuable skills. P10 noted how ChatGPT helped them refine their interview and resume writing skills, showing them “how to manage getting an interview”. P25 imagined ChatGPT being used as a “social coach” to assist people on the autism spectrum in becoming more sensitive in social situations. P12 speculated that ChatGPT could give students the freedom to ask questions

without the fear of judgment they likely feel in traditional classrooms, facilitating deeper learning and helping them cultivate critical thinking skills.

4.4.4 Summary & Analysis of ChatGPT's Advantages

The findings in this section partially answer RQ2: *What advantages and disadvantages do learners identify in ChatGPT?*

According to participants, the key advantages of ChatGPT include its usability, potential to save users time, and potential to improve users' knowledge and skills. For more details, see Table 2: *Advantages of ChatGPT* in Appendix D. The most frequently mentioned advantage was efficiency improvements, with 84% (n=26) of participants claiming their use of ChatGPT helped them save time. A smaller portion of participants, 39% (n=12), highlighted ChatGPT's usability as a key advantage of the model. Lastly, 33% (n=10) of participants found ChatGPT could help improve their knowledge and skills.

There seems to be a link between participants' age and the number of advantages they identified. The average age of participants (n=3) who did not identify any advantages was 42 years old. For participants (n=13) who identified only 1 advantage, the average age was 32 years old. Participants (n=10) who identified 2 advantages had an average age of 31 years old. Finally, the average age of participants (n=5) who identified 3 advantages was 24 years old. These findings seem to suggest that younger users of ChatGPT tend to find more advantages in the tool, whereas older users tend to identify fewer advantages. Table 3: *Average Age of Participants by the Number of Advantages Identified* can be viewed in Appendix D. There were no discernable patterns linking the number of advantages participants identified to their education level, area of specialization, or the number of tasks they used ChatGPT for.

4.5 Disadvantages of ChatGPT

4.5.1 ChatGPT's Content Generation Disadvantages

A majority of participants, 81% (n=25), expressed dissatisfaction with the quality of outputs generated by ChatGPT. For example, P07 criticized ChatGPT's writing saying it sounded like "a kid with an excessive number of adjectives". Other participants voiced concerns regarding the repetition, generic quality, and lack of personalization in ChatGPT's outputs. These issues were mostly linked to participants' use of ChatGPT for brainstorming, drafting, and editing content. ChatGPT's research related disadvantages will be discussed in the following section 4.5.2.

The repetitive nature of ChatGPT's responses was an issue for 16% (n=5) of participants. For instance, P03 noted that ChatGPT "follows a very similar rhetorical structure". P06 and P18 both observed that it tends to repeat itself. Likewise, P24 found ChatGPT's content often lacked variation and P29 said the content it gave them was "a bit redundant at times".

Another criticism, reported by 29% (n=9) of participants, centred on the generic quality of ChatGPT's outputs. P30 found the content generated by ChatGPT to be "mundane" and "boring", a sentiment shared by P31, who described it as "a little bit bland". P04 commented that ChatGPT "could not be specific or exact enough", while P08 said it gives "a very stereotypical reply for a lot of things". ChatGPT's generic quality made P17 question its capabilities, with P17 saying: "I don't think he's capable of depth or nuance…it's very superficial, you can't ask him to do an in-depth analysis of something". P19, who used ChatGPT to write their resume, expressed

concern that its “generic formulation” might be easily detected by organizations, suggesting a limitation in its applicability for tasks requiring a personal touch.

Several participants (n=9) complained that ChatGPT’s responses were missing a ‘human element’. For instance, P01 observed that ChatGPT “wasn’t taking into consideration the human side of things”. P01 evaluated its outputs saying “‘well, yes, this part is true, but there’s a lot left out’”. P24 admitted using ChatGPT to write a love letter, a task requiring a ‘human element’. Unsurprisingly, P24 found the letter to be “so regular and blunt in tone” they deemed ChatGPT could not be used to convey human warmth or emotions. Additionally, P03 said content generated by ChatGPT “reads kind of boring, it’s devoid of feeling or emotion”. P12 showed concern for the lack of personalization in ChatGPT’s outputs, saying:

> “I feel like it's not me who's doing the work anymore... I'm having the work done for me, so it's just like… someone hiring a nanny to raise their kid…. the personalized aspect has been taken away… there's no personal touch.”

P12’s analogy highlights their dissatisfaction with ChatGPT and points to guilt they may feel for not doing their work themself. P09 reflected on the current period of “upheaval”, where individuals are assessing “what ChatGPT can do and what we can do better”, ultimately finding that “[their] voice as a writer, ChatGPT can’t do”. P21 acknowledged that while ChatGPT could produce “OK results”, it was “not going to be better than what you could do on your own”.

4.5.1.1 Strategies for Mitigating ChatGPT’s Content Generation Disadvantages

Participants employed a variety of different strategies to mitigate ChatGPT’s content disadvantages. Some participants (n=3) avoided using ChatGPT for brainstorming or drafting, limiting their use of it just to editing content they created. While this strategy could not address all of ChatGPT’s content generation disadvantages, it does limit the level of influence it has on

participants' writing. Instead of using it across all stages of the writing process, these participants only employed it for editing tasks, helping them to retain more creative control over their work. As mentioned previously, P24 had attempted to generate a "love letter to [their] boyfriend" with ChatGPT but was disappointed with the result. Seeming to have learned from this experience, P24 only reported using ChatGPT for editing, explaining:

> "even if I write the essay or the letter… I write it by my own first because I don't want AI to generate it … I will do it first from my end and then I will tell it to refine it a little bit… I'll ask… what are the issues that I need to work upon and what are the things that I can do better the next time?"

In this way, P24 elicits feedback from ChatGPT while seeming to avoid some of the issues they experienced when they asked it to generate content from scratch. P24 also works toward the goal of improving their writing, asking ChatGPT to point out mistakes so they can avoid them next time. P04 worked in a similar manner, only using ChatGPT to obtain feedback on their work, saying:

> "I will take the initiative to think about it or evaluate it, see if it fits my expectations in how it expresses my thoughts. I compare ChatGPT's output with the idea that I had before I asked ChatGPT. [It's] more of a comparison role that ChatGPT provides so I can decide what to take or what to leave."

It appears from this statement that P04 makes a concerted effort to come up with their own ideas before using ChatGPT. They assign ChatGPT a clear role in their writing process, only using it to improve the work they have generated. Rather than being swayed by one of ChatGPT's subpar ideas, P04 generates their own ideas which sets their writing on a more sound foundation. P26 employs a similar strategy saying they "write it the way [they] would have written it without using it, then, just to check [they ask ChatGPT to] revise it for [them]".

P04, P24, and P26 all abstained from using ChatGPT for brainstorming and drafting as they identified its content generation disadvantages. However, other participants are not as strict or intentional in their use of ChatGPT. Most participants who complained about ChatGPT's content generation disadvantages still reported using it for brainstorming and drafting. Of the 25 participants that reported using ChatGPT for drafting, 80% (n=20) complained about its content generation disadvantages. Likewise, of the 15 participants that used ChatGPT for brainstorming, 87% (n=13) also complained about its content generation disadvantages. Based on these findings, ChatGPT's disadvantages do not seem to be enough to dissuade participants from using it to generate content for the tasks of brainstorming or drafting.

A more popular strategy, reported by 33% (n=10) of participants, to deal with ChatGPT's content generation disadvantages is to simply spend more time regenerating or revising its output until it meets their expectations. P12 said they often ask ChatGPT to regenerate its response multiple times to find the best result. Likewise, P09 described asking ChatGPT "can you think of a cool way to present this?" and if they "didn't like the idea" they "asked: 'have you got another one?'". P11 said "it's not ideal, usually I try to regenerate the response several times to find the better way". While these participants (n=3) may eventually obtain the results they want, they do not seem very concerned about the amount of time they invest in regenerating ChatGPT's responses.

Several participants (n=7) resorted to rewriting the content ChatGPT gave them as they were dissatisfied with it. For example, P28 said "[they]'d ask [ChatGPT] to do a synthesis and then [they]'d rewrite everything that was written because often [they weren't] satisfied with the result". The need for revision was also emphasized by P29 who said "it does the job for me, but even after that I will have to go back and revise". P29 recommended that all ChatGPT users

“need to go over whatever it has generated to make sure that you're producing something that's actually meaningful and concise”. Thinking along the same lines, P15 said they “make it a point to always reread everything because” ChatGPT sometimes gives them “sentences that are logically constructed, but when you read them, they mean nothing”. These participants seem dedicated to the task of checking and revising ChatGPT’s outputs to ensure their quality, even if it takes them more time.

4.5.2 ChatGPT’s Research Disadvantages

While the various content generation disadvantages described above are relevant to the use of ChatGPT for research, participants raised enough research-specific disadvantages to warrant a separate section. Nearly half of participants, 52% (n=16), voiced concerns relating to ChatGPT’s inadequacy in performing research-related tasks. For example, P17 expressed frustration with the generic quality of ChatGPT’s response to their research question. When P17 inquired about the ecological impacts of dam removal, ChatGPT “just said ‘well, it can be positive for the environment’, but it didn’t answer why it would be better”. P17 complained that ChatGPT “gives very generic answers that can be applied to a lot of things… it’s never going to tell you yes or no”. This observation reflects a limitation of ChatGPT; it may struggle with summarizing complicated topics, leaving users with a generic answer that does not really answer their question.

Several participants (n=3) complained that ChatGPT’s responses are often based on outdated information which limits its utility in providing real-time or current data. P03 explained that because ChatGPT was “trained on data from a few years ago… it might not have the most up-to-date information”. To illustrate their point, P03 said if they were to ask ChatGPT what

they would need to "build a computer… it might not have the most up-to-date information, and it might be wrong". P02 also recognized that ChatGPT is "limited to 2021 data" due to how it was trained. P02 imagined "asking it for information about what programs are available in Canada" but "if something came out after 2021, it's not going to answer that". When trying to find information about Walmart's current strategies to become more environmentally friendly, P30 asked ChatGPT "to give [them] a list of strategies with real time statistics" and received the response "no, we're sorry, we cannot do that, we are not trained to give you real time statistics". P30 expressed frustration with ChatGPT saying "it's not informative because I need to know exactly what they are doing right now… but ChatGPT cannot do stuff like that". These participants highlight a major disadvantage of ChatGPT. If users need up-to-date information to answer their research questions, ChatGPT is not the right tool to use.

Other participants (n=3) caught ChatGPT giving them false information when they tried to conduct research with it. P06 wanted to know what "the best methodological approach" would be for their thesis. However, P06 found ChatGPT "inventing methodologies, very specific forms of methodology that you don't see in courses or even when you do research afterwards". P06 concluded that doing research with ChatGPT was "a bit shaky" and "you have to be very careful with the information it gives". P27 reached a similar conclusion regarding ChatGPT's reliability saying "when it comes to specific academic questions, it's not always right". P08 recalled "asking it some computational chemistry questions" and initially "thought it was good but then [they] checked [their] prof's notes… and it was not at all the same thing". Based on this experience, P08 determined that "very niche, high-level questions will not be answered as successfully" by ChatGPT. These experiences underscore that while ChatGPT can be useful for general inquiries, its reliability falters in more specialized or complicated topics.

4.5.2.1 Strategies for Mitigating ChatGPT's Research Disadvantages

An uncommon strategy, reported by only 13% (n=4) of participants, to deal with ChatGPT's research disadvantages was to simply not use it for research. For example, P16 found "information on Google is much more reliable than on ChatGPT". P16 stressed "ChatGPT isn't a search engine, it's really an assistant that will help you do your tasks or produce something, Google is really more about finding information". Likewise, after ChatGPT responded to P28's research question with false information, they turned to other sources such as "YouTube" as they "have more confidence in the information" presented on the platform. Setting YouTube's potential to spread misinformation aside, both of these participants had complained about ChatGPT's research disadvantages and then reported to have discontinued their use of it for research.

Unfortunately, this strategy was uncommon amongst participants. Of those (n=16) who found ChatGPT to be limited in its capacity for research, most (n=12) still reported using it to conduct research. P14, for example, criticized ChatGPT saying "when it comes to research purposes, I find it's incredibly lacking". However, P14 also said ChatGPT:

> "does have a usefulness in providing you [with] very basic information, or at least [a] starting point like Wikipedia used to be… where you kind of take it with a grain of salt, but over time it has become a pretty much defacto source for information online".

It is clear from this comment that despite ChatGPT's disadvantages, P14 still finds it useful for starting the research process and for finding basic information. In comparing ChatGPT to Wikipedia, P14 compartmentalizes its research disadvantages so they can continue to use it. According to P14, Wikipedia, despite being unreliable, still became a widely used source of information. P14 seems to expect the same will happen for ChatGPT, where it can be used for

research but the information it provides is ‘taken with a grain of salt’. However, simply lowering one’s expectations for the quality of information ChatGPT can provide is a poor strategy. Users may not be able to properly judge the accuracy of ChatGPT’s information or how well it has answered their research questions. Another participant, P24, still uses ChatGPT for research tasks but if its response “is not satisfactory” they “hop onto Google”. Like P14, P24 relies on their own judgment, which may be flawed, for deciding if the information ChatGPT provides is satisfactory or when they need to consult an alternative source.

Other participants (n=3) leave slightly less up to their own judgment, seeming to expect from the start of their research that they will need to consult more than just ChatGPT. For these participants, ChatGPT is used to gather initial insights and refine search queries before turning to Google or academic databases for more in-depth research. For example, P19 says “when I’m not sure where I’m supposed to start, I’ll ask [ChatGPT], and then based on the results, I’ll do formal research”. P31 uses ChatGPT to figure out “how to word [their] searches” as they sometimes find it difficult to identify the best “keywords for Google searches”. While P30 noted that ChatGPT cannot give them up-to-date information, “it can give you the idea [of] what you should work on”. These participants all seem to use ChatGPT when they are starting their research to steer them in the right direction and give them an idea of what to search for on other, more reliable sites. Nevertheless, they are still relying on ChatGPT to a certain extent and may be setting a shaky foundation for their research.

A few participants (n=2) said they refrained from using ChatGPT for research when they were working on something they deemed to be especially important. For example, P26 said “to get information that’s really precise… [for] my doctorate… I’ll refrain from using it because it would be very time-consuming to verify every piece of information it gives me”. Despite saying

this, P26's other comments indicate use of ChatGPT for research, saying "the reason I went to ChatGPT rather than Google was that it [gave] me a summary… it's a way of finding information more quickly". While P26 may not use ChatGPT for their doctoral research, they seem to use it to conduct other types of research. Like P26, P15 criticized ChatGPT's ability for research saying "ChatGPT is great in a very general context… but for very specific things, like a literature review… there are tools that are much more suitable". P15 seems to avoid using ChatGPT for research projects that require more specificity. However, P15 recalled asking ChatGPT "'can you find me some more up-to-date references that relate to the same themes?'". P15 preferred ChatGPT as it "answered [their] question in a few seconds whereas it would have taken [them] time to go to Google Scholar, write down keywords… and find the articles". While P15 and P26 may have limited their use of ChatGPT for research in some contexts, they still seem to rely on it for others, leaving them vulnerable to its disadvantages.

4.5.3 ChatGPT's Deskilling Disadvantages

Roughly a third of participants, 33% (n=10), expressed concern over their use of ChatGPT 'deskilling' them or degrading their knowledge and skills. P10, for example, believes that if they use ChatGPT "as a first thing to go to for any decision" they "will lose [their] own thinking abilities". Likewise, P19 worried that frequent use of ChatGPT could lead them to "forget skills that [they] have managed to build up over time". For another participant, P27, deskilling was not just a worry but a painful reality. P27 reflected on how their own creative problem-solving abilities had diminished, saying, "I used to be creative, I used to find a way to solve my problems, but these days I usually try to ask ChatGPT to ease my problems".

Sharing another personal example, P27 admitted that when using ChatGPT to write a cover letter, their impatience led them to disengage entirely: “I didn’t even read the text after 2-3 times that ChatGPT produced the thing”. This experience prompted P27 to question the value of the tool for learning:

> “If I don’t read the thing that ChatGPT creates, where is the learning? I’m here to learn and if it just creates [it for me], I don’t learn… and now if you ask me to write the cover letter in that way, I’m not able to do that because I didn’t actually read what it created for me”.

P27’s reflection highlights how easy it can be for users to simply let ChatGPT do their work for them. Additionally, this alludes to the possible detrimental effects of Chat GPT’s ease of use; individuals using ChatGPT may have little incentive to actively engage with the content the tool produces, and as a result some users will fail to actually learn or retain information that was provided in the process. These concerns were echoed by P21 who claimed that use of ChatGPT “could lead to shallow learning, just the high level ideas of something, because you haven't researched yourself or maybe it doesn't go down into your long-term memory”.

Another drawback of ChatGPT, as noted by 29% (n=9) of participants, is its ‘addictiveness’. P27 warned, “if you use it frequently, there’s a possibility of getting addicted,” a sentiment echoed by P15, who acknowledged being “addicted to using it” and feeling uneasy about being “completely dependent on artificial intelligence”. P30 drew parallels between their reliance on ChatGPT and social media addiction, stating, “I have to set boundaries for myself because if I cross the border, there is no turning back”. P31 appears to have already become addicted, admitting “I feel stuck, like I don’t know how to do this myself”, when they cannot access ChatGPT. This growing dependency not only undermines participants’ autonomy but also intensifies the risk of deskilling, as individuals increasingly rely on ChatGPT for tasks they would otherwise perform independently.

4.5.3.1 Strategies for Mitigating ChatGPT's Deskilling Disadvantages

A few participants (n=3) emphasized the importance of completing tasks without relying on ChatGPT to preserve their knowledge and skills. At the time of interviewing, P21 had just started a new job and said, "I'm learning so I don't want that to get in the way, maybe when I've been there for a while and I'm jaded, I'll start using ChatGPT instead of my brain". P21 insinuates that by using ChatGPT, they turn off their brain and stop learning. They seem to be avoiding using ChatGPT, fearing that it may stunt their progress.

Based on similar concerns, P31 warned "if you're going to get used to using it, other skills that you've had before, decay—that's how things work; if you don't use it, you lose it". P31 said they must "remind [themself] that it's important that [they] still do [work] without the tool sometimes". Similarly, P16 expressed the need to actively engage their mind, stating, "there's a part of me that wants to stimulate my brain to produce a fluid text based on my ideas because I know it's still important". For these participants, dedicating periods of intentional non-use of ChatGPT seemed to be a strategy to counteract potential skill erosion. However, this approach may not be easy to practice due to ChatGPT's addictiveness.

P19 said we "have to find the balance between using AI but not over-relying on it". This is a good ideal to work towards, in that it could help users leverage ChatGPT's strengths while also preserving their knowledge and skills. However, P19 does not offer any advice on how to reach this balance, nor do they seem to have found it themself. P02 wanted users to recognize that ChatGPT is "not going to replace our individual intelligence, we still need our intelligence". P02 further recommended for users to "listen to what you're receiving, evaluate it, assess it, take whatever works for you from it". P02's strategy for maintaining skills and knowledge while

using ChatGPT is to actively engage with the content it generates. However, it is unclear if P02 actually does this in their own use of ChatGPT or how realistic this strategy is for users to adopt. Making sure to evaluate every piece of content ChatGPT generates would certainly take users more time. As most participants praised ChatGPT for its efficiency, they likely would have difficulty giving this advantage up even if it meant preserving their own knowledge and skills.

4.5.4 General Strategies for Mitigating ChatGPT's Disadvantages

Other strategies were mentioned by participants (n=15) that did not specifically pertain to just content generation or research but seemed to be useful for general mitigating of ChatGPT's disadvantages. Improving the prompts given to ChatGPT to initiate a better response, also known as prompt engineering, was a method described by a considerable number of participants (n=7). P20, for instance, said "when [they] first started using it, [they] would just [ask ChatGPT to] look this up, but now [their] strategy is to add as much detail as possible, situating ChatGPT… in a certain frame of mind before asking". P27 uses the same approach, explaining that they "define the situation completely" before asking ChatGPT to generate a response. Before prompting, P29 said they "cleaned the data so it's easier for it to process and so that it doesn't misunderstand or take something out of context". P07 was unhappy with ChatGPT's formulaic responses in which "it'll say X was found by so and so, and it leads to Y and Z". P07 has "been trying to engineer a prompt that will get it to stop doing that". For ChatGPT to work well, these participants seem to have to spend time crafting detailed prompts and strategizing how to steer it in the right direction. Although they may see this as a way of mitigating poor quality responses from ChatGPT, they do not seem to consider the amount of time they invest in prompt engineering.

Several participants (n=5) directly acknowledged the amount of effort required to obtain a good output from ChatGPT. P21 explained that "ChatGPT can't read your mind, so you need to be as concrete as you can" and "if you want something precise, you might have to put some more effort into it". Likewise, P15 acknowledged "there's a lot of work to be done on learning how to use this tool… if your question is not clear enough, poorly formulated, or vague, you can't expect a perfect output". P17 called ChatGPT an "effective, but time consuming tool" as it sometimes takes them "an hour to figure out how to properly ask ChatGPT what [they] want". These participants talked matter-of-factly about the amount of time and effort they spend in steering ChatGPT in the right direction. They seemed to accept that ChatGPT requires users to invest their energy into the tool.

Other participants (n=6) referred to specific skills and knowledge users needed to use ChatGPT effectively. For example, P03 said "it's kind of like a programming language… somebody who spends time on it… could do something very advanced". Likewise, P23 said "there's a way to talk to these models". These comments insinuate that for users to get the most out of ChatGPT, they must learn to speak its 'language'. Echoing this sentiment, P11 called "find[ing] the better way" of prompting ChatGPT "a real science". Courses on the 'science' of prompt engineering now exist for users to invest their time and money in. For example, P06 noticed "on TikTok a lot of people training to see how best to use ChatGPT". According to P07, "prompt engineering is going to be the next big thing". This belief prompted P07 to "[take] a couple of those online prompt engineering courses". These comments show participants to not only be accepting but eager to spend their time learning how to use ChatGPT.

The difficulty participants have in getting a decent response from ChatGPT may indicate issues with its usability or limitations in its capabilities. However, participants tended to blame

themselves rather than the tool for its poor outputs. Commenting on the quality of ChatGPT's outputs, P11 said "it really depends on how you use it". While P14 expressed frustration over having to "[do their] work twice - prompting it to do what [they] need and then verifying everything it has done", they attributed the issue to a deficiency in their skills. P14 remarked, "with any tool, it requires some practice and experience". P14 expects "it will become easier as [they] learn what prompts work and what prompts don't work". Similarly, P17 thought that if "[they] write it down badly… it gives [them] something not good", taking issue with the prompt they gave ChatGPT instead of the tool itself. Participants seem to be forgiving of ChatGPT's disadvantages. Moreover, they do not seem to see them as disadvantages, rather just indications that they do not yet know how to use the tool properly. They appear more ready to invest their time in becoming better users rather than advocating for a better tool.

4.5.5 Summary & Analysis of ChatGPT's Disadvantages

The findings in this section answer RQ2: *What advantages and disadvantages do learners identify in ChatGPT?* Participants highlighted disadvantages in ChatGPT's content generation, research capabilities, and potential to deskill users. These disadvantages are detailed in Table 4: *Disadvantages of ChatGPT* in Appendix D.

Most participants, 81% (n=25) mentioned at least one issue with ChatGPT's content generation. ChatGPT was criticized for producing generic, repetitive, and impersonal content. To mitigate these issues, some participants limited ChatGPT's role in content generation, using it mainly for feedback and refinement rather than for brainstorming or drafting. Other strategies included revising or regenerating ChatGPT's content until it met their expectations. However,

these strategies did not entirely eliminate the disadvantages and required time to implement, which detracted from ChatGPT's intended time-saving benefits.

Half of participants, 52% (n=16), identified specific disadvantages in ChatGPT's research capabilities. They noted concerns regarding its inability to provide real-time data and the generic or inaccurate responses it often delivered to research inquiries. To mitigate ChatGPT's research disadvantages, participants tried refining search queries; seeking alternative, more reliable sources; and limiting its use for more critical research tasks. Most participants who identified these research-specific disadvantages continued to use ChatGPT, potentially undermining the quality of their research.

One-third of participants, 33% (n=10), voiced concerns over ChatGPT's risk of deskilling users. Participants felt that relying too heavily on ChatGPT could hinder the development of critical skills like research, writing, and problem-solving. Many noted their growing dependency on the tool and decreased engagement in their work. The addictive nature of ChatGPT further exacerbated this deskilling effect, prompting participants to emphasize the importance of completing tasks independently to preserve their knowledge and skills. Although they recognized the need for a balance between using ChatGPT and maintaining their skills, few provided concrete strategies to achieve this, and the time required for critical evaluation of ChatGPT's outputs hindered skill preservation.

For most participants, ChatGPT's disadvantages were not significant enough to deter them from using the tool. Regardless of the identified disadvantage, participants continued using it for various tasks, often prioritizing its perceived advantages over its limitations. Many seemed to believe they could mitigate these disadvantages and still benefit from its advantages, rather than critically assessing whether the tool's drawbacks outweighed its usefulness. A substantial

number of participants (n=15) reported employing strategies such as prompt engineering and acquiring new skills to enhance ChatGPT's outputs, with some even acknowledging that these strategies were time-consuming. However, rather than questioning the overall effectiveness of ChatGPT, participants appeared more willing to adapt their own practices, suggesting a readiness to change their approach rather than critique the tool itself.

The common assumption among participants was that mastery of ChatGPT could overcome its shortcomings. However, this belief is somewhat naive, as these strategies, with the exception of discontinuing use, did not fully resolve the identified disadvantages. Moreover, the time invested in mitigating these issues detracted from one of ChatGPT's key advantages—its ability to save time. Participants seemed largely unaware or unconcerned with the amount of time and effort required to improve ChatGPT's responses, raising questions about the tool's actual usability and efficiency. This persistent use, despite the acknowledged disadvantages, reflects a positive bias toward ChatGPT, or at least a strong commitment to extract its benefits, even at the cost of time and effort.

This response highlights participants' tendency to overlook ChatGPT's limitations in favor of its immediate benefits. Factors such as tight deadlines or heavy workloads may have influenced their continued use of the tool, but it is also possible that the excitement surrounding ChatGPT contributed to their overlooking its disadvantages. In their enthusiasm, participants may not have fully considered the time investment required to achieve valuable outputs, suggesting that they were not critically weighing the pros and cons of the tool before diving into its use. There were no discernable patterns linking the number of disadvantages participants identified to their age, education level, area of specialization, or the number of tasks they used ChatGPT for.

4.6 Ethical Issues & Impacts of ChatGPT

4.6.1 ChatGPT and the Spread of Misinformation

Participants generally showed a low level of awareness regarding ChatGPT's potential to spread misinformation. Between the 31 participants, only 19% (n=6) demonstrated awareness and caution concerning ChatGPT's propensity for generating false information. Of the remaining participants, 33% (n=10) failed to mention misinformation altogether; 39% (n=12) were somewhat aware of the issue but approached it with a degree of naivety and a lack of caution; and 10% (n=3) of participants held inaccurate beliefs about ChatGPT's propensity for misinformation and were therefore deemed to be unaware of it.

4.6.1.1 Participants Unaware of ChatGPT's Misinformation.

The participants who were most unaware of ChatGPT's potential for misinformation were P10, P24, and P29. P24 wrongly assumed that ChatGPT "will understand everything", and P10 expressed the incorrect belief that "ChatGPT won't make errors". While P29 recognized that ChatGPT is "not for anything that would touch on your personal opinions", they asserted that "it's more for work or fact-based queries". P29 did not seem to be aware that ChatGPT can generate false information even in factual contexts.

4.6.1.2 Participants Somewhat Aware of ChatGPT's Misinformation

Over a third of participants, 39% (n=12), seemed to be only somewhat aware of ChatGPT's misinformation. Although these participants did not make overtly incorrect

statements about ChatGPT's misinformation, they did not appear to be very knowledgeable or cautious about it. For instance, several (n=8) did not expect errors from ChatGPT, and were surprised when they found it had given them false information. P26 recounted their initial excitement over ChatGPT-generated references: "oh my God, there are all these articles," only to later realize, upon verifying the sources, that "they didn't exist". P26 expressed frustration and shock at having over-trusted ChatGPT, especially because they are usually "vigilant about what [they] use as a reference". P13 recalled being initially impressed, saying "wow, that's incredible" at the reference list ChatGPT gave them, before realizing it was completely fabricated. P11 shared a comparable experience, describing their "surprise" upon discovering that the "list of literature" ChatGPT provided included "names that don't exist". Still incredulous, P11 asked, "why did it create those names from nothing?". P14 "didn't go into" using ChatGPT "with the intent to be skeptical", only later realizing the information ChatGPT generated "doesn't exist online". P06 admitted that at first they did not think ChatGPT had limits but "after 2 weeks [they] started to realize all the flaws".

These participants simply did not anticipate that ChatGPT could generate false or misleading information, despite warnings from OpenAI. As mentioned in the literature review, OpenAI included a warning in their initial launch of ChatGPT that it may generate "plausible-sounding but incorrect or nonsensical answers" (OpenAI, 2022a). There is also a warning directly on the interface which says "ChatGPT can make mistakes" (OpenAI, 2024c). Despite this, a considerable number of participants (n=8) seemed to assume, at least at first, that ChatGPT's outputs would be accurate, highlighting a gap in understanding the tool's limitations.

Upon realizing that ChatGPT can spread misinformation, over a third of participants (n=11) made efforts to validate its outputs before relying on them. However, their validation

methods often lacked rigor. Several participants (n=5) relied primarily on their prior knowledge to identify mistakes. For example, P17 thought ChatGPT is "really good at sounding like it knows what it's talking about, but if you know enough, you're like 'no, that's not true'". P17 confidently said if "it didn't make sense what [ChatGPT] was saying, I'd realize that, so it doesn't scare me too much". P17 places the responsibility of accurately understanding information solely on themselves, leaving room for inaccuracies. Likewise, P13 said "since it was stuff I knew, I could confirm what it was telling me" adding "but for something I didn't know, I wouldn't feel comfortable asking ChatGPT". While the latter of P13's comments demonstrates caution, overall, they are too reliant on their own knowledge base, which may have gaps or inaccuracies.

Other participants (n=6) relied on informal testing methods for verifying the information ChatGPT generated, often placing undue confidence in their own ability to identify its errors. Before using ChatGPT for a task, P28 said they would first "test to see if it's able to do what [they're] asking it to do, in a way that [they] think is correct" and "if [they] judged that its answers were appropriate, [they'd] continue". This verification method completely depends on P28's judgment, which may not be sound. Also naive, P11 assumed ChatGPT's information only "has to be validated when it comes to serious stuff", missing that ChatGPT can be wrong about anything, even something seemingly trivial. Most of the time, P11 relied on their prior knowledge and to verify information outside their expertise, P11 would "ask a professional or practitioner". However, this approach assumes the continual availability of experts, which may be impractical in situations where such resources are not readily accessible. P26 admitted that they "check sometimes, but not always," and when they do not verify ChatGPT's outputs, they

simply take it “with a grain of salt,” indicating a lack of consistent validation. These informal methods do not adequately address the need for thorough verification of ChatGPT’s outputs.

4.6.1.3 Participants Aware of ChatGPT’s Misinformation

Only 19% (n=6) of participants demonstrated both awareness and caution regarding ChatGPT’s potential to spread misinformation. For instance, P01 indicated a higher standard of caution by stating they were “not going to rely on what ChatGPT produces”, opting instead to “go back to the original sources” because “if it’s published and it’s been reviewed, there can be some trustworthiness to it”. This approach reflects a more rigorous verification process compared to participants in the ‘somewhat aware’ category. Similarly, P15 advised that “you have to double-check everything it does”, underscoring the need for thorough scrutiny. In contrast, P11, a ‘somewhat aware’ participant, had said they only validated “serious information”, indicating a lesser understanding of ChatGPT’s potential for error. P08 showed a higher level of insight, noting that OpenAI “have not implemented a way to stop ChatGPT from hallucinating” and cautioning that users should “expect errors”. P08’s reference to OpenAI, instead of solely relying on personal judgment, suggests a nuanced perspective on the technical limitations behind ChatGPT’s abilities.

In contrast to less aware participants, those with a deeper understanding of ChatGPT’s limitations (n=6) not only prioritized the validation of information but also recognized the broader ethical issues of misinformation. For example, P19 was concerned about ChatGPT’s ability to generate false answers, saying that people could easily be “fooled by ChatGPT”, which presents an “ethical concern”. Similarly, P27 said “ChatGPT can create false or wrong information” and worried about the likelihood that “nobody will find out” about the

“misinformation”. P01 described the absence of peer review in ChatGPT's outputs, expressing worry that “information that hasn’t been at least reviewed by somebody of knowledge” might be interpreted as truth. These participants displayed a more critical and ethically informed approach to using AI-generated content.

4.6.2 Biases in ChatGPT

Overall, participants demonstrated a relatively low level of awareness regarding bias in ChatGPT’s outputs. A majority, 55% (n=17), did not mention bias at all, while 7% (n=2) made inaccurate claims, suggesting that ChatGPT was entirely free from bias. Several participants, 23% (n=7), were somewhat aware of bias but still made naive assumptions, especially about how this bias should be managed. The remaining participants, 16% (n=5), demonstrated the highest level of awareness by sharing accurate knowledge and caution toward ChatGPT’s biases.

4.6.2.1 Participants Unaware of Biases in ChatGPT

A couple participants, 7% (n=2), exhibited a complete lack of awareness regarding bias, perceiving ChatGPT as inherently impartial. P31 said that ChatGPT represented “a more unbiased approach, whereas humans, it's hard to remove bias at times”. P31 demonstrates a fundamental misunderstanding of the nature of GAI, failing to recognize that biases can be embedded within the training data used by ChatGPT. In addition, P23 claimed ChatGPT:

> “looks at the sources and based on how it’s trained, gives responses that [are] acceptable to the greatest number of people and doesn’t show any signs of obvious political bias because that can be a risk to the corporations that run the service… it’s impartial for reasons of risk mitigation… for a product that’s deployed to the public, it must be very neutral”.

P23 conflated ChatGPT, a GAI model, with a recommender system, revealing a fundamental misunderstanding of how ChatGPT operates. P23 also wrongly assumed that the organization that runs ChatGPT, OpenAI, has managed to make it bias free, which is not the case.

4.6.2.2 Participants Somewhat Aware of Biases in ChatGPT

A relatively small portion of participants, 23% (n=7), were only somewhat aware of biases in ChatGPT. Among these participants, several (n=4) held the naive belief that bias in ChatGPT could be entirely mitigated with proper oversight. As detailed in the literature review, GAI models like ChatGPT are inherently biased. P08 revealed a gap in their knowledge with the question—"was the database it was trained on non-biased?"—illustrating an assumption that bias could be eliminated from the model and its training data. This viewpoint was echoed by P24, who stated that AI "should be bias-free," further reflecting a lack of understanding regarding the inherent nature of bias in GAI models and the data they are trained on. P08 also suggested that bias could be mitigated by having "a human eye to observe that the data set isn't corrupted and what's generated is not hurtful content". These views reveal a misunderstanding of the inherent biases embedded in GAI models, which are shaped by the data on which they are trained as well as the perspectives of their developers.

Other participants such as P12 and P15 demonstrated partial knowledge of the influence that developers have on the presence of bias in GAI models, but they did not fully grasp its broader implications. P12 observed that "AI has a lot to do with the kind of people that develop it; in Pakistan, the development would be different than in the US, it's very contextualized". However, P12 went on to say "you're responsible for forming your opinion" ChatGPT "doesn't tell you what to do, it just says information, do whatever you want with it". P12's comment

detracts from their earlier insight by revealing an overall lack of concern or understanding of the impacts these biases can have. Additionally, P15 noted that “AIs aren’t neutral, they are programmed from a certain perspective, and so they’re going to generate a certain perspective”. However, P15 underestimated the pervasive nature of bias in GAI models, believing it would only pose significant problems in extreme cases, stating, “it works for the majority of cases, but as soon as you get into questions that are more ambiguous or politically charged, it becomes problematic”. This perspective overlooks the real issues of bias in ChatGPT, which can subtly influence outputs across a wide range of contexts, rather than only doing so when presented with controversial queries.

P15 further downplayed the problems of bias in ChatGPT by comparing them to existing biases in tools like search engines, suggesting that while AI might exacerbate these issues, the overall impact is not substantial. This sentiment was echoed by other participants who, despite recognizing bias in ChatGPT, expressed little concern or had modest expectations for how such biases should be addressed. For instance, P14 recounted an interaction with ChatGPT where they questioned the platform’s criteria for determining factual information. Upon receiving a list of credible sources that aligned with their own views, P14 was satisfied and proceeded to use the tool without further scrutiny. This reflects a broader lack of caution among participants who, while aware of potential biases, did not view them as critically problematic or felt that these biases were manageable.

4.6.2.3 Participants Aware of Biases in ChatGPT

A smaller group of participants, 16% (n=5), exhibited a more advanced understanding of bias, recognizing that it is inherently programmed into GAI models due to the nature of their

training data. P01, for example, highlighted that "if there were biases in what it was fed, it's going to generate responses from a certain perspective". This awareness extended to the understanding that human biases are inevitably reflected in GAI models like ChatGPT, as P01 further remarked, "it's human created, so I'm not going to automatically trust what ChatGPT generates". P01 is considerably more knowledgeable and cautious than participants in the 'somewhat aware' group. For example, P16 questioned the selection process behind the references used by ChatGPT, asking: "how [is ChatGPT] able to find the references [it uses] to justify a point, are there any biases, what makes it choose one ref over another?". While P16 did not fully understand the extent of bias in ChatGPT, they recognized the potential for bias in certain tasks and expressed wariness towards relying on ChatGPT to generate complete paragraphs, citing possible "mistakes and biases". Nevertheless, due to their uncertainty, P16 was deemed to be only somewhat aware of ChatGPT's bias. Participants in the aware category were more confident and knowledgeable of bias in ChatGPT. For example, P19 said "there's definitely a bias in the way it's answering" and P17 said "there are biases in machine learning".

P21 pointed out that ChatGPT's training involved "scraping the Internet" which they thought to be "poison" as "there are so many opinions out there on the Internet and some of them are unpleasant and some are just stupid". P21 explained that if "you put garbage in, you're going to get garbage out" and, due to the inclusion of data from the Internet, ChatGPT "takes human biases". P21's point that ChatGPT "takes human biases" due to its reliance on Internet data reinforces a critical concern about GAI models: they not only learn from vast information sources but also replicate the biases embedded within that data. This can result in GAI models reproducing harmful stereotypes, misrepresentations, or skewed perspectives.

Additionally, P06 discussed how biases in GAI models can influence users. P06 warned of "the polarization of ideologies" via ChatGPT which "is designed to reinforce our ideas, and that could be a danger for people". By noting that ChatGPT "is designed to reinforce our ideas," P06 points to how these models may present information that aligns with users' existing beliefs, rather than challenging or diversifying their perspectives. This feedback loop of continuously reinforcing biases poses a danger for users, as it can deepen ideological divides and contribute to the polarization of social discourse.

4.6.3 ChatGPT and the Spread of Disinformation

Amongst the 31 participants, 42% (n=13), made no mention of disinformation. Only one participant, P07, explicitly used this term, cautioning that "disinformation is going to worsen" as a result of ChatGPT's release and growing popularity. Other participants, 26% (n=8), appeared to be somewhat aware of ChatGPT's disinformation but only alluded to it in vague terms. Just over a third of participants, 33% (n=10), were deemed to be aware as they demonstrated greater knowledge of the issue mentioning specific types, impacts, and actors related to disinformation. Unlike the issues of misinformation and bias, there were no incorrect statements regarding disinformation.

4.6.3.1 Participants Somewhat Aware of ChatGPT's Disinformation

Several participants, 26% (n=8), did not explicitly mention disinformation, instead hinting at its potential dangers. For instance, P11 said that the "stuff" generated by ChatGPT "can be harmful for you", wishing that people would "use it more consciously and understand" its potential for harm. P18 vaguely pointed to potential impacts of disinformation, stating that

“the effects on society [are such that] you will not know what's true, [and] they're gonna doubt everything that’s there”. Similarly, P13 warned that “it could end up in the hands of people who use it for the wrong purposes”. This was echoed by P19, who admitted, “I'm scared that we're going to use it for bad reasons”. P09 acknowledged the prevailing concerns in public discourse, noting that “there’s lots of headlines that say we should be super scared, and that bad people will use AI to do bad things”. These statements reflect an awareness of the potential misuse of GAI models like ChatGPT, though not necessarily a deep understanding of how disinformation may actually manifest through these models.

4.6.3.2 Participants Aware of ChatGPT’s Disinformation

Other participants, 33% (n=10), raised more specific concerns about ChatGPT’s disinformation. P15 noted that “content generated by artificial intelligence - video, voice, images - are becoming increasingly difficult to distinguish from reality”, adding that this raises “ethical questions”. P08 also cautioned that AI could be used to “push fake news,” while P24 expressed concerns regarding the “potential misuse of AI-generated content,” leading to the spread of fake news. Both P07 and P14 expressed concerns over GAI models like ChatGPT being used to create deepfakes. These participants pointed to specific forms of disinformation that ChatGPT could be used to create, and thus demonstrated greater awareness of the issue.

A handful of participants (n=4) raised concerns about the possibility of ChatGPT being used for the purpose of manipulation. P01 was concerned that the existence of GAI models would grant certain groups “the power... to influence users”. P01 also mentioned the potential for GAI to be leveraged “to control the population by always generating certain opinions and perspectives”. Additionally, P08 feared GAI could be misused for “bigotry or authoritative

governments policing people," and P28 highlighted the risk of GAI being used for election propaganda to "create bots that are similar to people" and sway public opinion. P26 cautioned that "anything that can impact people's perceptions or beliefs can become dangerous, especially when we don't know who's behind the controls". Comments from these participants indicate knowledge of and concern over the misuse of GAI models like ChatGPT to spread forms of disinformation and manipulate users.

A few participants (n=4) pointed to the possibility of ChatGPT being used for fraudulent activities such as scams which are another type of disinformation. P25 said ChatGPT has "been used to help people create more believable scams". P23 imagined GAI's realistic voice synthesis features being used by fraudsters to impersonate their victims' loved ones and extort money out of them. P14 similarly warned that GAI could facilitate voice spoofing, often deceiving elderly individuals into giving away their savings. P28 suggested that GAI could be used to exploit individuals' vulnerabilities, facilitating fraudulent activities by targeting groups who are the most susceptible to scams.

The varying levels of participant awareness regarding disinformation bring to light the complexities surrounding ChatGPT's potential misuse. While a considerable portion of participants, 45% (n=14), did not mention disinformation at all, those who expressed concerns ranged from vague acknowledgments of harm to detailed discussions of specific threats. Participants who were somewhat aware tended to focus on general misuse, whereas those who were more knowledgeable identified concrete risks, such as the creation of deepfakes and scams.

4.6.4 Privacy Issues with ChatGPT

Almost half of participants, 48% (n=15), did not mention the subject of privacy at all. A handful of participants, 13% (n=4), were deemed to be only somewhat aware of ChatGPT's privacy issues due to their lack of concern and generally complacent attitude towards it. Over a third of participants, 39% (n=12), demonstrated a high degree of awareness and caution regarding ChatGPT's privacy issues and their potential impact. There were no incorrect statements about ChatGPT's privacy risks.

4.6.4.1 Participants Somewhat Aware of ChatGPT's Privacy Issues

Several participants, 13% (n=4), seemed to be somewhat aware of ChatGPT's privacy risks, but their caution was tempered by an attitude of inevitability. P06 acknowledged uncertainty in reference to data handling, noting that "we don't know where our information is going". Despite this, P06 said they "give ChatGPT a lot of information", especially when they "ask it to write a letter of recommendation" or "make a meal plan". As P06 uses ChatGPT for personal projects, they seem to have grown accustomed to "giving a whole new level of information" away. P06 downplayed the severity of ChatGPT's privacy risks, remarking, "my information is already everywhere… might as well give it to other people too", exhibiting a troubling indifference towards their personal data privacy.

P23 claimed they were cautious by not sharing confidential information with ChatGPT, but they still shared some personal data when using the tool, stating, "for personal information… I have a softer limit". P23's oversight ignores that even seemingly non-sensitive data can still be exploited, indicating a superficial understanding of ChatGPT's privacy risks. P13 claimed, "it's no longer even possible to keep track of where you've given information", overlooking the

solution of reviewing their ChatGPT session history to monitor what personal information they have shared. Instead of taking practical precautions, P13 adopted a defeatist stance, saying, "someone who wants my data, they'll get it". This attitude seemed less like a reasoned conclusion and more like an excuse to avoid taking meaningful steps to protect their privacy.

4.6.4.2 Participants Aware of ChatGPT's Privacy Issues

Over a third of participants, 39% (n=12), showcased a greater level of awareness and caution toward the privacy risks of using ChatGPT. P28 reflected on the traceability of personal data, remarking: "I'm trying to be aware that my data… is traceable… they're able to paint my portrait", underscoring the potential for GAI models like ChatGPT to exploit sensitive information. P26 echoed these concerns, stating: "I'm not going to dare give too much personal information to the artificial intelligence because I don't want to give it a head start".

P01 expressed a deep distrust of ChatGPT's handling of sensitive data, asserting, "I'm not trusting of these things or giving anybody my personal information". P01's hesitation extended to sharing unpublished work, acknowledging that, "providing this thing with your unpublished work [is risky] because I don't know how it's used". This skepticism reflects a broader wariness of how sensitive data might be mishandled or distributed by the tool. P09 shared similar caution, only willing to input information they were comfortable with making publicly available.

P07 raised concerns about ChatGPT's training process, specifically noting how data is "scrubbed from the internet without permission", indicating an understanding of a major privacy issue. As mentioned in the literature review, data from the Internet was used to train ChatGPT and a lot of people's personal information made its way into the model. P25 referenced an

incident where a company's internal information was mistakenly made accessible to ChatGPT, highlighting the critical need for securing sensitive data not only at the personal level, but at an organizational level as well. P25 also demonstrated a high level of caution by intentionally avoiding the use of ChatGPT for tasks related to their government internship, prioritizing data security over convenience. Likewise, P11 said they did not use ChatGPT for their job because they "work with sensitive information".

P12 described the risks of "information leaks", recalling another "scandal where private information got leaked to ChatGPT's database". P12 cautioned, "don't put your address on ChatGPT, what if it's hacked?" emphasizing the need for awareness of AI related security vulnerabilities. P16, who at times worked with confidential patient data, was firm in avoiding the use of ChatGPT when sensitive information was present, noting, "I'd never enter a patient's confidential data into an AI because I know it takes everything you write and then keeps it". P21 shared similar sentiments, stating they would be "reticent to put [their] data or someone else's data into it" as it "could be hacked".

P31 expressed concerns in regard to data ownership and AI-generated content, explaining that "if you use AI generators for photos…the generator actually owns your photos and can use it without your consent". P31 expressed a desire for "a better understanding of ChatGPT's security" and said that they would limit how much personal information they shared with it until they became more educated on the subject. P18 also demonstrated caution, refusing to upload images of themselves or their family to ChatGPT, aware of the privacy risks involved. P18 expressed concern that their family members might not exercise the same level of care. Overall, this group of participants consistently demonstrated a deeper understanding of ChatGPT's privacy risks, actively adjusting their behaviour to mitigate potential harm.

4.6.5 Transparency Issues with ChatGPT

The majority of participants, 87% (n=27), made no mention of ChatGPT's transparency issues. Several participants, 7% (n=2), made comments related to transparency, but only seemed somewhat aware of the issue. The same number of participants, 7% (n=2), seemed to be both aware and cautious of ChatGPT's lack of transparency and its impacts. Participants did not make any incorrect statements of transparency.

4.6.5.1 Participants Somewhat Aware of ChatGPT's Transparency Issues

Two participants, 7% (n=2), were somewhat aware of ChatGPT's transparency issues, but their knowledge of the issue appeared limited. For example, P09 mentioned they "read a headline that even the engineers behind ChatGPT aren't sure how ChatGPT works". This describes the 'black box' nature of advanced AI, where even developers will struggle to fully grasp the intricate processes and decision-making mechanisms within the model. However, P09 did not articulate the broader implications of this lack of transparency, such as the potential risks of unpredictable outputs or the difficulty in holding the technology accountable for mistakes and biases.

Similarly, P06 raised concerns about the intentional opaqueness of ChatGPT, stating that "the creators aren't going to tell us exactly how ChatGPT works" and that ChatGPT was "launched without explaining how it works, what it's for, and then people learned by using it". P06 speculated that this lack of transparency could be an intentional "marketing strategy", making the technology more intriguing and fueling excited discourse. This initial reflection

demonstrates a recognition of the strategic withholding of information, suggesting a deeper awareness of how the AI's opaqueness might be deliberately crafted.

However, P06 later contradicted this insight by displaying a more naive understanding of the model's transparency. P06 claimed,

> "ChatGPT is pretty open about the fact that if you ask him a question and he doesn't know how to answer it, he'll say OK, I can't answer it... he explains quite a lot about how, what his limits are".

This comment reflects a more simplistic view of ChatGPT's transparency, mistaking the model's admission of its limitations for genuine openness. While P06 initially showed a nuanced awareness of the potential for deliberate opaqueness, their later remarks reveal a lack of critical engagement with the broader and more complex transparency issues that are rampant in GAI technologies like ChatGPT.

4.6.5.2 Participants Aware of ChatGPT's Transparency Issues

A few participants, 7% (n=2), exhibited awareness of ChatGPT's lack of transparency. P11 emphasized the need for caution, stating, "we have to be cautious about AI because we don't know how it works", reflecting both their awareness of the opacity surrounding ChatGPT and the importance of user vigilance. Similarly, P26 observed, "we do not know who's behind the controls," pointing out the uncertainty surrounding who develops and governs GAI models. P26 expanded on this concern, explaining that "everything that has to do with people's perceptions, people's beliefs, it can become dangerous, especially when we know less who is behind the controls". This comment underscores the potential dangers of GAI influencing perceptions, particularly when its inner workings remain hidden. By linking the lack of transparency to these risks, P26 highlighted the potential harm that could arise from using ChatGPT without fully understanding who or what is driving its outputs.

4.6.6 Sustainability Issues with ChatGPT

The vast majority of participants, 94% (n=29), did not mention ChatGPT's sustainability issues. Only 7% (n=2) of participants were aware of the impacts GAI models like ChatGPT can have on the environment. There were no incorrect statements made about ChatGPT's sustainability issues.

4.6.6.1 Participants Aware of ChatGPT's Sustainability Issues

Two participants, 7% (n=2), expressed concern over ChatGPT's sustainability issues, particularly in terms of its energy consumption and resource usage. P17 noted, "it's fun, all the automatic stuff, but it requires energy… in general, electronics require rare metals". P17's comment highlights both the energy and resources advanced technologies like ChatGPT use which many users do not think of at all. P22 commented on the growing popularity of GAI models like ChatGPT, stating, "it's all going to be a game of computing power and energy". P22 criticized ChatGPT's energy consumption, saying, "this thing takes too much energy and too much computing to answer my extremely stupid prompt". These reflections demonstrate awareness of ChatGPT's sustainability issues.

4.6.7 Responsibility Issues with ChatGPT

Most participants, 65% (n=20), did not address issues of responsibility related to ChatGPT. Only a small amount, 7% (n=2) explicitly used the term 'responsibility', while others indirectly referred to it by suggesting which groups should be held accountable for potential harms caused by ChatGPT. A considerable portion of participants, 23% (n=7), provided more

nuanced views on responsibility, showing a stronger alignment with HCAI principles. These participants considered a shared responsibility model, where blame would be distributed between all involved parties. In contrast, 13% (n=4), opted to attribute blame on a single group, reflecting a less nuanced perspective on the idea of responsibility. One participant, 3% of the sample, was categorized as unaware as they advocated for a tech-centric perspective that contradicted the human-centric focus of HCAI.

4.6.7.1 Participants Unaware of ChatGPT's Responsibility Issues

P08's comments revealed them to be unaware of ChatGPT's responsibility issues. By dismissing the need for design choices aimed at protecting users and society, P08 minimized the importance of ethical considerations in GAI development, stating:

> "There's a meme that says, 'as a large AI language model, I cannot comment on this,' it's a very stereotypical reply for a lot of things that it doesn't want to answer and sometimes it won't give that answer even if it wasn't controversial. People were upset because the developers designed it to stifle the creativity of LLMs. It almost made it an inferior product than it was previously. That's where over regulation can kill a product".

P08's concern that "overregulation can kill a product" enforces a perspective that prioritizes product performance and user satisfaction over ethical restraints and safeguards. While it is true that regulation can introduce constraints, these are often necessary to mitigate the harm GAI models may cause. P08's framing suggests that restrictions on what ChatGPT can answer limit its value, without considering the potential dangers of an unregulated system—such as amplifying harmful content or spreading misinformation unchecked. This argument directly conflicts with the ideas described in HCAI principles, which emphasize the importance of safeguarding human well-being alongside innovation.

4.6.7.2 Participants Somewhat Aware of ChatGPT's Responsibility Issues

The participants deemed to be 'somewhat aware', 13% (n=4), demonstrated a limited understanding of the complexities of ChatGPT's issues with responsibility. Their comments often assigned responsibility primarily to one group—usually users or developers—without fully appreciating the need for shared accountability in GAI development and use.

For instance, P30 framed the issue as one of personal responsibility, drawing a comparison between ChatGPT and social media: "it's just like social media or any other technology innovation, know how to use it so you can control it, otherwise it will control you". Similarly, P12 stressed the individual's role in forming opinions, stating: "you're responsible for forming your opinion… it doesn't tell you what to do, it just says information, do whatever you want with it". Both P30 and P12's comments demonstrate a user-centric view, assigning sole responsibility to individuals. This perspective overlooks how ChatGPT's design—such as how it presents information and the biases it may carry—can adversely influence users.

P01, a participant in the 'aware' category, provides a contrast to P30 and P12's views by pointing out that "people aren't going to be critical… just because an AI generated it, they're going to take it as truth". P01's comment highlights an understanding of how users, especially those lacking in media literacy skills, may accept AI-generated content without skepticism. P30 and P12's failure to consider this risk reflects a gap in their awareness of ChatGPT's potential to shape opinions and behavior, instead putting the burden on users to act as informed experts.

P23 raised valid concerns about OpenAI's ethical practices, particularly in terms of labor exploitation: "OpenAI did reinforcement learning… but that required underpaying an army of foreign workers to rate responses, which is clearly trying to solve an ethical problem

unethically". However, despite recognizing this issue, P23 believed that users would be able to independently assess the merit of AI-generated content: "the most responsible thing to do is to just let it give you all sides, even if all sides aren't equal in merit, that should be up to the individual to decide". This perspective overlooks the fact that ChatGPT's interface often obscures crucial signs of credibility, hindering users from distinguishing between valid and misleading information. P23's idealized view assumes that individuals will be able to critically evaluate content without recognizing the systemic challenges that impede informed decision-making.

4.6.7.3 Participants Aware of ChatGPT's Responsibility Issues

The participants in the 'aware' category, 23% (n=7), demonstrated a clear understanding of the shared responsibility between users, developers, and broader societal structures in the ethical use of ChatGPT. Their insights aligned closely with HCAI principles, which emphasize the need for collective responsibility and taking measures to mitigate AI-related risks.

P01 expressed deep skepticism regarding the state of GAI, highlighting the necessity of vigilance from both users and developers: "we have to remain critical of it and we have to remain critical of the people who produce it". P01's statement captures the essence of shared responsibility, acknowledging that ethical oversight must extend beyond the technology itself to include those who create and deploy it. P01 explained further by stating: "it's not that I don't trust the technology, I don't trust the intentions of the people behind it, and I don't trust that we're ready to be able to use it well and responsibly". Here, P01 recognizes the dual accountability of developers and users, pointing to the larger issue of whether society is equipped to handle the ethical complexities of GAI.

P28 also focused on the difficulty of assigning responsibility to one single group, explaining: “it has to come from the people who create the algorithm, because otherwise, you have very little control, [but] it's hard to go back up the chain and say ‘you intended to do this’”. P28 highlights the issues inherent in creating GAI models, which evolve and adapt in ways that may escape direct human oversight. P28's perspective aligns with the HCAI focus on the dynamic and multifaceted nature of AI development, where responsibility cannot be pinned solely on the creators but must be shared across various stakeholders.

P06 illustrated this quandary by questioning who bears the ultimate responsibility for AI’s actions, given its capacity for continuous learning:

> “Technology is moving 10 times faster than the law. That’s also the problem, because who is responsible for the consequences of artificial intelligence? Is it the people who programmed the AI behind it, because AI learns as it goes along, so it evolves. We don’t even know what the algorithm behind it looks like today”.

P06's comment highlights a central tension in the AI ethics debate: how to manage responsibility for a system that operates with increasing autonomy. This struggle showcases the need for a regulatory framework that keeps pace with technological advancements, a core principle of HCAI.

Other participants, such as P14 and P15, talked about the influence of profit-driven motives in the development of ChatGPT and the absence of effective safeguards. P14 criticized the prioritization of financial gain over ethics, noting that “if money is involved, people will rush it out the door, try to capitalize it and monetize it without necessary guardrails or precautions”. P15 echoed this concern, stating that “with all technology that was revolutionary, people just roll it out, try to make money as soon as possible, and then we are left as a society trying to fix all these things”. Both comments align with HCAI’s call for more proactive measures, as these

participants stress the need for developers to be held accountable and for regulations to be put in place before serious harm occurs. P14 went further, suggesting standardized interventions to prevent misinformation: “content generated by AI has to be labeled as such to prevent the spread of further misinformation”. This idea of labeling AI-generated content is a practical solution that is consistent with HCAI's goal of transparency and accountability in AI systems.

Several participants (n=4) highlighted cracks in the current regulatory frameworks surrounding GAI like ChatGPT. P04 asserted that “there needs to be strong requirements in how AI is regulated”, while P15 said that “since the only thing that regulates it is the market, the companies that come out with the most widely used, most marketable products are going to be the ones that flourish the most”. These sentiments point to a larger systemic problem: the absence of robust regulatory frameworks that prioritize the well-being of the public over short-term profit. This lack of regulation allows companies, like OpenAI, to push products out to users without considering the long-term societal impacts involved. P15 further critiqued the reactive nature of regulation, stating: “we release new technologies, we use them, we find something that’s really serious… and create something to filter that, we’re very little into prevention”. P15’s sentiment aligns with HCAI’s emphasis on foresight and prevention, advocating for a more informed and forward-thinking approach to the ethics of AI deployment.

In addition, P14 reflected on the early days of the internet, noting that if basic guardrails had been put in place from the beginning—such as mechanisms to prevent spam—society’s quality of life could have been greatly improved. This historical perspective reinforces the need for preemptive action in AI regulation, a key principle in HCAI, which encourages developers and regulators to anticipate future harms rather than merely react to them.

4.6.8 Education Impacts of ChatGPT

Regarding ChatGPT's impact on learning and education systems, 42% (n=13) demonstrated some awareness; 42% (n=13) displayed a deeper understanding and alignment with HCAI principles; and 16% (n=5) made no mention of ChatGPT's educational implications.

4.6.8.1 Participants Somewhat Aware of ChatGPT's Impacts on Education

Close to half of participants, 42% (n=13), were somewhat aware of the challenges ChatGPT poses to education, yet many appeared resigned to accepting these changes as inevitable. This passive acceptance does not align with HCAI principles, which prioritize human well-being and critically assesses whether a given technology actually serves human needs. While participants in this group acknowledged ChatGPT's impact, they adopted an attitude of necessary acceptance, failing to question if these changes truly benefit learners or the education system at large.

Several participants (n=5), viewed ChatGPT's adoption as inevitable, drawing comparisons between its rise and earlier technological breakthroughs. For example, P30 likened ChatGPT's educational impact to the transformation that calculators brought to mathematics:

> "When we started having calculators, there are some math problems we don't need to solve anymore... It's going to be the same thing for AI, it can be a very good private tutor… helping students study by themselves… it's going to change the structure and system of education a lot."

This analogy is flawed for reasons that have been discussed in Section 2.5 in the literature review. Unlike calculators, which are consistently accurate, ChatGPT is prone to errors and misinformation, and as a result it is an unreliable tutor. Moreover, writing involves complex, subjective skills like creativity and critical thinking that cannot be automated. P30's comparison overlooks these key differences and underestimates the potential loss of critical thinking when

relying on ChatGPT. P09 observed that “people liken it to calculators” and tried to figure out what “writing skills will remain essential and which ones will become obsolete” to avoid “a battle with the computer”. P09 suggested that “creative skills ... will be something that we won’t really have to use”, instead we will practice “editing” skills for reviewing the content that ChatGPT generates for users. P09’s comments not only diminish the value of human creativity, but also contradict the HCAI emphasis on augmenting human capabilities instead of replacing them. Rather than adopting a fatalistic view of AI as a superior force, the goal should be to integrate AI in ways that empower people to retain control over creative processes and make meaningful contributions, with ChatGPT serving as a tool that enhances human creativity, rather than replacing it entirely.

Other participants (n=3) compared ChatGPT to the Internet itself. P27 described it as a “wonderful strong tool… it’s like the Internet or other fundamental inventions by human beings”, while P14 claimed GAI developments are “on par with the revolutionary change that we have experienced in the past quarter century… on par with the ascent of the Internet or mobile computing”. These comparisons suggest that ChatGPT, like the Internet, will become ubiquitous and essential, implying that quickly adapting to it is necessary. However, this perspective fails to critically assess whether such rapid integration benefits education or serves human needs, which are priorities of HCAI principles.

These participants (n=4) often brushed off the harms caused by ChatGPT as inevitable growing pains, viewing these challenges as necessary for progress. P30, for example, minimized concerns, stating, “in the first days of every type of innovation, they all have disadvantages or drawbacks, but they will improve it in no time”. This perspective shows a passive acceptance of the disruption brought by new technologies like ChatGPT and a lack of critical assessment of its

long-term impacts on education and society. Participants (n=2) also framed ChatGPT literacy as an essential skill, implying that adapting to its use is easier than resisting it. P21 remarked,

> "the people who replace us would be the people who know how to work with generative AI... certain people who can't adapt to it will lose jobs for it, but I think that's just what happens, this happened before".

This defeatist attitude highlights a resignation to the inevitability of job displacement for those unable to adapt, supporting the perspective that learning how to use ChatGPT is the only viable path forward. P30 further equated ChatGPT literacy with basic digital skills, stating, "the ability to utilize ChatGPT is a very common daily life skill... just like how we have to know how to write an email or use a smartphone". By arguing that GAI is a necessary tool for everyday life, P30 downplays the broader implications of its integration into education, such as potential deskilling and dependency. Multiple participants (n=6) pointed to education as a solution, suggesting that teaching students how to use ChatGPT properly could mitigate its downsides. P12 stated, "let them use the tool and teach them how to use it properly… it's just like using the Internet… you can't just say don't use the Internet". Similarly, P27 stressed the need to "teach society and prepare for this revolution because this revolution is coming, we cannot ignore it". However, these participants appeared overly optimistic about education's ability to address the issues that ChatGPT introduces, such as plagiarism, misinformation, and erosion of critical skills.

Some participants (n=2) acknowledged the plagiarism concerns surrounding ChatGPT but displayed an ambivalence toward its role in education, despite their initial worries about deskilling. P06, for example, expressed concern that "if first-year university students start using ChatGPT, they won't be able to develop their knowledge… their critical thinking, and their writing skills". Yet, P06 later tempered this view, admitting, "I don't think you should condemn ChatGPT at university level …that would be hypocritical of me because I use it a little bit too".

This shift suggests a degree of cognitive dissonance, as P06 recognizes the tool's potential harm to the development of skills but simultaneously justifies its use. Although P06 maintained that ChatGPT is “a good tool and shouldn’t be banned”, their suggestion to address plagiarism by “giving some resources to learn how to use it” lacks depth, offering no clear path forward for ensuring academic integrity. P19 displayed a similarly inconsistent stance. Initially, P19 had strong concerns over students’ ChatGPT use and how it might prevent them from gaining valuable research skills. P19 claimed they value the “ability to do research and find solutions on our own” and lamented how reliance on ChatGPT compromises these skills. P19 further reflected, “if you would have done your research on your own, you might have had different thoughts or opinions,” emphasizing that the research process itself is integral to learning. However, P19 later contradicted this by admitting they “use it as a research tool… never to write my paper” but to “help me find ideas or help me start researching”. This comment downplays P19’s initial concern, as it assumes ChatGPT can be easily compartmentalized as a benign research aid without addressing the deeper issues of dependence and deskilling.

A few other participants (n=4) also exhibited weak and inconsistent standards regarding ChatGPT's impact on education and plagiarism concerns. At first P13 set out strict guidelines for themself saying “I’m not going to… copy and paste… I’d be uncomfortable… it’s a form of plagiarism when it doesn’t come from me”. However, P13’s stance on plagiarism changed once they were under pressure with a task “imposed on [them]” that they “didn’t have time to do”. P13 admitted that while “[they] wouldn’t have felt comfortable taking an excerpt from Google, given that with ChatGPT, they’re not able to recognize plagiarism… [they] would have plagiarized”. This highlights a lapse in ethical integrity and agency, as P13’s reliance on the tool compromised their own principles when faced with a challenge. Similarly, P20 stated, “I would

have no issues with my kids using it; I would encourage it actually, but not for school assignments, only extracurricular". While P20 appears to draw a boundary, their vague definition of "extracurricular" and lack of clarity about which tasks are appropriate for ChatGPT use suggest an acceptance of the technology rather than a critical assessment of its potential harm. By not considering the deskilling effects of using ChatGPT outside of schoolwork, P20 fails to engage in the thoughtful deliberation that HCAI principles require, compromising the long-term well-being and skill development of their children.

4.6.8.2 Participants Aware of ChatGPT's Education Impacts

Over a third of participants, 39% (n=12), showed a deeper level of understanding and concern about ChatGPT's impacts on education. For example, P18 said of their students: "they're taking the easy option and they're not learning how to do these things… [like] research [or how to] validate sources". Similarly, P25 emphasized that ChatGPT's ease of access does not promote deep learning or cognitive development: "it's not really engaging you in the way that you need to grow and to actually have it in your long-term memory". P25 further observed that many users are "thoughtlessly seeking and getting information", resulting in poor retention since they are not actively processing or reflecting on the content themselves. These participants demonstrate awareness that although the passive consumption of AI-generated content might make it easier to complete tasks quickly, it may come at the cost of true comprehension, skill development, and long-term knowledge retention. By prioritizing convenience over active learning, users risk becoming disengaged from the very processes that foster growth and innovation.

Several participants (n=7) described ChatGPT as a danger to creativity and expressed concern over the impacts a potential loss in human creativity may cause. P04 warned that future generations might struggle to generate original ideas without assistance from GAI models like ChatGPT. Echoing these fears, P16 speculated that the "new generation of students" will be unable to complete creative tasks independently because they have always relied on ChatGPT. P10, a teacher, observed this trend firsthand, noting that ChatGPT was already "taking the creativity out of students". P17 pointed out that ChatGPT relies on existing knowledge and content, suggesting that human creativity could diminish as we base our ideas on what already exists. As P18 succinctly put it, "there is no creativity" if everyone uses ChatGPT— "another person is going to have exactly the same thing". Similarly, P01 said, "I'm concerned that people are going to start to over-rely on AIs and not produce anything new for themselves anymore". P01 further warned, "if we rely too heavily on it, we're going to not understand our world anymore, be less creative, not progress as much… it would actually, in the end, slow us down". This comment is significant as it links reliance on ChatGPT not only to the degradation of creativity but also to our collective progress and innovation.

A few more aware participants (n=3) critiqued the popular comparison between ChatGPT and calculators. P07 acknowledged that "when the calculators came in, the ability to do mental math sort of went away" but "if individuals lose the ability to research… that's a concern". P07's remarks challenge the oversimplified belief that what calculators did to math, ChatGPT will do to writing-related skills. P07 sees research skills, a writing related competency, as too vital to simply automate. P07 expresses concern over the risk of deskilling that comes along with ChatGPT use. While we can still function without the ability to do complex mental math, the

same cannot be said for writing-related skills and greater caution should be taken so we do not lose these skills entirely.

P01 expressed similar views on the calculator analogy, pointing out that: “we still have to be the one who’s actually processing the math behind it in terms of the context of the situation and why I'm adding these numbers or subtracting these numbers”. P01 draws attention to the idea that, even when using a tool like a calculator, the user must engage with the underlying concepts and rationale behind the task. This applies directly to ChatGPT and writing, where the tool can assist with generating content, but the user must still grasp the context, structure, and purpose of their writing. Therefore, just as a calculator does not eliminate the need for understanding math, ChatGPT does not eliminate the need for writing competence—users must still bring critical thinking and context to their work. P01 further explained:

> “I wouldn’t necessarily have a problem with my students using AI, it can be a great launching point for them too. If I'm using it that way, why can’t my students? But if students are only using AI and not thinking for themselves and haven’t actually learned anything because they relied solely on AI, that's where it becomes a problem”.

P01 highlights the need for critical engagement with ChatGPT rather than passive reliance. P01 stresses that “we need to teach kids right from the start to be critical, to still be the creators... but using AI as a tool to just help that process go faster”. A few other participants (n=3) also emphasized the need for critical education on ChatGPT. For example, P11 said schools “should have a lesson to educate children on how to use ChatGPT… more consciously, and understand what kind of challenges it has and also that sometimes it can be harmful”. Likewise, P25 advocated for “teaching strategies to make AI work in an ethical way” to avoid “stopping students from thinking critically”. These comments describe a crucial element of HCAI: the need for critical awareness and informed engagement with AI tools. Without proper education,

students may rely on ChatGPT uncritically, leading to superficial understanding and potential ethical pitfalls. By emphasizing critical engagement, these participants aim to empower students to discern the strengths and limitations of ChatGPT, fostering a more nuanced relationship with technology. This contrasts with participants in the 'somewhat aware' category, who primarily viewed education about ChatGPT as a way to ensure students stay competitive in the workforce, rather than as a means of maintaining personal learning and development.

While participants in the 'aware' category did argue for critical education, a few (n=3) still expressed skepticism regarding the effectiveness of educational initiatives to mitigate the potential harms associated with ChatGPT. P28 recognized that "it's hard to educate people about it". This observation points towards the daunting challenge in fostering a comprehensive understanding of ChatGPT, especially given its complex and evolving nature. Similarly, P29 acknowledged,

> "there's a big gap in the way people understand the implications of using it… but that's also the case with any technology that ever came. It takes time for people to realize and understand, and then they're like, oh, this is wrong, and then they protest… and usually by that time it's too late".

These comments suggest that while education is a crucial component of navigating the challenges posed by AI, it is not a panacea. The timeline for public understanding and adaptation often follows sluggishly behind the rapid advancement of new technologies, resulting in a reactive rather than proactive approach to understanding its consequences. This delayed response can lead to widespread adoption and integration of GAI tools like ChatGPT before society fully grasps their potential ethical pitfalls and social implications. Moreover, P29's observations underscore a historical pattern wherein the introduction of new technologies frequently leads to a period of uncritical acceptance followed by a backlash when serious negative impacts are eventually discovered. This cycle not only highlights the limitations of education as a singular

solution but also stresses the necessity of ongoing discourse, critical engagement, and adaptive strategies to navigate the complexities of AI.

4.6.9 Summary & Analysis of ChatGPT's Ethical Issues & Impacts

The findings in this section answer RQ3: *To what extent are learners aware of ChatGPT's ethical issues and impacts?* Participants' comments were split into three categories based on the coding explained in Section 3.8. For a full breakdown of these categories, refer to Table 5: *Participants Unaware of ChatGPT's Ethical Issues & Impacts*, Table 6: *Participants Somewhat Aware of ChatGPT's Ethical Issues & Impacts*, and Table 7: *Participants Aware of ChatGPT's Ethical Issues & Impacts*.

Most participants fit into more than just one category. For some ethical issues, a participant might have demonstrated awareness, but for other issues they lacked awareness. To compare the level of awareness for each ethical issue or impact, a composite score was created. The score is based on how many participants mentioned the issue as well as the depth of participants' awareness of the issue.

The number of aware comments made by participants were multiplied by two so that the final score reflected the difference between aware and somewhat aware comments. If the raw aware score was simply added to the somewhat aware score, it would minimize the difference between the two and the score would not adequately reflect the level of awareness participants showed for a given ethical issue or impact. The unaware comments were turned into negative numbers and detracted from the overall score. The treatment of unaware comments is meant to reflect how incorrect statements about ChatGPT's ethical issues show a lack of awareness. If the

unaware comment was added to the composite score and not subtracted it would treat the comment as adding to the overall level of awareness, which it does not.

The methods used for determining the awareness level score are imprecise but overall useful in showing general patterns in the findings. The composite scores for each ethical issue can be seen in Table 8: *Comparing Awareness Levels of ChatGPT's Ethical Issues and Impacts* in Appendix D. The following will present the ethical issues and impacts in order of participants' level of awareness.

Participants were most aware of ChatGPT's impacts on education, with the issue scoring a total of 36. This was not surprising as the most popular sub-specialization was education with 55% (n=17) of participants either working or studying in this area. The overrepresentation of specialty in education in the sample may have skewed findings. Many participants expressed concerns about how ChatGPT could disrupt traditional learning processes, jeopardize academic integrity, decrease motivation for learning, and potentially deskill learners. Their expertise in education may have shaped these informed responses, leading to a deeper understanding of ChatGPT's educational implications.

Tied for second were the issues of disinformation and privacy which both had an awareness score of 28. Disinformation will be presented first, and a discussion of privacy will follow. Disinformation scored highly due to participants' recognition of the dangers posed by ChatGPT generating false but convincing information. Participants acknowledged the potential harm of ChatGPT's disinformation. However, while participants recognized the risk, not all seemed fully aware of the specific mechanisms by which disinformation is created or spread, which is why the score did not reach the level of education impacts.

Participants were also highly aware of ChatGPT's privacy issues, with an awareness score of 28. The high score indicates that privacy was a critical issue many participants were both aware and concerned about. Participants may have demonstrated a higher level of caution as privacy issues tend to have a more tangible personal impact that is easier to recognize than other issues such as sustainability. Concerns about personal information security are prevalent in discussions about digital technologies, making this issue more recognizable. However, some incorrect statements were made regarding ChatGPT's privacy risks, which reduced the overall awareness score for this issue. There was also a lack of deep understanding about the technical specifics of how personal data is processed and stored.

With a score of 21, misinformation had the third highest awareness level. Many participants acknowledged ChatGPT's misinformation, but overall, their understanding of its mechanisms was incomplete. While participants recognized that ChatGPT could generate inaccurate responses, especially when used for research purposes, they often did not delve into its broader societal impacts or how misinformation is spread through its outputs. Some participants pulled the awareness level for misinformation down by making incorrect assumptions that ChatGPT always provided accurate information without questioning its reliability.

Participants scored a total of 17 in terms of their awareness of ChatGPT's responsibility issues. Relative to other issues, responsibility scored lower as participants struggled to fully grasp the shared nature of responsibility between AI developers, users, and society. Some participants leaned towards shared responsibility between developers and users, aligning more closely with HCAI principles. However, others tended to place blame solely on developers or

users, indicating a limited understanding of the systemic nature of ChatGPT's responsibility issues and the collaborative efforts needed for responsible GAI use.

Bias ranked lower with a score of 15, as many participants underestimated the biases that can be embedded in ChatGPT's outputs. Bias in AI is a well-documented issue, with models like ChatGPT often reflecting societal biases present in the data they are trained on. Despite this, some participants believed ChatGPT to be entirely neutral and objective, failing to see how it could perpetuate harmful stereotypes and reinforce social inequalities. While some participants acknowledged bias in ChatGPT's responses, they did not fully grasp how systemic biases can manifest in AI-generated content. Only a few participants demonstrated an understanding of how bias could affect the fairness and equity of ChatGPT's responses, indicating a need for greater awareness of how GAI can perpetuate inequalities.

Participants only scored a total of 6 for ChatGPT's transparency issues, demonstrating a low level of awareness in this area. The literature emphasizes that transparency is critical to trust in GAI models, yet most participants either overlooked or were unaware of this issue. While a few participants pointed out that ChatGPT's operations were opaque, most were only somewhat aware, hinting at the complexity of the system without critiquing the lack of transparency in its decision-making. Their limited understanding of transparency likely stems from the invisible nature of algorithmic decision-making processes, making it harder for non-technical users to recognize its importance. The low score indicates a significant gap in participants' awareness of how opaque GAI models like ChatGPT can be, and how this lack of transparency can lead to unchecked biases, errors, and ethical violations.

Finally, participants were the least aware of ChatGPT's sustainability issues, with a score of only 4. The literature stresses the energy-intensive nature of training and running large GAI

models, which contribute to significant carbon emissions. However, this issue remained largely unrecognized by participants, perhaps because environmental concerns around GAI are less visible or widely discussed in public discourse compared to more immediate ethical concerns like privacy and disinformation.

The scores reflect participants' varying levels of awareness based on both their personal experiences with ChatGPT and the broader societal concerns surrounding GAI use. Participants were particularly attuned to the impacts on education and data privacy, likely due to the direct relevance these issues had to their academic and professional lives. They also demonstrated awareness of ChatGPT's disinformation, likely because deepfakes and fake news are hot topics in public discourse. However, participants displayed overall less awareness of more nuanced or systemic concerns like bias, transparency, sustainability. This suggests that participants' ethical awareness was shaped more by immediate, visible impacts rather than the long-term or hidden challenges that require a deeper understanding of GAI infrastructure.

A similar process was conducted to create a composite score showing participants' overall level of awareness. The number of aware, somewhat aware, and unaware comments participants made were added up to make the score. Comments flagged as 'aware' were multiplied by two to give it appropriate weight. In addition, any incorrect statements made by participants were detracted from their overall score. To see participants' scores showing their awareness of ChatGPT's ethical impacts and issues, refer to Table 9: *Comparison of Awareness Levels by Participant* in Appendix D.

Based on their score, participants were placed in three separate groups to indicate their overall level of awareness of ChatGPT's ethical issues and impacts. If participants scored 0-3, they were placed in the low-level awareness group. The medium level awareness group consisted

of participants who scored between 4-7. Finally, the high-level awareness group had scores of 8-12. Most participants in the high-level awareness group had scores of 8-9, but there was an outlier with a score of 12 who was also added to the group. To see a comparison of awareness scores by group, refer to Table 10: *Comparison of Participants by Awareness Level Group* in Appendix D.

There were no discernable patterns linking participants' awareness levels to their age; the number of tasks they used ChatGPT for; the number of advantages they identified in ChatGPT; or the number of disadvantages they identified in ChatGPT. However, there did seem to be a relationship between participants' education level and their awareness of ChatGPT's ethical issues and impacts. As participants' education levels increased, their awareness levels also increased. The low-level awareness group's education level was distributed in the following way: 20% BA, 80% MA. For the medium awareness group, the distribution was: 0% BA, 64% MA, and 36% PhD. In the high-level awareness group there were: 0% BA, 43% MA, and 57% PhD. Based on these findings, it appears that participants enrolled in PhDs tended to have a higher level of awareness. Whereas, the participants pursuing a BA only had a low-level of awareness. The students enrolled in an MA were distributed around the middle. This suggests that participants with a higher education level will also have a higher level of awareness of ChatGPT's ethical issues and impacts.

An additional key finding was that all participants, no matter their awareness level, tended to have a positive view of ChatGPT. It is logical to expect participants most aware of the harm ChatGPT causes to view it in a more negative light than the participants with lower awareness. However, all participants (n=7) with a high-level awareness expressed an overall positive and curious attitude toward ChatGPT. For example, when asked for their overall

impression of the tool, P01 said “ChatGPT is incredibly helpful” and P06 said it can do “magic”. Participants' curiosity for the tool seemed to drive their use. P26 explained:

> “when ChatGPT went public… out of curiosity, I went to check out what it was… I learned that I could ask it all the questions I wanted and get an answer, and that it could explain very complicated things to me quite simply”.

Like P26, P28 said “there’s a certain curiosity… to see how it works” and P11 said they are “always curious about new technologies coming out”. Despite having expressed concerns over ChatGPT’s various ethical issues, these participants seem drawn to it out of curiosity and excitement for the new tool. P06 shared that they were “having a lot of fun seeing what’s possible and what the limits of ChatGPT are”. While in one breath P06 talked seriously of ChatGPT’s inherent biases and the harm they could cause, in another they were light-hearted and positive toward the tool. Tinkering with novel technologies seems to be an enjoyable experience that P06, and other highly aware participants, seek out. This was exemplified in a comment from P15 in which they recalled:

> “The first time I tried ChatGPT… I had an adrenaline release…. I asked a question, he answered me in a few seconds, I asked the question again, he answered me in more detail… and I thought ‘that would have taken me, maybe, one hour thirty minutes to do that’... it took 30 seconds… so I was excited”.

The way in which P15 talks of their first experience with ChatGPT makes it seem like it was a drug they were taking for the first time. This first instance of use seemed to engender a powerful response in P15, leading them to only focus on ChatGPT’s performance and what it could do for them. This contrasts sharply with P15’s and other highly aware participants’ earlier pleas for caution and critical assessment of the tool before use.

As was discussed in Section 4.5.5, participants overall seemed to prioritize ChatGPT's advantages, trying to mitigate its disadvantages so they could continue using it. While ChatGPT's disadvantages mainly affected just the individual user, its ethical issues may cause widespread harm affecting not just users of ChatGPT, but society as a whole. It is reasonable to expect those more aware of ChatGPT's issues to hold a negative attitude toward it and use it less. However, participants' awareness levels did not seem to be linked in any way to their use of ChatGPT. Highly aware participants may use ChatGPT just as much as other, less aware participants.

Moreover, highly aware participants expressed overall positive attitudes toward ChatGPT. For example, P07 said, although "there was a great deal of potential, both positive and negative" associated with ChatGPT, they continue to be "optimistic". P07 does not give any concrete reasons for remaining optimistic in the face of ChatGPT's many ethical issues. When asked about the effect of children's use of ChatGPT, P11 thought it "would be more positive". P11 noted that ChatGPT, "is not always ideal… but at the same time it makes my life basically easier" and so they are "grateful" for it and "excited to see what will happen next". These participants seem to forgive ChatGPT for its many issues, as they are excited and curious about the positive aspects it may bring.

Chapter 5: Discussion

5.1 Introduction

The discussion section provides an analysis of the key findings from this study, positioning them within the context of existing literature and exploring their broader implications. This section also considers the strengths and limitations of the study, offering a critical evaluation of its outcomes. By comparing the results with previous research, this discussion aims to shed light on both the unique contributions of this study and the areas where its findings align with or diverge from existing knowledge.

5.2 Key Findings

The study identified several key findings regarding how learners use ChatGPT for writing tasks and their perceptions of its advantages, disadvantages, and ethical implications. Participants commonly used ChatGPT for drafting, editing, research, and brainstorming. This is consistent with previous studies, which also highlighted these uses (Barrett & Pack, 2023; Chan & Hu, 2023; Ingley & Pack, 2023; Johnston et al., 2024; Shoufan, 2023; Singh et al., 2023; Tossell et al., 2024; Zou & Huang, 2023). This study not only validates these findings but also provides additional insights by ranking the uses of ChatGPT according to the frequency with which learners report engaging in them.

Drafting emerged as the most common use of ChatGPT, reported by 74% (n=23) of participants. Following drafting, 71% (n=22) of participants indicated that they used ChatGPT for research, taking advantage of the tool for rapid information retrieval and summarization. Editing ranked third, with 68% (n=21) of participants using ChatGPT to enhance their writing by

correcting errors, rephrasing content, and adjusting tone. Finally, brainstorming was the least frequently reported use, with 48% (n=15) of participants employing ChatGPT primarily to overcome writer's block. This ranking emphasizes the significant role that drafting plays in learners' interactions with ChatGPT while also highlighting the tool's supportive functions in research, editing, and brainstorming tasks. The prominence of drafting indicates that learners view ChatGPT primarily as a generator of content.

In terms of ChatGPT's advantages, participants highlighted its ease of use, potential to increase their efficiency, and enhance their skills and knowledge. These were ranked in order of how many participants mentioned them. The most frequently cited benefit was ChatGPT's efficiency improvements, with 84% (n=26) of participants noting that the tool helped them save time. This finding is consistent with existing research, which emphasizes ChatGPT's ability to improve productivity and streamline tasks (Budhathoki et al., 2024; Chan & Hu, 2023; Hasan, 2023; Thi, 2023). Studies by Singh et al. (2023) and Johnston et al. (2024) also talked about GAI's time saving benefits, in particular how they may help students manage their workloads more effectively. However, this study showed that while ChatGPT may help learners complete tasks more efficiently, it also poses the risk of encouraging more surface-level engagement with information, potentially compromising deep learning. This study offers a more nuanced analysis of ChatGPT's advantages, suggesting that while efficiency is valued, deeper engagement with information may be overlooked.

A smaller portion of participants, 39% (n=12), highlighted ChatGPT's usability, which aligns with previous research emphasizing its user-friendly interface (Chan & Hu, 2023; Sebastian, 2023; Sison et al., 2023; Tiku et al., 2023). In addition, findings from Thi's (2023) and Shoufan's (2023) studies both showed usability to be a key driver of learners' adoption of

ChatGPT. However, in the current study, the relationship between ChatGPT's ease of use and its adoption is less clear. Participants who noted ChatGPT's usability did not report a wider range of applications for the tool. Mentions of other advantages associated with ChatGPT were not linked to its usage frequency. While these findings do not entirely undermine the impact of usability or other perceived advantages on the adoption of ChatGPT, they suggest a more complex dynamic at play, which will be explored in further detail later in this section.

Additionally, 33% (n=10) reported that ChatGPT enhanced their knowledge and skills. Particularly noteworthy were participants' claims that ChatGPT helped them in language learning. Prior research by Singh et al. (2023) emphasizes ChatGPT's effectiveness in language learning, particularly through its suggestions for clearer communication. Participants in this study echoed these results, noting that ChatGPT helped improve their vocabulary and assisted with translations. However, this study took a more nuanced approach by carefully weighing ChatGPT's advantages against its potential disadvantages. ChatGPT's potential to enhance participants' language skills is at odds with its dependency and deskilling disadvantages. Language learners are at risk of becoming overly reliant on ChatGPT, which could impede their ability to write independently in the language they are trying to learn. This dependency may ultimately limit their engagement with the language-learning process, preventing them from fully internalizing language structures.

Participants identified disadvantages related to ChatGPT's content generation, research capabilities, and its potential to deskill users. A large portion of participants, 81% (n=25), expressed concerns about the quality of ChatGPT's output, criticizing it for being generic, repetitive, and impersonal. This aligns with previous research that highlights GAI's challenges in conveying emotion and handling abstract concepts (Park et al., 2021; Sánchez Reina et al., 2024;

Sison et al., 2023; Sun & Hoelscher, 2023; Vo & Nguyen, 2024; Zou & Huang, 2023). Studies comparing AI-generated content to human-produced content consistently rated ChatGPT's outputs as less creative and more formulaic (Jimenez-Crespo, 2024). Additionally, 52% (n=16) of participants pointed out the shortcomings in ChatGPT's research capabilities, particularly its inability to provide real-time data and the frequent inaccuracies in its responses. This finding is echoed in the literature, which consistently reports ChatGPT's limitations in delivering accurate, reliable information, making it unsuitable for rigorous research (Barrett & Pack, 2023; Deuze & Beckett, 2022; Sebastian, 2023; Sison et al., 2023; Tiku et al., 2023; Tossell et al., 2024; Warner, 2023).

A concern raised by 33% (n=10) of participants was the potential for deskilling due to use of ChatGPT. This finding echoes concerns from Siegle (2023) and Romero-Rodríguez et al. (2022), who warn that GAI tools, when uncritically adopted, may diminish learners' skills by promoting passive consumption of information rather than active engagement. Other studies have similarly argued that frequent use of ChatGPT can reduce students' capacity for creativity, critical thinking, and problem-solving (Abbas et al., 2024; Chan, 2023; Chan & Hu, 2023; Fui-Hoon Nah et al., 2023; Haque & Li, 2024; Sánchez Reina et al., 2024; Siegle, 2023; Singh et al., 2023). This study reinforces those arguments by demonstrating that deskilling is not merely a hypothetical concern—participants felt their use of ChatGPT had already diminished their creativity, critical thinking skills, and motivation for learning. However, it is concerning that only a third of participants recognized ChatGPT's deskilling risk. This points to a significant gap in awareness among users regarding the long-term implications of over-reliance on ChatGPT. The fact that a majority of participants either overlooked or downplayed this risk raises questions

about their understanding of how habitual use of ChatGPT might degrade their knowledge and skills.

Also concerning is the fact that most participants continued using ChatGPT despite acknowledging its disadvantages. This behavior reflects a tendency to prioritize immediate benefits—such as time-saving and ease of use—over long-term considerations related to skill retention and development. Weighing the advantages against the disadvantages is crucial, as previous research suggests that a "higher perception of benefits compared to costs is linked to increased adoption intentions" (Budhathoki et al., 2023, p. 11). However, participants appeared to favor ChatGPT's advantages, minimizing the significance of its disadvantages. They often overlooked that their strategies to mitigate its disadvantages were costing them extra time and energy. This aligns with Shoufan's (2023) finding that "despite the trickiness of prompting and the modest accuracy, students perceive ChatGPT as a helpful and efficient tool for learning and professional life" (p. 38813). In both my study and Shoufan's (2023), participants were forgiving of the tool's limitations, hinting at possible additional factors that caused them to continue their use.

In terms of ChatGPT's ethical issues, awareness was highest regarding ChatGPT's impact on education, scoring 36, which is unsurprising given that 55% (n=17) of participants were either working or studying in the education sector. Disinformation and privacy concerns both scored 28, reflecting participants' recognition of the risks of false information and data privacy issues. However, many lacked a detailed understanding of how disinformation spreads or how personal data is processed by ChatGPT, pointing to a gap in knowledge despite their general concerns. Awareness of other ethical issues was notably lower. Misinformation scored 21, responsibility 17, and bias 15. Many participants underestimated the biases embedded in GAI

outputs and had limited understanding of the shared responsibility between developers, users, and society in ensuring responsible AI use. Transparency scored particularly low at 6, despite being critical for building trust in GAI models. Most participants either overlooked or were unaware of the issue, likely due to the hidden nature of algorithmic decision-making processes. Sustainability was the least recognized issue, scoring only 4. Despite the energy-intensive nature of training large GAI models, participants largely ignored the environmental impact. This could be because sustainability concerns are less visible or widely discussed compared to more immediate issues like privacy and disinformation.

Overall, participants demonstrated higher awareness in areas more relevant to their personal and professional experiences, such as education and privacy, while more systemic issues like bias, transparency, and sustainability received far less attention. This indicates that participants were more focused on short-term, visible impacts rather than deeper, long-term ethical challenges associated with ChatGPT. Even those with a high level of awareness of ChatGPT's ethical issues continued to use it, even expressing excitement and curiosity for the tool. This behavior mirrors findings from Thi's (2023) study, where students continued to use ChatGPT despite recognizing "numerous problems with using ChatGPT in their studies" (p. 13). Similarly, Shoufan (2023) found that participants were aware of ChatGPT's limitations but remained optimistic about its potential. In Su et al.'s (2024) study, participants "viewed the challenges of ChatGPT in a welcomed and positive way" (p. 81), reflecting a similar enthusiasm to the highly aware participants in my study, who were eager to explore and understand how ChatGPT works. This curiosity and excitement seemed to overshadow critical judgment, with participants focusing more on the tool's immediate utility than its potential drawbacks.

ChatGPT's widespread hype likely played a role in shaping participants' attitudes. Public discourse around GAI has generally been positive (Barrett & Pack, 2023), and a sentiment analysis of social media posts about ChatGPT revealed that positive sentiments outweighed negative ones (Tlili et al., 2023). Other studies have also found that users tend to have a more favorable than negative view of ChatGPT (Chan, 2023; Sánchez Reina et al., 2024; Sharevski et al., 2023; Shoufan, 2023; Tossell et al., 2024). There is strong evidence that attitudes toward ChatGPT are generally positive. Moreover, research has begun to show a link between positive attitudes and increased usage of ChatGPT. Zou & Huang (2023) found a correlation between students' attitudes and their intention to use ChatGPT. Similarly, Hasan (2023) and Sánchez Reina et al. (2024) highlighted that individuals who perceive AI positively are more likely to adopt it. Although my study did not comprehensively explore attitudes, it is likely that a similar dynamic was at play, with participants' generally positive attitudes perhaps influencing their continued use of ChatGPT despite recognizing its disadvantages and ethical issues.

5.3 Limitations & Recommendations for Future Research

While this thesis research offers some important insights, it has several major limitations. The most significant limitation is the study's sample size and composition. The study relied on a relatively small number of participants, which limits the generalizability of its findings. Although the qualitative nature of the research was not intended to produce widely generalizable results, the small sample size still restricts the study's ability to reflect the full diversity of experiences with use of ChatGPT. Of the participants with multiple specializations, all had specialization in social sciences, particularly education with 55% (n=17) in this area. Dr. Davidson and her research team are based in Concordia's Department of Education. Due to the non-random

sampling techniques used in the study, a significant portion of participants were recruited from the Education Department. Additionally, as the participants were mostly graduate students, the findings may not be applicable to other populations, such as undergraduate students or secondary students. Future studies should aim to include a larger, more diverse sample of participants. This would allow researchers to assess whether the findings of this study hold true across different educational contexts, age groups, and professional settings. Including participants from secondary education or professionals who use ChatGPT in their work could provide a broader understanding of how the tool is adopted and integrated across various stages of learning and career development.

Another limitation pertains to the self-reported nature of the study's data. Self-reported data tends to be inaccurate as it depends on participants' ability to recall and report their own behaviour, which they may not do accurately or comprehensively (Panadero et al., 2017). McCardle & Hadwin (2015) explained that educational researchers in particular have moved away from this type of data due to "findings that reveal the inaccuracy, or poor calibration, of student self-reports" (p. 8). This research was exploratory, and so did not prioritize using more stringent methods of data collection such as observation. The aim was to obtain initial insights and a general idea of participants' uses and perceptions of ChatGPT. However, due to the reliance on self-reported data, participants' accounts of how they used ChatGPT may not fully align with their actual behavior. In addition, factors such as social desirability bias may have influenced participants' into overstating their ethical awareness or understating their reliance on the tool to present themselves in a more favorable light. Without external validation of participants' claims, it is difficult to ascertain the extent to which the findings were accurate.

Future research may opt to collect additional types of data, such as observations of ChatGPT users, to increase the accuracy of their findings.

Lastly, the study was conducted soon after ChatGPT's initial release when it, along with GAI models in general, were still relatively new to many people. As a result, some of the findings may not fully capture the long-term impacts of ChatGPT, all its possible uses for writing, or the full range of its advantages and disadvantages for learners. Future studies might find different patterns of use or more nuanced perceptions of its advantages, disadvantages, issues, and impacts as learners have had more time with the tool and become more familiar with GAI in general. However, it may be difficult to obtain accurate findings as the model is constantly changing, inspiring whole new areas of use along with new issues and impacts to grapple with. It will likely be a challenge for future research on ChatGPT to stay ahead of these changes and collect findings that remain relevant long enough to influence regulation around GAI models or other means of improving the model and mitigating its harm. Hasan (2023) emphasizes the "need for ongoing empirical research that keeps pace with the evolving nature of AI adoption" (p. 16). Studies on ChatGPT, its use, and the perceptions of its users should be conducted more regularly.

5.4 Conclusion

In conclusion, this study has contributed to the understanding of learners' interactions with ChatGPT, shedding light on their patterns of use; perceptions of advantages and disadvantages; and awareness of ethical implications. By investigating the perceptions of students, who represent one of ChatGPT's biggest user groups, this research addresses a critical gap in the literature surrounding ChatGPT, which primarily focused on teachers' perspectives.

The findings reveal that participants predominantly used ChatGPT for drafting, followed by research, editing, and brainstorming. Participants tended to focus on the immediate benefits ChatGPT could provide, such as potential time savings and ease of use.

Despite acknowledging certain disadvantages associated with ChatGPT, such as poor quality outputs and potential deskilling, many participants maintained an optimistic view of the tool. Participants exhibited higher awareness of issues directly related to their personal and professional experiences, particularly education and privacy, while more systemic issues like bias, transparency, and sustainability received significantly less attention. Their prioritization of immediate advantages often overshadowed long-term ethical concerns.

The study emphasizes the importance of fostering critical engagement with GAI, as it is easy to get swept up in the hype surrounding these rapidly developing technologies. If we are to truly learn from our mistakes and prevent harms like those experienced in the rise of social media and other technological revolutions, then we must be more proactive in addressing the issues and impacts associated with GAI models like ChatGPT.

As GAI continues to play an increasingly prominent role in education, it is essential to cultivate critical awareness of its ethical implications and promote informed use that prioritizes active engagement in the writing process. The principles of HCAI remind us that AI should serve to augment human capabilities, rather than replace them. If we are to leverage the power of GAI and extend our capabilities, we must remember to safeguard what makes us uniquely human along the way.

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Appendices

Appendix A: Interview Invitation

Call For Participants

Have you used AI tools, such as **ChatGPT**? We are recruiting university students (you must be at least 18 years old) to participate in a study about the ethical aspects of AI for learning.

We wish to understand your take on the potentials and issues related to generative AI, through 1 hour interviews.

If you want to participate, or if you have any questions about this study, please contact the Principal Investigator, Dr. Ann-Louise Davidson: ann-louise.davidson@concordia.ca.

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Appendix B: Interview Protocol

Checklist before starting interview:

1. Introduce yourself: My name is _____ and I work as a research assistant for the Ethical AI project
2. Make sure participant signed the consent form.
3. Inform participant that we are recording and we will be transcribing the interviews. Their name will be removed from the transcriptions. We will only use the audio from the recordings and we will delete the video.
4. Ask if it is ok to start the recording.

Demographic questions:

- What is your name?
- How old are you?

Student	**Lifelong Learner**
• What is your program of study/occupation? • What stage of progression are you in your program? Beginning, middle or end? • In what field do you plan to work when you graduate?	• What did you study? • What do you study in your free time? • Are you enrolled in a program of study? • What type of job do you have? • What is your next career move?

ChatGPT

- What do you know about ChatGPT?
  - Have you experimented with it yourself?
  - What did you think of it?
- Tell me how you use ChatGPT.
  - What strategies do you use to work with ChatGPT?
  - How did you learn how to do this?
  - What are the limitations of this?
- Could you write an example of a prompt in the chat?

Awareness of AI

- What do you think AI is? OR How do you define AI in general?
  - Where did you get that information?
- How do you think AI is used in various contexts?

Use of AI

- When did you first start using AI?
- How do you use AI now?
- How often do you use AI?
- Are there any AI tools other than ChatGPT that you use?
  - Which ones?

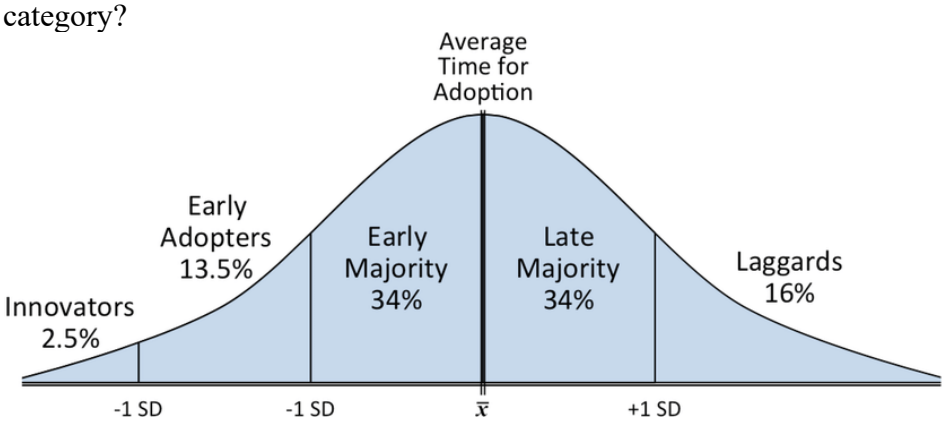
    - How do you use them?
- What wouldn't you use AI for?
- How do you want to use AI in the future?

Social impacts of AI

- What concerns you about AI?
    - What are some potential solutions?
- What should AI do?
    - What is promising about AI in the future?
- How can AI affect society more broadly?

Relationship with Technology

Through his Diffusion of Innovation theory, Rogers has defined categories to classify individuals according to their willingness to adopt a technological innovation. Innovators are defined as those who take risks to innovate. Early Adopters are the first customers of an innovation. The Early Majority represents the people who will adopt the technology before the average person, thus contributing to the diffusion of that technology. The Late Majority consists of those who tend to be skeptical, adopting a technology later than the average person, often by necessity or peer pressure. Finally, Laggards are the last to adopt a technology, usually because they do not like change. Can you map yourself on Roger's Continuum? Why would you map yourself in that category?



- Based on the continuum, are you usually an early adopter or late adopter of technology? Why?
  (Ex. do you need to understand how the tech works first or start playing with it right away?)
    - Can you give some examples of how you adopted technologies?
        - Are you an early adopter/late adopter by intention? By accident or on purpose?
- Which category (early adopter or late adopter) resonates with you in relation to AI? Why?
- How does AI make you feel?

Ending

Is there anything you wanted to tell us that we did not discuss? Or any example you forgot to share? Or any document you want to share?

Appendix C: Interview Consent Form

INFORMATION AND CONSENT FORM

Study Title: Interdisciplinary innovation challenges to improve ethical AI And the digital technology for social relevance and EDI
Researcher: Ann-Louise Davidson Ph.D.
Researcher's Contact Information: ann-louise.davidson@concordia.ca
Source of funding for the study: International Observatory on the Societal Impacts of AI and Digital Technology

You are invited to participate in the research study mentioned above. This form provides information about what participating involves. Please read this form carefully before deciding if you want to participate or not. If there is anything you do not understand, or if you want more information, please ask the researcher.

A. PURPOSE

The purpose of the research is to create a model of innovation pedagogy in which students become confident innovators through challenge-based learning that targets ethical AI, socially relevant digital technologies, and EDI (equity, diversity and inclusion).

B. PROCEDURE

If you participate, you will do a 1-hour audio recorded interview on Zoom. You will be asked to reflect about your relationship to technology and AI, your awareness and use of AI, the social impacts of AI and generative AI, such as ChatGPT.

In total, participating in this study will take 1 hour of your time.

C. RISKS AND BENEFITS

There are no foreseeable risks with participating in this interview.

Potential benefits for participants include reflecting about their perceptions of generative AI tools. Participants will also have the opportunity to participate in a networking event with stakeholders of the AI ecosystem.

Societal benefits: For practitioners, this project will yield five open-source interdisciplinary innovation challenges and resources that can be used in the context of responsible innovation education. For policy makers, this project will yield recommendations for the creation of learning experience design that takes ethical and socially responsible AI and digital technologies, and EDI issues into consideration.

Scientific benefits: This project will yield tools for generative AI which is currently an ill-defined domain and data to demonstrate results that will be published in scientific papers and presented in peer-reviewed conferences.

Scholarly benefits: We will hold ideation sessions, a workshop and networking events. We will also write recommendations to inform public policy and peer-reviewed publications and presentations.

D. CONFIDENTIALITY

We will gather the following information as part of this research: demographic information about you, your relationship to technology and AI, your awareness and use of AI, the social impacts of AI and generative AI, such as ChatGPT.

Nobody will access the information, except for people directly involved in conducting the research. We will only use the information for the purposes of the research described in this form.

The research team will know your real identity. The information gathered will be confidential. This means the research team will know your identity, but it will not be disclosed in the written publications.

We intend to publish the results of the research. However, it will not be possible to identify you in the written published results.

We will protect participant's information by keeping digital copies on a password-protected laptop and on MS Teams.

We will destroy the information five years after the end of the study.

F. CONDITIONS OF PARTICIPATION

You do not have to participate in this research. It is purely your decision. If you do participate, you can stop at any time. You can also ask that the information you provided not be used, and your choice will be respected. If you decide that you do not want us to use your information, you must tell the researcher when you leave the interview. After the interview is complete the information will be part of publications and it will not be possible to remove it.
There are no negative consequences for not participating, stopping in the middle, or asking us not to use your information.

G. VERIFICATION OF DATA

Please indicate how you prefer to be contacted if the researcher needs to validate the data or to share some results with you:

[ ] By phone _____

[ ] By email _____

H. PARTICIPANT'S DECLARATION

I have read and understood this form. I have had the chance to ask questions and any questions have been answered. I agree to participate in this research under the conditions described.

NAME (please print)

_____

SIGNATURE

_____

DATE

_____

If you have questions about the scientific or scholarly aspects of this research, please contact the researcher. Their contact information is on page.

If you have concerns about ethical issues in this research, please contact the Manager, Research Ethics, Concordia University, 514.848.2424 ex. 7481 or oor.ethics@concordia.ca.

Appendix D: Tables

Table 1: Uses of ChatGPT

	Brainstorm	Research	Draft	Edit	Total
P01	1	1	1		3
P02		1			1
P03	1		1		2
P04				1	1
P05	1		1		2
P06	1	1	1		3
P07			1	1	2
P08	1	1	1	1	4
P09	1		1	1	3
P10		1	1		2
P11	1	1	1	1	4
P12		1	1	1	3
P13	1		1	1	3
P14	1	1	1		3
P15		1		1	2
P16	1		1	1	3
P17	1	1	1	1	4
P18	1	1			2
P19	1	1	1		3
P20		1	1	1	3
P21	1				1
P22		1	1	1	3
P23		1	1	1	3
P24		1		1	2
P25		1	1	1	3
P26		1		1	2
P27		1	1	1	3
P28			1	1	2

P29	1	1	1	1	4
P30		1		1	2
P31		1	1	1	3
Total	15	22	23	21	81

Table 2: Advantages of ChatGPT

	Efficiency	**Usability**	**Learning Potential**	**Total**
P01				0
P02	1	1		2
P03	1			1
P04	1	1	1	3
P05	1			1
P06	1	1		2
P07	1			1
P08	1	1	1	3
P09	1			1
P10	1		1	2
P11	1		1	2
P12	1		1	2
P13	1			1
P14	1	1		2
P15	1	1		2
P16	1	1	1	3
P17	1	1		2
P18	1			1
P19	1			1
P20				0
P21	1			1
P22	1	1		2

P23			1	1
P24	1	1	1	3
P25	1		1	2
P26	1			1
P27				0
P28	1			1
P29	1			1
P30	1	1	1	3
P31		1		1
Total	26	12	10	48

Table 3: Average Age of Participants by the Number of Advantages Identified

Advantages Identified	Average Age
0	42
1	32
2	31
3	24

Table 4: Disadvantages of ChatGPT

	Content	Research	Deskilling	Total
P01	1			1
P02		1	1	2
P03	1	1		2
P04	1			1
P05	1			1
P06	1	1		2
P07	1	1		2
P08	1	1		2
P09	1			1

P10	1	1	1	2
P11	1			1
P12	1			1
P13				0
P14		1	1	1
P15	1	1	1	2
P16		1		1
P17	1	1		2
P18	1		1	1
P19	1	1	1	3
P20	1			1
P21	1		1	1
P22				0
P23	1			1
P24	1			1
P25	1			1
P26	1	1		2
P27		1	1	2
P28	1			1
P29	1			1
P30	1	1	1	3
P31	1	1	1	3
Total	25	15	10	40

Table 5: Participants Unaware of ChatGPT's Ethical Issues & Impacts

	Misinfo	**Bias**	**Disinfo**	**Privacy**	**Transparency**	**Sustainability**	**Responsibility**	**Education**	**Total**
P01									0
P02									0
P03									0
P04									0

P05									0
P06									0
P07									0
P08							1		1
P09									0
P10	1								1
P11									0
P12									0
P13									0
P14									0
P15									0
P16									0
P17									0
P18									0
P19									0
P20									0
P21									0
P22									0
P23		1							1
P24	1								1
P25									0
P26									0
P27									0
P28									0
P29	1								1
P30									0
P31		1							1
Total	3	2	0	0	0	0	1	0	6

Table 6: Participants Somewhat Aware of ChatGPT's Ethical Issues & Impacts

	Misinfo	**Bias**	**Disinfo**	**Privacy**	**Transparency**	**Sustainability**	**Responsibility**	**Education**	**Total**

P01									0
P02		1							1
P03									0
P04	1							1	2
P05									0
P06	1			1	1			1	4
P07									0
P08		1					1		2
P09			1		1			1	3
P10									0
P11	1		1						2
P12		1					1	1	3
P13	1		1	1				1	4
P14	1	1						1	3
P15		1						1	2
P16	1	1							2
P17	1								1
P18			1						1
P19			1					1	2
P20								1	1
P21	1							1	2
P22									0
P23	1			1			1		3
P24		1						1	2
P25									0
P26	1						1		2
P27			1					1	2
P28	1								1
P29			1	1					2
P30	1		1					1	3
P31									0

Total	12	7	8	4	2	0	4	13	50

Table 7: Participants Aware of ChatGPT's Ethical Issues & Impacts

	Misinfo	**Bias**	**Disinfo**	**Privacy**	**Transparency**	**Sustainability**	**Responsibility**	**Education**	**Total**
P01	1	1	1	1			1	1	6
P02									0
P03								1	1
P04							1	1	2
P05									0
P06		1					1		2
P07	1		1	1				1	4
P08	1		1						2
P09				1					1
P10								1	1
P11				1	1			1	3
P12				1					1
P13									0
P14			1				1		2
P15	1		1				1		3
P16				1				1	2
P17		1				1		1	3
P18				1			1	1	3
P19	1	1							2
P20									0
P21		1		1					2
P22						1			1
P23			1						1
P24			1						1
P25			1	1				1	3
P26			1	1	1				3
P27	1								1

P28			1	1			1	1	4
P29								1	1
P30									0
P31				1				1	2
Total	6	5	10	12	2	2	7	13	57

Table 8: Comparison of Awareness Levels by Ethical Issues or Impact

	Misinfo	**Bias**	**Disinfo**	**Privacy**	**Transparency**	**Sustainability**	**Responsibility**	**Education**
Aware	12	10	20	24	4	4	14	26
Somewhat Aware	12	7	8	4	2	0	4	13
Unaware	-3	-2	0	0	0	0	-1	0
Total	21	15	28	28	6	4	17	39

Table 9: Comparison of Awareness Levels by Participant

	Aware	**Somewhat Aware**	**Unaware**	**Total**
P01	12	0	0	12
P02	0	1	0	1
P03	2	0	0	2
P04	4	2	0	6
P05	0	0	0	0
P06	4	4	0	8
P07	8	0	0	8
P08	4	2	-1	5
P09	2	3	0	5
P10	2	0	-1	1
P11	6	2	0	8
P12	2	3	0	5
P13	0	4	0	4
P14	4	3	0	7
P15	6	2	0	8

P16	4	2	0	6
P17	6	1	0	7
P18	6	1	0	7
P19	4	2	0	6
P20	0	1	0	1
P21	4	2	0	6
P22	2	0	0	2
P23	2	3	-1	4
P24	2	2	-1	3
P25	6	0	0	6
P26	6	2	0	8
P27	2	2	0	4
P28	8	1	0	9
P29	2	2	-1	3
P30	0	3	0	3
P31	4	0	-1	3

Table 10: Comparison of Participants by Awareness Level Group

		Low Awareness (scored 0-3)	Medium Awareness (scored 4-7)	High Awareness (scored 8-12)
Number of Participants		10	14	7
Age	Average	30.8	30.3	34.3
	Youngest	18	24	23
	Oldest	47	39	42
Education Level	BA	20%	0%	0%
	MA	80%	64%	43%
	PhD	0%	36%	57%
Specialization	Social Sci	70%	79%	71%
	CS/Engineering	50%	43%	14%

	Business	30%	7%	14%
	Arts/Hum	0%	14%	0%
	Natural/Health Sci	10%	0%	14%
Uses	Average	2.4	2.8	2.6
	Brainstorm	30%	64%	43%
	Research	80%	64%	71%
	Draft	70%	79%	71%
	Edit	60%	71%	71%
Advantages	Average	1.6	1.6	1.3
	Efficiency	80%	86%	86%
	Usability	50%	36%	29%
	Learning Potential	30%	43%	14%
Disadvantages	Average	1.7	1.5	1.9
	Content gen	80%	71%	100%
	Research	50%	43%	71%
	Deskilling	40%	36%	14%