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Students' Perceptions of ChatGPT in Higher Education: A Study of Academic Enhancement, Procrastination, and Ethical Concerns

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Abstract: The integration of AI tools in education is reshaping how students view and interact with their learning experiences. As AI usage continues to grow, it becomes increasingly important to understand how students' perceptions of AI technology impact their academic performance and learning behaviours. To investigate these effects, we conducted a correlational study with a sample of 44 students to examine the relationship between students' perceptions of ChatGPT's utility—focusing on usage frequency, perceived usefulness, accuracy, reliability, and time efficiency—and key academic outcomes, including content mastery, confidence in knowledge, and grade improvement. Additionally, we explored how these perceptions influence student behaviours, such as reliance on ChatGPT, procrastination tendencies, and the potential risk of plagiarism. The canonical correlation analysis revealed a statistically significant relationship between students' perceptions of ChatGPT's utility and their academic outcomes. Students who viewed ChatGPT as reliable and efficient tended to report higher grades, improved understanding of the material, and greater confidence in their knowledge. Furthermore, the bivariate correlation analysis revealed a significant relationship between dependency on ChatGPT and procrastination (r = 0.546, p < .001), indicating that a higher reliance on AI tools may contribute to increased procrastination. No statistically significant association was identified between ChatGPT dependency and the risk of plagiarism. Future research should prioritize the development of strategies that promote the effective use of AI while minimizing the risk of over-reliance. Such efforts can enhance academic integrity and support independent learning. Educators play a critical role in this process by guiding students to balance the advantages of AI with the cultivation of critical thinking skills and adherence to ethical academic practices.

Keywords: *AI-assisted learning, ChatGPT, ethical concerns, learning outcomes, student perceptions.*

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Introduction

Artificial intelligence (AI) is increasingly involved in our education system and significantly changes the way students approach learning. AI tools such as ChatGPT facilitate immediate responses to inquiries and allow learners to explore complex topics in a more accessible and enriched way. There is evidence showing that this interactive approach makes education more adaptable and relevant for many learners. Many educational researchers argue that by integrating AI into educational settings, we can transform traditional pedagogical practices into more dynamic, flexible, and student-centred approaches (Chang et al., 2023; Hadi Mogavi et al., 2024; Kamalov et al., 2023). As AI technologies become more integrated into the learning process, understanding how students view these tools helps educators customize their approaches, address concerns, and enhance engagement. Furthermore, exploring these perceptions can inform best practices for implementing AI in ways that support learning and maintain the essential role of teachers and educational institutions (Chan & Tsi, 2024).

Research indicates that understanding students' views on digital technology can enhance learning and academic performance by creating environments that meet their specific needs (Chang et al., 2023; Cho et al., 2021; Khan et al., 2023; Roumeliotis & Tselikas, 2023; Wekerle et al., 2022). For example, understanding that students find online discussion boards and shared document platforms more effective for group projects than in-person meetings could lead educators to integrate tools like Google Workspace or Microsoft Teams in their instructional plans. This adjustment would make collaboration more accessible and align with students' preferences, enhancing their learning experience. The ability to interact with ChatGPT allows students to ask specific questions and receive answers that are directly

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relevant to their needs. This interactive support helps students appreciate the tool as a valuable resource for self-directed learning and overcome many potential challenges independently (Baidoo-Anu & Ansah, 2023; Biswas, 2023; Fauzi et al., 2023; Kokku et al., 2018; Rajala et al., 2023; Shoufan, 2023).

While AI technology offers significant benefits for enhancing learning and understanding, it is important to recognize that its integration into education also presents certain challenges. Some of these challenges are concerns about potential plagiarism, threats to academic integrity, biases in AI-generated content, privacy issues, and the risk of students becoming overly reliant on technology (Elali & Rachid, 2023; Glaser, 2023; Vaccino-Salvadore, 2023).

Building on the recognition of both the benefits and challenges associated with AI technology in education, it is essential to understand students' perceptions of AI tools. Understanding how students perceive AI — whether as a helpful resource or a potential obstacle — provides valuable insights into its impact on their learning and academic behaviours. Research shows that students' perceptions of AI and its integration into education significantly influence their learning experiences and levels of engagement (Licorish et al., 2018). When students view AI tools as valuable resources that enrich their learning, they are more likely to use them effectively (Grájeda et al., 2024). This positive perception can foster greater engagement, a deeper understanding of the material, and a more proactive approach to learning (Chellappa & Luximon, 2024). Conversely, if students perceive these technologies as irrelevant or unhelpful, they may be less inclined to use them, potentially missing out on the benefits they offer. Additionally, if students have concerns about using specific AI technology—such as fears of becoming overly dependent on the tool or worries about the integrity of AI-generated content—they may either avoid using it or use it in ways that fails to maximize its potential benefits.

The rationale for this study stems from the increasing integration of AI technologies in higher education and their potential impact on student learning. Previous research indicates that positive perceptions of technology can enhance its adoption and use among students (Sadegh-Zadeh et al., 2023). However, a lack of focused research on undergraduate students' perceptions of ChatGPT—such as ChatGPT's usefulness, time efficiency, reliability, and frequency of use along with their impacts on academic outcomes and potential challenges like plagiarism and procrastination—present an opportunity to investigate whether similar trends apply to students in higher education. We believe that understanding students' perceptions of AI in learning can guide educators in effectively integrating AI-related tools into their teaching practices and may lead to effective student engagement and learning outcomes.

Research Questions

1. How does the perceived utility of ChatGPT usage affect students' academic outcomes, such as content understanding, grade improvement, and confidence in their knowledge?
2. How does dependency on ChatGPT influence procrastination and plagiarism in academic settings?

To answer these questions, we will statistically analyze students' survey responses and interpret our findings through several theoretical lenses. The Technology Acceptance Model (TAM) will help us explain how students' perceptions of ChatGPT's usefulness and ease of use influence their adoption of the tool. Cognitive Load Theory (CLT) will offer insights into how ChatGPT affects cognitive load and learning efficiency. Additionally, Self-Determination Theory (SDT) will help us understand how behaviours such as over-reliance on ChatGPT might impact students' sense of autonomy and competence. These frameworks will guide our interpretation of the results and provide insights into how ChatGPT can be used to enhance student learning and academic performance. We hope our findings will assist educators and policymakers in developing strategies to maximize the benefits of AI tools while effectively addressing challenges such as procrastination and academic integrity.

Literature Review

Technology has transformed education by changing how students learn, engage, and interact with information. Research shows that technological tools such as digital collaboration platforms and AI-driven educational applications enable students to engage actively in their learning process. This engagement involves taking an active role in acquiring and applying knowledge, which includes thinking critically, questioning, synthesizing information, and solving problems rather than merely absorbing information (Hajian et al., 2021; Selwyn, 2017; Timotheou et al., 2023).

Technology has significantly improved access to informational resources for both teachers and students (Javaid et al., 2023), especially for those with special circumstances and needs (Degirmenci et al., 2020). For example, Intelligent Tutoring Systems (ITS) in higher education have provided numerous benefits to enhance the student learning experience. These systems can evaluate student submissions, identify errors, and provide targeted feedback, supporting students' learning and improvement. By delivering support tailored to each student's current level of understanding, ITS can significantly enhance student engagement (A. Nguyen et al., 2024).

Technology enables learners to gain a deeper and more active understanding of their subjects by fostering inquiry and exploration (Hajian et al., 2021). Additionally, it empowers them to be more independent, reducing their reliance on teachers or textbooks as their sole sources of information (McKnight & Kashdan, 2009; Timotheou et al., 2023).

As technology becomes increasingly integral to education, AI has emerged as a transformative tool by providing just-in-time information, knowledge accessibility, engagement, and supporting personalized educational experiences (Chang et al., 2023; Das & J.V., 2024; Firaina & Sulisworo, 2023; Kokku et al., 2018; Opara et al., 2023). In particular, ChatGPT developed by OpenAI has generated significant interest due to its advanced natural language processing capabilities, user-friendly interface, and versatility in adapting to countless educational scenarios. ChatGPT's advanced features have fundamentally transformed the way learners and educators interact with information. This shift in educational practices has prompted many researchers to explore the impact of AI on various aspects of education, including self-regulation, assessment, comprehension, engagement, and academic performance (Chang et al., 2023; Lo et al., 2024; Meyer et al., 2023).

But how do students truly perceive ChatGPT's impact on their educational experience, and what specific attitudes shape their engagement with this tool? While existing literature suggests that university students generally view ChatGPT favourably (Das & J.V., 2024), there is still limited understanding of the ways in which these attitudes influence their learning experiences and outcomes (Ngo, 2023). For instance, Cotton et al. (2024) found that ChatGPT can enhance student engagement, collaboration, and access to information, as well as communication and remote learning. However, further exploration is needed to understand how these positive perceptions translate into meaningful educational experiences and outcomes.

Regular users of ChatGPT often express satisfaction with its ability to support brainstorming, completing assignments, assisting with text revision, and refining arguments (Das & J.V., 2024; Magalhães Araujo & Cruz-Correia, 2024; Shoufan, 2023). Shoufan (2023) argues that students particularly appreciate the real-time responsiveness of ChatGPT, along with its ability to provide personalized learning, lesson planning, assessment, and evaluation (Singh et al., 2023).

Students generally appreciate ChatGPT for its engaging and user-friendly interface and find it motivating and helpful due to its well-structured responses and explanations (Siregar et al., 2023). However, they also acknowledge significant limitations, particularly regarding accuracy and reliability. For example, in a study conducted by Clark (2023), students find that ChatGPT often lacks accuracy in complex academic tasks. The inaccuracy can lead to confusion for students relying on ChatGPT for precise answers, especially in technical subjects. Therefore, as students increasingly use AI tools, it is important to understand and address the accuracy challenges to ensure AI supports learning without causing misunderstanding.

The accuracy challenge can have negative consequences, such as fostering an incomplete understanding of topics, encouraging passive learning, and diminishing students' motivation to seek out and verify information from diverse sources (Clark, 2023). Over time, this reliance on potentially inaccurate or incomplete responses can lead to gaps in knowledge and critical thinking skills. In addition to accuracy issues, other drawbacks, such as limitations in adequately citing sources (M = 3.59) and assessing their reliability (M = 3.63), have been identified by researchers like Ngo (2023). These findings emphasize the challenges of using AI tools like ChatGPT, indicating that students may encounter significant issues with the credibility and accuracy of sources. Privacy and data handling concerns also contribute to the mixed perceptions of ChatGPT's usage (Farhi et al., 2023). A longitudinal study by Polyportis (2024) further elaborates on these issues, revealing a significant decline in ChatGPT usage over an 8-month period. According to this study, initial enthusiasm may diminish as students become more aware of AI's limitations. Such limitations indicate the need for students to carefully assess the quality of the information they receive from these tools.

Educators should, therefore, promote a balanced approach toward integrating AI as a supportive resource while ensuring students remain engaged in active learning and critical thinking (Clark, 2023; Shoufan, 2023; Valova et al., 2024). Given the growing concerns about over-reliance on AI tools and their limitations, it is crucial to adopt a thoughtful and critical approach to their use in educational settings. Over-reliance on AI can undermine the development of independent problem-solving skills, hinder meaningful learning, and lead students to bypass essential cognitive processes (e.g., Choudhury & Shamszare, 2023).

Despite numerous studies on AI tools, less is known about students' subjective experiences and perceptions in higher education. Existing research on student experiences with AI tools is often not inclusive, lacking perspectives from students in diverse fields such as psychology. While there is substantial research on the technical capabilities and general benefits of AI, insight into how students from varied academic backgrounds perceive and interact with tools like ChatGPT remains restricted (Tossell et al., 2024). There is limited research on how students perceive these tools in terms of their effectiveness, reliability, and overall usefulness in enhancing learning outcomes. We argue that understanding the diverse perspectives of students in higher education is crucial for effectively incorporating ChatGPT into educational settings (Das & J.V., 2024; Fauzi et al., 2023; Valova et al., 2024). By considering the reasons why some students choose not to use ChatGPT and the opinions of those who do, educators can address some of the existing concerns and foster a more inclusive environment.

While university students generally have a positive perception of the tool, it is essential to address concerns related to accuracy, over-reliance, and data privacy. Similar to many disruptive technologies, ChatGPT comes with its own challenges and potential risks. One such challenge, highlighted in the literature, is the issue of over-reliance on the tool (Fullan et al., 2024). ChatGPT carries the risk of promoting complacency among students, as its ability to quickly complete

tasks may hinder the development of critical thinking, analytical skills, writing ability, and other essential competencies (Zhai et al., 2024). Some studies have validated this concern, where the hindering of learning was observed among students making use of this tool (Nguyen Minh, 2024). Consideration should also be given to the accuracy of the generated responses by the language model. The official website of OpenAI explicitly states that outputs may be inaccurate or untruthful and that caution should be exercised (OpenAI, n.d.). Research aimed at quantifying the accuracy of ChatGPT reveals that its performance fluctuates based on the nature and complexity of the questions posed. Despite ongoing development, its behaviour can change substantially, with new models performing worse than their predecessors on similar tasks (Beltozar-Clemente et al., 2024; Chen et al., 2023; Johnson et al., 2023).

We believe that addressing the identified gaps will help develop informed guidelines for integrating ChatGPT into educational settings (Chang et al., 2023; Das & J.V., 2024; Kokku et al., 2018), which may ultimately lead to more comprehensive and beneficial outcomes for higher education. This study aims to address these gaps by examining how students' perceptions of ChatGPT impact their academic performance and learning behaviours. Specifically, we will explore how students engage with and approach their learning processes, including study habits, motivation, and interactions with ChatGPT. We hope to offer valuable insights that will contribute to the development of effective strategies for integrating AI tools into education in ways that enhance teaching methods, support student learning, and foster academic achievement.

Methodology

Research Participants and Procedure

To collect data for this study, we administered an online survey to undergraduate students in the Psychology Department at Kwantlen Polytechnic University. The survey, conducted using the Qualtrics platform, consisted of a series of Likert scale questions designed to assess students' perceptions of ChatGPT and its impact on their academic outcomes and behaviours. A total of 44 participants completed the survey, which was accessed through a link posted on the psychology lab website. To encourage participation and increase response rates, students were offered bonus points and course credit within the psychology department. This approach ensured that we gathered relevant and actionable insights from a specific group of students.

Survey Design

The researchers independently designed the survey for this study, without reliance on external resources, to examine university students' perceptions of ChatGPT and its influence on their academic behaviours. First, demographic information was collected through three introductory questions, followed by an initial screening question on ChatGPT use; those who responded affirmatively were directed to the rest of the questionnaire. Students were asked a question about their "GPT Usage Frequency" utilizing a 4-point scale with options ranging from "Daily" to "Rarely," to measure how often they interacted with ChatGPT. Two additional multiple-choice questions were included to gain a deeper understanding of how students use and perceive ChatGPT for their learning, one inquiring about the role of ChatGPT in their studies and another assessing their overall perception of the tool, both of which offered the option to provide open-ended responses. The core of the survey featured ten questions on a 5-point Likert scale, ranging from "Strongly Disagree" to "Strongly Agree."

These questions were designed to measure both predictor and outcome variables. The predictor variables in the study were GPT Usage Frequency, GPT Usefulness, GPT Accuracy, GPT Reliability, and GPT Time Efficiency. The outcome variables included both learning and behavioural outcomes. The learning outcomes assessed in the study were content understanding, confidence in knowledge, and grade enhancement, whereas the behavioural outcomes of the study included dependence on the tool, procrastination, and risk of plagiarism. In the questionnaire, we included key statements such as "I find ChatGPT to be useful in assisting with studying and completing assignments" and "Utilizing ChatGPT as a tool for studying has enhanced my understanding of course material" to assess students' perceptions of ChatGPT effectiveness. Statements such as "I believe that incorporating ChatGPT in educational settings increases the risk of plagiarism or academic dishonesty" were employed to explore concerns regarding academic integrity. Each statement utilized a 5-point Likert scale to allow participants to express their level of agreement, from "Strongly Disagree" to "Strongly Agree."

Specifically, the survey aimed to assess how students' perceptions regarding ChatGPT might relate to their academic performance, as well as their tendencies to become over-reliant on the tool, procrastinate, or engage in plagiarism. The survey was conducted online using the Qualtrics platform, which allowed for a user-friendly and accessible design. This structured approach facilitated the systematic collection of data and clear analysis of the relationships between ChatGPT usage and its impact on student behaviour.

In addition to these quantitative measures, open-ended questions were included in the survey to gather detailed feedback on the benefits and challenges associated with ChatGPT usage. This qualitative data aimed to capture nuanced insights into students' experiences with ChatGPT and provide a richer context to complement the quantitative findings. However,

due to the complexity and depth of qualitative analysis required, this data was not included in the current study. A comprehensive qualitative analysis of these open-ended responses will be the focus of a separate, forthcoming study.

Exclusion Criteria

Students who responded neutrally to all questions or completed the survey in less than one minute were excluded from the analysis. This decision was made to ensure the validity of the data, as such responses likely indicated either non-engagement with the survey content or a lack of thoughtful consideration. By excluding these participants, we improved the reliability of our findings and ensured that the data accurately reflected the participants' true perceptions and experiences.

Data Analysis

We analyzed two types of relationships based on the quantitative data collected through a Likert scale survey: (1) the relationships between students' perceptions of ChatGPT utility and their academic outcomes and (2) the relationship between the perception of ChatGPT dependency and academic behaviours. To achieve a comprehensive understanding, we employed a canonical correlation analysis and bivariate correlation techniques, both performed using SPSS (Statistical Package for the Social Sciences).

Findings/Results

This section presents the results of the study, which investigated students' perceptions of ChatGPT and its effects on their learning outcomes and behavioural patterns. Using a sample of 44 students, we employed a canonical correlation analysis and bivariate analysis to examine the data. The assumption of homogeneity of variance was met for our dataset, and normality checks indicated only a slight deviation from a normal distribution. Although the data did not fully meet the normality assumption, we proceeded with the analysis, as canonical correlation analysis is generally robust to slight deviations from normality, especially when the sample size is adequate (e.g., Tabachnick & Fidell, 2013). Therefore, the slight non-normality in our data is unlikely to compromise the validity of our findings. A canonical correlation analysis was therefore used to assess the relationships between students' perceptions of ChatGPT, including perceived usefulness (M = 3.77, SD = 0.937), accuracy (M = 2.981, SD = 0.831), reliability (M = 2.681, SD = 0.883), dependency (M = 2.863, SD = 1.167), and frequency of use (M = 2.412, SD = 0.844), and key academic outcomes such as content understanding (M = 3.862, SD = 0.841), grade improvement (M = 3.432, SD = 0.925), and confidence in knowledge (M = 3.143, SD = 1.002). In addition, bivariate analysis was applied to explore correlations between ChatGPT dependency and behavioural outcomes, including procrastination (M = 2.953, SD = 1.133) and plagiarism risks (M = 3.821, SD = 1.084). The findings indicated a significant relationship between ChatGPT perception and academic outcomes, as well as a positive correlation between ChatGPT dependence and procrastination. These analyses allowed us to understand how various aspects of ChatGPT's utility impact students' academic performance and behaviours. This approach provided insights into both the benefits and potential challenges associated with AI tools in education.

Canonical Correlation Analysis

A canonical correlation analysis was performed to examine the relationships between two sets of variables. The first set, serving as the predictor variables, included usage frequency, perceived usefulness, accuracy, reliability, and time efficiency of ChatGPT. The second set, serving as the criterion variables, encompassed content understanding, knowledge confidence, and grade enhancement.

With a total of 3 canonical functions extracted, the relationship between the two sets of variables was found to be statistically significant for the first canonical function, with Wilk's Lambda = .306, Approximate F (15, 97.021) = 3.467, $p < .001$. However, the subsequent canonical functions were not statistically significant ($p > .05$). Table 1 presents the canonical correlation coefficients, eigenvalues, and the significance of the canonical functions.

Table 1. Canonical Correlation Analysis Results

	Correlation	Eigenvalue	Wilks Statistic	F	Num D.F.	Denom D.F.	Sig.
1	0.772	1.475	0.306	3.467	15.000	97.021	0.000
2	0.383	0.172	0.757	1.344	8.000	72.000	0.236
3	0.336	0.127	0.887	1.570	3.000	37.000	0.213

H0 for the Wilks test is that the correlations in the current and following rows are zero

The dimension reduction analysis shown in Table 2 indicates that the first canonical function accounted for approximately 83% of the total variance, making it the focus of further interpretation. With a squared canonical correlation (R_C^2) of .596, this function also explains 59.60% of the variance in the criterion variables by the predictor variables.

Table 2. Dimension Reduction Analysis Results

	Eigenvalue	Variance %
1	1.475	83%
2	0.172	10%
3	0.127	7%
Total	1.774	100%

The structure coefficients for the first function for the predictor and criterion variables are shown in Tables 3 and 4. The first predictor function is associated with lower levels of GPT Usage Frequency (-.791), GPT Usefulness (-.701), GPT Time Efficiency (-.684), GPT Reliability (-.640), and GPT Accuracy (-.470). The first criterion function is associated with lower levels of Grade Enhancement (-.968), Knowledge Confidence (-.750), and Improved Content Understanding (-.716).

Table 3. Predictor Variables Canonical Loadings

	1	2	3
GPT Usage Frequency	-0.791	0.386	0.110
GPT Usefulness	-0.701	-0.556	-0.262
GPT Accuracy	-0.470	-0.541	0.697
GPT Reliability	-0.640	-0.232	0.087
GPT Time Efficiency	-0.684	0.154	0.002

Table 4. Criterion Variables Canonical Loadings

	1	2	3
Improved Content Understanding	-0.716	0.667	0.208
Knowledge Confidence	-0.750	0.148	-0.644
Grade Enhancement	-0.968	-0.249	0.043

The stated relationship is visually represented in Figure 1.

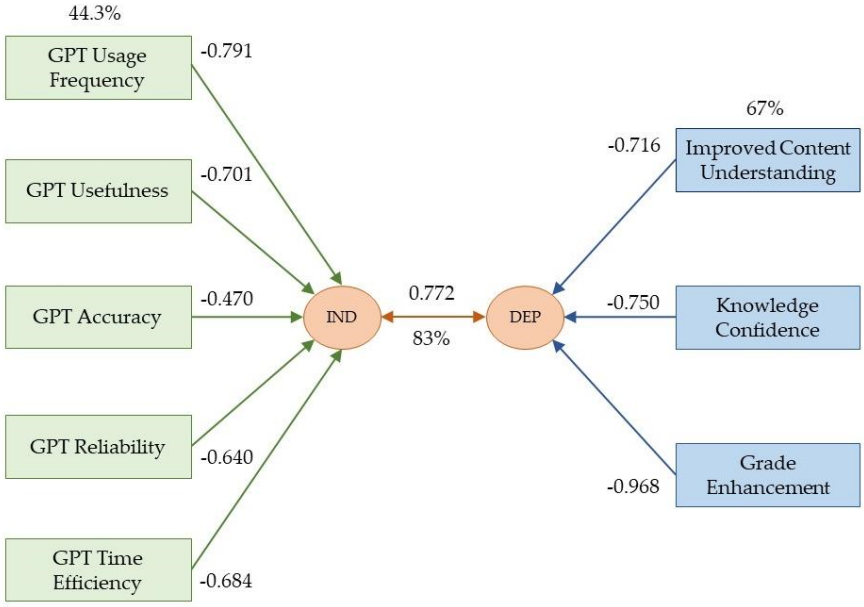

Figure 1. Graphical Representation of the Canonical Correlation Functions, Showing the Strength of Relationships Between Perceptions & Usage of ChatGPT and Academic Outcomes

Bivariate Correlation Analysis

A bivariate Pearson correlation analysis was conducted to examine the relationships among three potential behavioural outcomes related to ChatGPT use: GPT Dependence, Procrastination, and Plagiarism Risk. The goal was to understand how over-reliance on ChatGPT might be associated with procrastination tendencies and the risk of engaging in plagiarism.

The descriptive statistics, as shown in Table 5, reveal that students reported relatively low levels of GPT Dependence (M = 2.860, SD = 1.167) and Procrastination caused by ChatGPT use (M = 2.950, SD = 1.133), suggesting that these behaviours are not highly prevalent outcomes among the sample. In contrast, Plagiarism Risk was reported at a higher average (M = 3.820, SD = 1.084), reflecting a moderate to high level of concerns regarding the risk of plagiarism with ChatGPT use.

Table 5. Descriptive Statistics of Potential Behavioural Outcomes Related to ChatGPT Use

	Mean	Std. Deviation	N
GPT Dependence	2.861	1.167	44
Procrastination	2.953	1.133	44
Plagiarism Risk	3.822	1.084	44

The correlation analysis, presented in Table 6, shows a significant moderate positive correlation between GPT Dependence and Procrastination (r = .546, p < .001), indicating that higher ChatGPT dependence may be associated with increased procrastination. However, no significant correlations were found between GPT Dependence and Plagiarism Risk.

Table 6. Bivariate Correlation Analysis

	1	2	3
1. GPT Dependence	1.000		
2. Procrastination	.546**	1.000	
3. Plagiarism Risk	.108	.153	1.000

**. Correlation is significant at the .01 level (2-tailed).

Discussion

In this study, we explored how students' perceptions of ChatGPT's utility and frequency impact their academic performance and behavioural outcomes. The interpretation of the data will be presented from multiple perspectives, considering both the implications of the results and their alignment with existing literature.

Canonical Correlation Analysis

The results from the canonical correlation analysis revealed a strong relationship between the perceived usefulness of ChatGPT and better academic outcomes. More specifically, the first canonical function was shown to be responsible for most of the explained variance. Looking at the canonical loading for this function (Table 3 & 4 and, Figure 1), it was found that all the variables were negatively loaded on both the independent (predictors) and dependent (outcomes) sets. These results suggest that lower levels of ChatGPT usage frequency, as well as negative perceived understanding of usefulness, accuracy, confidence in reliability, and time efficiency, are associated with lower academic outcomes, such as lower levels of grade enhancement, confidence in one's knowledge, and improvement in content understanding. Among the independent variables, usage frequency and perceived usefulness had the highest canonical loadings, indicating that these factors are the strongest predictors of the associated academic outcomes. On the dependent side, grade enhancement and knowledge confidence had the highest loadings, suggesting that these outcomes are the most affected by students' perceptions of ChatGPT.

Understanding Learner Engagement with Technology

It is no surprise that perceived usefulness was one of the highest predictors in our study. According to Venkatesh and Davis (1996), perceived usefulness is a crucial factor in determining user acceptance of technology. This finding is consistent with the Technology Acceptance Model (TAM), which identifies both perceived usefulness (PU) and perceived ease of use (PEOU) as essential factors for the successful adoption of technology (Venkatesh et al., 2007). In practical terms, when students find ChatGPT to be useful for their studies, they are more likely to incorporate it into their learning routines. This increased use can lead to improved academic performance, indicating how perceived usefulness drives effective technology integration.

This interpretation is further supported by the study conducted by Romero-Rodríguez et al. (2023), which examined the perceived usefulness of ChatGPT. Their research identified several key factors that significantly influence students' intentions to use ChatGPT: performance expectancy, user experience, and facilitating conditions. Specifically, the study

found that students are more likely to integrate ChatGPT into their study routines when they expect it to enhance their academic performance, have had positive prior experiences with the tool, and find the learning environment supportive of its use. These findings suggest that performance expectancy, positive user experience, and a conducive learning environment are crucial in shaping students' adoption and continued use of ChatGPT as a valuable educational resource.

Managing Cognitive Load in Learning with Technology

According to Cognitive Load Theory (CLT) (Sweller, 2011), effective learning happens when the cognitive load on working memory is managed in a way that maximizes the efficiency of processing and integrating new information. This theory suggests that if students find ChatGPT to be time-efficient and use it more frequently, their cognitive load might decrease. The reduction in cognitive load happens because less effort is required to access and process information, allowing students to focus more on understanding and applying the content. In essence, CLT asserts that learning becomes more effective when the cognitive demands on students are minimized. By reducing unnecessary cognitive load, students can more easily process and retain new information.

Bannert (2002) highlights that students can manage their cognitive load more effectively when their learning experiences are personalized (Lange, 2023). Personalization allows learners to adjust instructional materials to fit their individual learning styles and needs, which can reduce cognitive overload. We argue that technology is crucial in this process because it provides tools that help minimize extraneous cognitive load: Unnecessary mental effort caused by poorly designed instructional materials or those that do not align with students' preferences. Kirschner (2002) and Sweller (2011) support this view, emphasizing that ineffective instruction can result in excessive mental effort, which hinders students' ability to process and retain information (Kalyuga, 2009). By using technology to offer customized learning experiences and reduce extraneous cognitive load, educators can improve instructional effectiveness and better support student learning outcomes.

We need to be careful with the other side of the argument as well. While personalization through technology can enhance learning, technology-based learning can also contribute to mental overload if it presents an overwhelming amount of information. This excess information can exceed students' working memory capacity, requiring significant mental effort to process and prioritize key content. Such overload can disrupt cognitive processes, reduce motivation, and ultimately impair the effectiveness of learning (Bannert, 2002; Karr-Wisniewski & Lu, 2010; Kirschner, 2002; Rutkowski & Saunders, 2018).

It is crucial to balance the benefits of personalized learning tools with the risk of cognitive overload to ensure they enhance rather than hinder students' educational experiences. When technology is too complex for a given task, it can strain cognitive capacity instead of providing support. According to the theory of task-technology fit, technology is most beneficial when it aligns with the specific tasks students need to perform. For instance, using advanced data analysis software for simple math problems can be overwhelming and unnecessary. In this case, a basic calculator would probably be a lot more helpful. Similarly, employing a complex project management tool for a small group assignment may lead to confusion, while a simple to-do list could be more effective (Karr-Wisniewski & Lu, 2010; Sweller, 2020).

Autonomy and Dependency on AI-Assisted Learning

According to Self-Determination Theory (SDT) (Deci & Ryan, 2012; Ryan & Deci, 2000), competence, relatedness, and autonomy are fundamental psychological needs essential for optimal development, motivation, and success (Chiu, 2024; Q. N. Nguyen & Sidorova, 2018). Our finding that dependence on ChatGPT is associated with increased procrastination may indicate a reduced sense of autonomy in students. This can occur because heavy reliance on ChatGPT for learning tasks can reduce students' engagement in self-directed learning and problem-solving activities. When students frequently turn to external tools like ChatGPT, they may miss valuable opportunities to actively engage with educational material and develop critical thinking skills.

This over-reliance can limit the fulfillment of essential psychological needs, such as autonomy and competence, which are crucial for sustaining motivation and personal growth (Niemiec & Ryan, 2009). According to the SDT, fulfilling these needs is fundamental for effective learning and well-being. When students rely excessively on external AI tools, they may not fully experience the satisfaction and sense of achievement that come from overcoming challenges and solving problems independently.

Research shows that active engagement in the discovery process – where students actively explore, investigate, and seek new information – along with the ability to process this information is a crucial element of effective learning (Chu & Law, 2007; Hajian et al., 2021). Inquiry-based activities help students develop a deeper understanding of the material and improve knowledge retention (Hajian et al., 2021). However, excessive use of tools like AI tools might disrupt these crucial learning processes by providing ready-made answers and reducing opportunities for independent exploration and critical thinking.

We argue that as students become more dependent on ChatGPT, they may start using it for increasingly trivial tasks under the label of efficiency. This approach raises concerns about the long-term impact on their learning habits. Over

time, this approach could lead to a reduction in students' ability to engage in more complex problem-solving and critical thinking tasks, ultimately affecting their overall educational development and preparedness for real-world challenges (Chakraborty Samant et al., 2024). Thus, while tools like ChatGPT can be valuable, their overuse may negatively impact students' learning experiences and personal growth.

The rapid access to information provided by ChatGPT is a double-edged sword. While this feature can help students overcome inefficiencies in their study time, it may also encourage undesirable habits. Our analysis showed a significant positive correlation between dependence on ChatGPT and procrastination. This relationship suggests that relying heavily on ChatGPT may be linked to a tendency to delay tasks. In other words, the ease of accessing information might lead students to become complacent and put less effort into their learning, potentially hindering their overall educational progress.

We argue that the potential issues with ChatGPT can be effectively addressed if educators encourage students to use it as a supplementary tool rather than a primary resource. By promoting a balanced approach, where students actively engage with educational materials and develop critical thinking skills, educators can help maintain students' autonomy and motivation. ChatGPT is a valuable resource when used strategically; however, it should complement rather than replace essential learning processes such as exploring new concepts, critically analyzing information, solving complex problems, reflecting on one's understanding, and applying knowledge to practical situations. These core activities are crucial for deep learning and the development of essential inquiry skills (Balım, 2009; Hajian et al., 2019, 2021).

Conclusion

In conclusion, this study sheds light on both the benefits and challenges of using ChatGPT in education. Our findings show that students who perceive ChatGPT as useful, accurate, and reliable tend to experience positive academic outcomes, including better content understanding, increased confidence in their knowledge, and improved grades.

We also found that ChatGPT dependency was correlated with procrastination, suggesting that students who rely more on ChatGPT are more likely to delay their work. On the other hand, ChatGPT dependency was not correlated with plagiarism risks, indicating that over-reliance on ChatGPT does not necessarily increase the likelihood of academic dishonesty. Despite this finding, concerns about plagiarism remain moderate among students, which highlights the need for ongoing attention to this issue.

In summary, while ChatGPT provides valuable learning support, it is crucial for educators to guide students in using it effectively and responsibly to ensure it enhances their learning without encouraging procrastination or raising concerns about academic integrity. Further research is required to gain a deeper understanding of effective strategies for promoting the ethical use of AI tools in education.

Recommendations

We believe that to gain a more comprehensive understanding of AI's influence on academic and behavioural outcomes, future research should include larger sample sizes and participants from diverse academic disciplines. Furthermore, exploring the correlation between students' perceptions of generative AI tools and objective academic performance metrics, such as test scores or GPAs, would offer a clearer insight into their impact on learning outcomes. We also think that gaining insight into students who do not use ChatGPT and their reasoning behind this choice would be beneficial in identifying potential barriers to adopting such technology. This approach will ensure that the findings are more representative of the broader student population and provide valuable insights into how AI tools like ChatGPT impacts students across different fields of study. Expanding research in this direction will contribute to a deeper and more holistic understanding of AI's role in education.

Limitations

One limitation of this study is its small sample size, which may affect the generalizability of the results. Additionally, the exclusive focus on psychology students limits the applicability of the findings to other academic disciplines. The use of an online survey also introduces potential inaccuracies due to concerns about anonymity. Finally, although correlations between variables were identified, they do not demonstrate cause-and-effect relationships. Therefore, the observed associations cannot be interpreted as evidence of causality.

Ethics Statements

The study was conducted in accordance with the Declaration of Helsinki and approved by the Institutional Review Board of Kwantlen Polytechnic University (protocol code 2024-09, approved on April 29, 2024). Written informed consent was obtained online from all participants prior to their involvement in the study and for the publication of this paper.

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Conflict of Interest

The authors declare no conflicts of interest. The funders had no role in the design of the study, in the collection, analyses, or interpretation of data, in the writing of the manuscript, or in the decision to publish the results.

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Generative AI Statement

As the authors of this work, we used the AI tool ChatGPT to assist with generating examples and ideas. After using this AI tool, we reviewed and verified the final version of our work. We, as the authors, take full responsibility for the content of our published work."

Authorship Contribution Statement

Uppal: Conceptualization, design, analysis, writing, editing/reviewing, interpretation, drafting the manuscript, revision of the manuscript, securing funding. Hajian: Conceptualization, design, analysis, writing, editing/reviewing, interpretation, drafting the manuscript, critical revision of the manuscript, supervision.

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