

Research Article

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Artificial Intelligence (AI) in Education: A Case Study on ChatGPT's Influence on Student Learning Behaviors

Thuy Nhu Thi Nguyen , Nam Van Lai , Quyet Thi Nguyen

Abstract

Background/purpose. The integration of ChatGPT at Ho Chi Minh City University of Technology and Education (HCMUTE) aims to transform teaching and learning dynamics. This research evaluates ChatGPT's impact on student learning behaviors, exploring its potential to enhance educational outcomes while addressing ethical concerns.

Materials/methods. A mixed-methods approach was used, involving 73 first and second-year students from HCMUTE selected through stratified random sampling. Data were collected via electronic surveys and semi-structured interviews with 15 faculty members. Quantitative data were analyzed using IBM's SPSS, while qualitative data were thematically analyzed.

Results. ChatGPT is widely adopted by students for learning and information searches, with many also finding it reliable for academic tasks such as idea generation and assignment completion. However, concerns about overreliance were noted, which may hinder independent thinking and critical evaluation skills. Issues related to academic dishonesty, reduced creativity, and ethical problems such as plagiarism and information security were also identified.

Conclusion. ChatGPT significantly impacts student learning behaviors. Whilst it offers benefits in accessibility and efficiency, its integration requires a balanced approach in order to maximize benefits whilst mitigating risks. This study highlights the need for stringent policies to ensure ethical usage and to promote independent learning. Future research should focus on the long-term impacts of AI tools on educational outcomes and ethical implementation frameworks.

1. Introduction

In the evolving landscape of global education, the onset of the Industrial Revolution 4.0 has significantly expedited the integration of digital technologies, profoundly transforming higher education systems worldwide. Vietnam, with its proactive economic and educational reforms, stands prominently in this transformative wave, particularly through the utilization of technologies such as ChatGPT (Generative Pre-Trained Transformer) within its higher education institutions, such as the Ho Chi Minh City University of Technology and Education (HCMUTE). This study delves into the profound impacts of ChatGPT on student learning behaviors at HCMUTE, reflecting broader trends across Vietnamese higher education.

The integration of advanced digital tools like ChatGPT into educational frameworks redefines traditional pedagogical methodologies, student engagement, and the design of learning materials, ushering in an era of enhanced digital education (Demirkol & Malkoc, 2023; Karakose & Tülübaş, 2023; Tülübaş et al., 2023). While the digital transition offers numerous opportunities for enriching educational experiences and personalized learning, it also introduces challenges including concerns over academic integrity, the perpetuation of the digital divide, and the critical need for digital literacy among educators and students (Liu et al., 2020).

Amidst these technological advancements, Vietnam's educational strategies are deeply influenced by both contemporary needs and historical and philosophical underpinnings. Philosophical doctrines from Chinese philosophy, emphasizing moral education and talent development, resonate with Vietnam's modern educational reforms which aim to blend ethical training into the fabric of educational processes (Nguyen, 2022b; Quyet et al., 2021; Thuy & Quyet, 2021). Moreover, the educational ideals of prominent Vietnamese leaders, such as President Ho Chi Minh, advocate for a holistic education model that encompasses not only academic knowledge but also ideals, health, esthetics, and morality (Nguyen & Nguyen, 2024; Nguyen, 2022a; Quyet et al., 2023).

The integration of AI tools like ChatGPT in the Vietnamese educational system is like a double-edged sword. On the one hand, ChatGPT enables the creation of more effective and personalized learning environments (Karakose & Tülübaş, 2023), whilst necessitating rigorous reassessment and adaptation of educational policies to ensure ethical its usage and equitable access to these technologies. The transformative potential of ChatGPT in enhancing educational outcomes must therefore be balanced with considerations of ethical usage and digital equity.

The current study aims to explore the effective integration of AI tools such as ChatGPT into Vietnam's higher education landscape. Specifically, the study seeks to:

- Evaluate ChatGPT's role in shaping student learning behaviors at HCMUTE;
- Assess the potential of ChatGPT to enhance educational outcomes;
- Examine the philosophical and ethical considerations that must guide the adoption of AI tools in education.

Through this examination, the study seeks to provide insights into how Vietnam can harness these technological advancements in order to achieve its educational objectives. This involves aligning with global technological trends while adhering to local cultural values.

By focusing on the intersection of technology and education, this research highlights the dynamic relationship between digital innovation and pedagogical practices. The findings aim to contribute to a broader understanding of how AI-driven tools can be integrated into educational systems in a manner that promotes equity, ethics, and excellence.

Ultimately, the current study underscores the importance of a balanced approach in adopting advanced digital tools. While the potential benefits are significant, careful consideration of the accompanying challenges is crucial for sustainable and inclusive educational reform. Through a

detailed exploration of ChatGPT's impact on student learning behaviors at HCMUTE, this study aims to inform policymakers, educators, and technology developers on best practices for integrating AI in education. This will ensure that technological advancements serve to enhance, rather than hinder, the educational experiences of students in Vietnam and beyond.

2. Literature Review

The rapid evolution of information technology has been pivotal in shaping socioeconomic landscapes globally. This technological advancement necessitates a reevaluation of digital competence, transforming it from a basic skill to an essential component of modern literacy. Katz (2007) and Killen (2018) liken this transformation to the indispensability of reading and writing in earlier centuries. The World Bank's "The Changing Nature of Work" reinforces this perspective, positioning digital skills at the core of the 21st-century skills framework, emphasizing the crucial role of digital literacy in preparing individuals for future challenges (The World Bank, 2019).

Digital competence today transcends technical proficiency, encompassing a broad spectrum of cognitive, emotional, and social competencies necessary for effective problem solving and functionality in digital contexts (Ameen & Gorman, 2009; Eshet-Alkalai, 2004). The work of van Deursen and van Dijk (2010) expands on this by categorizing digital skills into operational, formal, informational, communication, content creation, and strategic skills, each highlighting the complexity of digital competence. UNESCO (2018) and the recent framework from The World Bank further delineate digital competence as not only involving basic computer use and information technology skills, but also incorporating digital leadership and cultural capabilities as crucial for digital transformation strategies within organizations (Melhem & Jacobsen, 2021). Digital capability encompasses not only digital skills but also digital leadership and cultural competencies, all crucial elements for the effective implementation of any digital transformation strategy. Despite the various approaches and terminologies related to digital skills, as well as differences in content and methods for the assessment of digital competence, these studies have elucidated the nature, role, and core elements of digital skills. They provide a significant foundation for both individuals and organizations to explore how digital technology supports teaching and learning, and to develop strategies that help learners to enhance their digital skills so as to adapt to new conditions. For instance, Bartlett-Bragg (2017) and Varga-Atkins (2020a, 2020b) both asserted that student learning is greatly influenced by technology-related factors, such as the integration of technology applications in course design and the interaction between students, as well as between students and teachers, through digital resources. Additionally, researchers have focused on individual characteristics related to digital competence. Thuy proposed a three-factor framework comprising cognitive aspects (e.g., technology selection, information search, and critical information evaluation), technical aspects (e.g., technical understanding of technology), and social aspects (e.g., support through online communities and self-protection in digital environments) (Nhu Thuy, 2022; Thuy et al., 2022).

Transformative Shift Towards Online Learning. This shift towards online learning marks a significant transformation in educational delivery, enabled by the use of advanced computer network technologies. This mode of learning challenges traditional educational models by providing resources and interactive experiences that transcend geographical and temporal barriers (Andrews & Haythornthwaite, 2007; Rosenberg & Foshay, 2002; Welsh et al., 2003), but emphasizes the need for a connected, digitally equipped learning environment (Holmes & Gardner, 2006; Oliver & Towers, 2001). Research utilizing the e-UTAUT model by Gonzalez et al. (2020) provides empirical evidence on factors enhancing the acceptance and effectiveness of online learning systems, pointing towards trends in personalized, interactive, and resource-rich educational experiences.

Integration and Impact of ChatGPT in Education. The release of the ChatGPT application in November 2022 was pivotal in the integration of artificial intelligence in education, shifting the focus

of scientific discourse from broad-based AI applications to the specific functionalities of large language models (LLMs) and their educational applications (Demirkol & Malkoc, 2023). ChatGPT has been noted for its ability to deliver accurate information, albeit sometimes lacking in depth, particularly when employed in emergency remote teaching scenarios (ERT) (Tülübaş et al., 2023).

ChatGPT's influence extends to transforming educational practices by facilitating personalized learning environments and supporting diverse educational needs, including those of students with disabilities (Karakose & Tülübaş, 2023). This AI tool aids teachers in enhancing instructional design, such as developing lesson plans and assessment rubrics, thereby enriching educational content and making pedagogy more effective.

Policy Implications and Ethical Considerations. The integration of AI technologies like ChatGPT in educational settings necessitates a proactive approach in policy formulation to maximize benefits while mitigating risks. Educational leaders are urged to cultivate a digital-friendly environment that aligns with ethical standards and is supportive of maintaining academic integrity (Karakose & Tülübaş, 2023). Demirkol and Malkoc (2023) highlighted emerging concerns such as plagiarism and the ethical use of AI in academia, underscoring the need for stringent policies to address these issues.

Future Directions and Research Needs. The continued evolution of ChatGPT in educational contexts suggests a need for targeted research to better understand and optimize its use. The growing discourse on potential risks and ethical implications of AI technologies in education calls for ongoing research and a collaborative interplay between human expertise and artificial intelligence. This collaboration is essential for navigating future challenges and ensuring the effective and responsible integration of AI into educational systems (Tülübaş et al., 2023).

This literature review identifies several notable gaps in the current research landscape regarding AI tools like ChatGPT in educational settings, particularly outside of western contexts. First, it highlights a scarcity of research with a focus specifically on AI technologies such as ChatGPT, as opposed to broader digital competencies or e-learning platforms. This gap underscores a need for more targeted research on how these sophisticated tools are employed and their effects in specific locales, such as in Vietnamese higher education institutions. Additionally, there is a lack of detailed empirical evidence concerning how AI influences student behavior, learning outcomes, and academic practices. This absence of granular data limits understanding of the practical implications of AI integration in the classroom. Finally, the review points to a lack of exploration of the impact of AI on academic integrity and engagement. While the potential for technology-facilitated cheating is acknowledged, comprehensive studies on how AI tools specifically alter academic honesty and student involvement are lacking, suggesting a need for focused research on these critical issues.

2.1. Theoretical Frameworks

In order to comprehensively explore these issues, the current study employs two robust theoretical frameworks: The Technological Acceptance Model (TAM) and Cognitive Load Theory (CLT).

Technological Acceptance Model (TAM). Developed by Davis (1989), TAM is a well-established model in the field of information systems that predicts how users come to accept and use a technology. The model suggests that user acceptance of technology is primarily influenced by two factors: perceived usefulness and perceived ease of use. Perceived usefulness refers to the degree to which a person believes that use of a particular system would enhance their job performance or academic learning. In contrast, perceived ease of use denotes the degree to which a person believes that using the system will be free of effort (Venkatesh & Davis, 2000).

In the context of the current study, TAM provides a framework for understanding how students and faculty at HCMUTE perceive the usefulness and usability of ChatGPT, and how these perceptions influence their acceptance and integration of the tool into their academic routines.

Cognitive Load Theory (CLT). Developed by Sweller (1989), the focus of CLT is on understanding how information presentation affects human cognition and learning. The theory posits that instructional design can enhance or hinder learning depending on how it aligns with human cognitive structures. Central to CLT is the concept of cognitive load, which refers to the amount of mental effort being used in the working memory. Instruction that optimally manages cognitive load can significantly improve learning outcomes by minimizing unnecessary mental effort and fostering greater cognitive engagement with the material (Sweller et al., 2011).

Through applying CLT, the current study examines whether ChatGPT helps manage the cognitive load of students by facilitating easier access to information, simplifying complex content, and providing tailored feedback, thereby potentially enhancing learning efficiency and effectiveness.

This literature review underscores the critical need for comprehensive research into the specific impacts of AI tools like ChatGPT on student learning behaviors and academic integrity within Vietnamese higher education. By leveraging TAM and CLT, the current study aims to provide nuanced insights into how such tools can be optimally integrated into educational frameworks to enhance student learning while addressing potential challenges such as threats to academic integrity.

In short, the integration of AI in education, particularly in a unique educational and cultural setting like Vietnam, requires detailed and context-sensitive research. The current study contributes to addressing the existing literature gap by offering a detailed examination of the implications of AI tools like ChatGPT, guided by established theoretical frameworks. Through this research, we aim to provide valuable insights that can inform educational policy and practice, ensuring that the benefits of AI are fully realized while its challenges are effectively managed.

3. Methodology

This study examines the integration and impact of ChatGPT in the educational environment of Vietnam's Ho Chi Minh City University of Technology and Education (HCMUTE) within the context of the Industrial Revolution 4.0. To gain a thorough understanding of this phenomenon, the research employs a mixed-methods approach, combining both quantitative and qualitative research methodologies. This approach allows for an in-depth investigation of the complex relationship between the use of digital technology, particularly ChatGPT, and its effects on students' learning behaviors, academic performance, and overall educational experience.

3.1. Participants

The study sampled first and second-year students from Ho Chi Minh City University of Technology and Education (HCMUTE). A stratified random sampling method was used to ensure representation across various faculties and departments. The stratification criteria included academic year, major, and previous exposure to digital tools, aiming to diversify the sample to reflect varying levels of familiarity and engagement with AI tools like ChatGPT. The total sample size was determined to be 73 students, based on the institution's student population and the practical considerations for qualitative depth in follow-up interviews. Additionally, 15 faculty members were selected using purposive sampling to gain insights from experienced educators on the integration of ChatGPT in their teaching practices.

3.2. Instruments

Two primary instruments were used:

a) **Surveys:** Distributed electronically, the surveys consisted of Likert-type scale questions, multiple-choice questions, and open-ended questions to assess students' usage, perceptions, and the perceived impact of ChatGPT on students' learning.

b) **Semi-structured Interviews:** Conducted with selected faculty members to explore deeper insights into the academic integration of ChatGPT and perceived educational outcomes.

3.3. Procedures

The data collection period was planned meticulously to ensure comprehensive coverage and accuracy of the findings.

3.4. Data Analysis

a) *Quantitative Data Analysis*: Initial analysis involved computing frequencies, means, and standard deviations for all quantitative survey items to understand basic trends and distributions in the data.

b) *Qualitative Data Analysis*:

Coding Process: Audio-recorded interview data were transcribed verbatim and subjected to thematic analysis. Initial codes were generated, and data were categorized into themes to represent faculty perspectives on the educational implications of ChatGPT.

Validation: To ensure reliability, a second researcher independently coded a subset of the data. Discrepancies were discussed and resolved by consensus, enhancing the confirmability of the thematic outcomes.

c) *Analysis Techniques*: All quantitative data analyses were conducted using IBM's SPSS (Statistical Package for the Social Sciences), which facilitated complex statistical testing, including regression and factor analyses.

3.5. Ethical Considerations

Ethical approval was obtained from the university's research ethics board. Participants were informed about the study's purpose, their rights, including withdrawal without penalty, and measures taken to ensure confidentiality and anonymity of their responses.

This mixed-methods research methodology was crafted to offer a comprehensive view of ChatGPT's impact on students at HCMUTE. By integrating quantitative and qualitative data, the study sought to provide valuable insights into the effective integration of AI tools in educational settings, highlighting both the opportunities they offer and the challenges they present.

4. Results and Discussion

The integration and utilization of ChatGPT in educational settings have brought about both opportunities and challenges. This section delves into the findings from various studies, focusing on the adoption and impact of ChatGPT among students at Ho Chi Minh City University of Technology and Education (HCMUTE), the reliability of information provided by ChatGPT, the purposes for which students use ChatGPT, and the broader implications and ethical considerations of its usage.

4.1. ChatGPT Accessibility

Ever since its launch on November 30, 2022, ChatGPT has become incredibly popular with consumers. In just 2 months after its launch, ChatGPT had over 100 million users, making it one of the fastest-growing consumer software products ever, according to Silverman et al. (2023). The quick uptake of ChatGPT highlights the growing need for AI-driven solutions that offer creative and intuitive user experiences in a range of industries. A new age of ubiquitous AI use is heralded by models such as ChatGPT, which represent a considerable development in AI capability (Silverman et al., 2023). The students in the current study's research sample learned about ChatGPT from a variety of information sources. In particular, 68 students, or 93.2%, found out about ChatGPT via social media platforms; 64 students, or 87.7%, found out through the media; 41 students, or 56.2%, through friends; 28 students, or 38.4%, through the press; 16 students, or 21.9%, found out through the university; 16 students, or 21.9%, through applications and other services; and 10 students, or 13.7%, found out about ChatGPT through friends.

4.2. Utilization Period

Based on the findings of our poll, the majority of students (66.7%) used ChatGPT for no more than 15 to 20 minutes every day, whereas 21.1% used it for between 30 and 60 minutes, and 12.2% of students used it for 2 hours or longer.

4.3. Accuracy of Data Obtained from ChatGPT

The ChatGPT software has gained widespread popularity very quickly, and has been utilized by many students, both in general and at Ho Chi Minh City University of Technology and Education. Nonetheless, there have been a number of problems reported in how students have been making use of ChatGPT. In order to find out more, the team quickly polled students on their usage of ChatGPT. The results indicated that 74.5% of the study sample's students had utilized the app, while 25.5% had not. This outcome demonstrates how common ChatGPT's usage has become and its use for educational purposes.

Up to 64.4% of students in the survey sample believe that the information offered by ChatGPT varies from trusted to completely trustworthy when it comes to the information's dependability on looking for ideas or recommendations for learning reasons. Meanwhile, 12.3% (nine students) offered no opinion, and 23.3% of the students did not believe in the use of ChatGPT to varying degrees (see Figure 1). This suggests that students view ChatGPT as a tool for idea searching, assignment completion, and learning support; in other words, they view it as a way for students to find information faster than they would otherwise do so by relying on ChatGPT rather than investigating information through traditional, trustworthy channels.

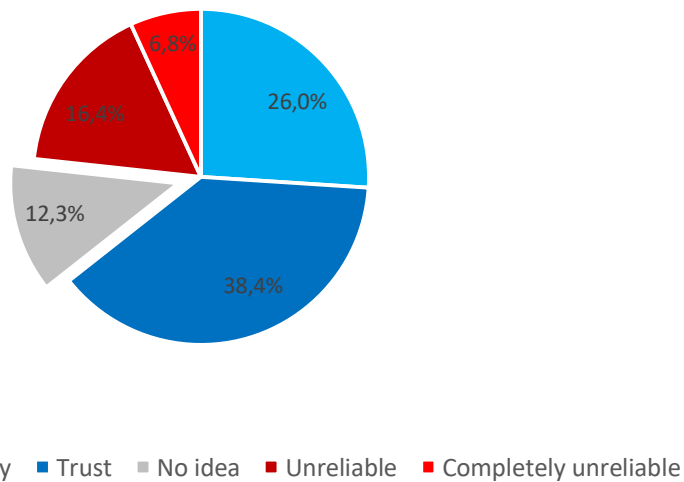


Figure 1. Student trust levels in ChatGPT information reliability at HCMUTE

4.4. Purpose of ChatGPT Usage

Most students used ChatGPT to aid their studying, with the highest response rates of 82.2% for learning and 75.3% for information searching. Next, aspects of personal work also accounted for quite high proportions, with 43.8%, 35.6%, and 32.9%, for problem solving, text editing, and content creation, respectively. Only a very small proportion (9.6%, seven students) used ChatGPT for other purposes (see Figure 2). This shows the significant influence of ChatGPT on learning of the students surveyed at HCMUTE.

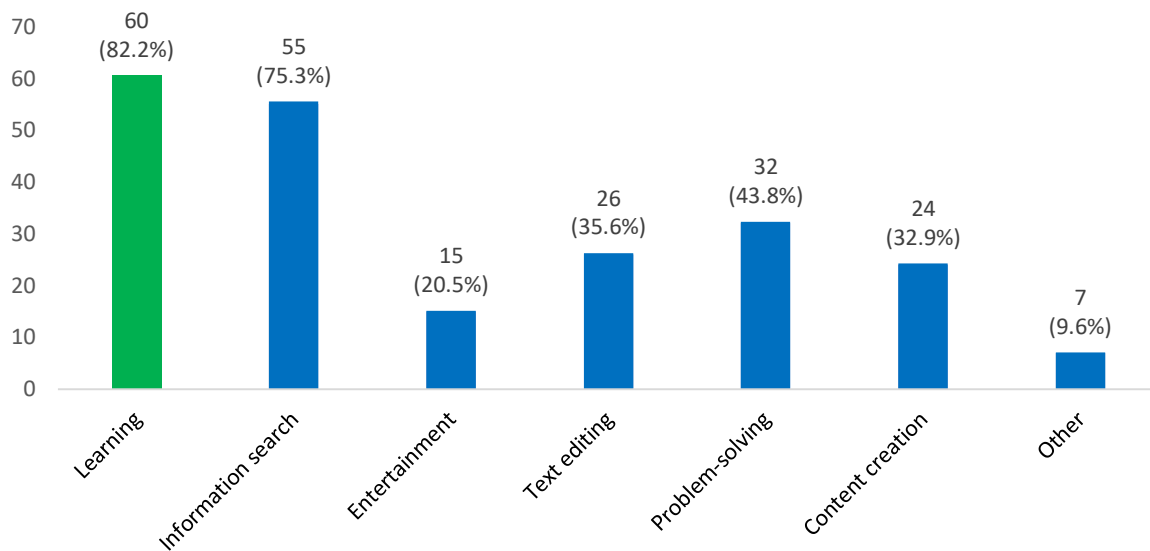


Figure 2. Purposes of ChatGPT usage among HCMUTE students

ChatGPT has gained significant recognition for its extensive features and utilities, including a user-friendly interface and compatibility with both laptop and mobile devices. It enables users to quickly and effectively address questions, access diverse and rich information, reduce costs and time, and enhance work productivity. ChatGPT also serves as a reliable reference channel for solving problems in both everyday life and learning contexts.

The survey conducted among 73 students at HCMUTE revealed varied uses of ChatGPT. A majority of the students (58.9%, 43 students) found ChatGPT to be useful for quickly summarizing lesson content or issues through suggestions. Additionally, 54.8% (40 students) utilized ChatGPT for idea development and content creation. The ChatGPT product was also employed by the students for the correction of spelling errors and information checking (31.5%, 23 students), while 45.2% (33 students) used it for translation purposes. Furthermore, 38.4% (28 students) used ChatGPT for language learning and 54.8% (40 students) referred to it for building solutions and recommendations. Lastly, 21.9% or 16 of the students used ChatGPT for entertainment purposes. These findings underscore the multifaceted application of ChatGPT in enhancing educational experiences and everyday tasks.

4.5. Access to ChatGPT

The use of ChatGPT is being encouraged more and more in learning environments to help improve the integration and application of digital technologies in teaching and learning in today’s open university education environment. This move is expected to help students access information and study materials more easily, improve their ability to learn on their own, develop their creative abilities, and learn new things faster. As previously mentioned, ChatGPT facilitates information searches, question-answering, and even discussions of topics pertaining to academic subjects for students. Throughout the learning and research process, this can help individuals save considerable time and also improve their knowledge. The usage of ChatGPT as a resource for students seeking information and career help is another advantageous outcome. It can assist students in researching different career paths, employment requirements, and offer guidance on how to further their career following graduation from higher education.

ChatGPT is not only considered useful for education, but it can also be used for entertainment purposes. After long study sessions, students might engage in lighthearted conversation with the app about subjects unrelated to their studies in order to decompress. According to the results of our poll, 15 respondents (20.5% of the sample) had used ChatGPT for amusement purposes.

In particular, ChatGPT has been used at Columbia University in the United States to develop interactive exercises for a course entitled “Critical Thinking,” with students tasked with being able to think critically and analytically in various exercises. Students must therefore think critically and rationally before expressing their thoughts on the use of ChatGPT. Their usage can also enhance their communication and writing abilities, which may aid both their academic and professional futures. Stanford University’s “Academic English” course leverages ChatGPT to generate customized tests as a means to evaluating students’ grammar and writing abilities. ChatGPT has also been used by Harvard University to provide study guides for a “World History” course, with the aim being to provide students with a deeper comprehension of historical events (Poellhuber et al., 2024). According to the survey applied in the current study, 67.1% of the students believed that their teachers supported the use of ChatGPT to look up information or consult problem-solving techniques during class. Compared to traditional approaches, this creative and inventive approach to learning fosters a more proactive and positive attitude towards learning. As a result, it encourages a number of positive qualities that students today are skilled in, particularly in employing new technologies such as ChatGPT to conduct information research, in locating pertinent content, and for solving problems.

4.6. Negative Impacts of Using ChatGPT

While ChatGPT offers numerous benefits to students, it also presents several challenges that need careful consideration. A significant concern is the potential for students to become overly dependent on the tool when searching for information and answering questions, rather than engaging in independent thought and comprehension. Our study found that 83% of surveyed students believed that this overreliance on technology impedes their ability to solve tasks independently. Additionally, 76% of respondents indicated that the misuse of ChatGPT hampers the development of communication, critical thinking, and opinion exchange skills, leading to a more passive approach to learning. Consequently, 56% of students felt that this dependency reduced their ability to conduct independent research, thereby negatively affecting their capacity for creative thinking and self-learning, and making it more difficult to critically evaluate information.

Furthermore, 46% of the surveyed students noted that ChatGPT’s capacity to generate consistent answers could reduce differentiation among students. This reliance on AI-generated responses could diminish students’ creative thinking and problem-solving abilities. With easy access to ChatGPT, students may prefer using the tool to find solutions to their learning problems rather than delving deeply into concepts and then forming their own opinions. This trend towards laziness and superficial engagement with study material has been observed globally, where students have misused ChatGPT for tasks like essay writing, math problem solving, and in plagiarism (Bains, 2023). A survey by Intelligent magazine revealed that about 60% of university students use chatbots for over half of their assignments, with 30% specifically using ChatGPT for essay writing support (Bains, 2023). Academic dishonesty, including plagiarism and cheating, is a widespread issue (Baran & Jonason, 2020), influenced by personality traits, attitudes towards rules, and self-efficacy (Eshun et al., 2023; Wang & Zhang, 2022). COVID-19 further exacerbated these issues by increasing opportunities for unethical behaviors during long periods of online learning when face-to-face teaching was largely withdrawn at the height of the pandemic (Kohen-Vacs et al., 2021).

In addition to academic dishonesty, ethical concerns have arisen regarding the use of ChatGPT. Our research showed that 93% of students we surveyed believed that ChatGPT tends to produce similar answers or ideas among users, which can lead to violations of citation and source attribution principles. For instance, the Chinese University of Hong Kong implemented measures to detect AI use in assignments, considering unauthorized use as plagiarism (Nguyen, 2023). In Russia, a student even used ChatGPT to complete a graduation thesis in just 23 hours, sparking calls for restrictions on AI usage within educational institutions due to concerns over academic integrity (Tam, 2023).

Information security is another critical issue, with 71% of students worried about potential privacy and network security breaches. Moreover, 47% of students expressed concerns about the accuracy and verifiability of information provided by ChatGPT. Since ChatGPT generates content from large datasets, there is a risk of producing inaccurate or unreliable information. This issue was highlighted when a man in China was arrested for using ChatGPT to create fake news, leading to significant legal consequences (Kharpal, 2023).

Our research findings revealed that 74.5% of students believed that ChatGPT reduced their creativity and critical-thinking abilities, making them dependent on the tool. Additionally, 62.7% expressed concerns about data control, whilst 52.9% noted that the information received back from ChatGPT can sometimes be inaccurate.

In conclusion, while ChatGPT has become an integral part of students' learning experiences, it has also introduced certain challenges that need to be properly managed. Overreliance on the use of ChatGPT can hinder students' independent learning and critical-thinking skills, and ethical issues such as academic dishonesty and information security must be addressed proactively by educators and policymakers.

4.7. Comparative Analysis with Other Studies

The rapid adoption of ChatGPT in educational contexts, as evidenced by the high usage rates and multifaceted applications among students at the Ho Chi Minh City University of Technology and Education (HCMUTE), highlights both the potential and challenges of integrating AI technologies in learning environments. This analysis compares findings from the current study on ChatGPT with insights drawn from other significant research conducted on educational technology leadership and AI integration in schools.

4.8. Technology Leadership in Education

Davies (2010) explored the evolving role of technology leadership in schools, emphasizing that effective leadership is more about the reorganization of teaching processes rather than the teaching itself. Davies points out the need for clear definitions and models for technology leadership, highlighting gaps in the literature at that time. This contrasts with the practical applications and student interactions with ChatGPT as detailed in the current study. While ChatGPT is user-driven, Davies' focus was on leadership and structural organization within educational institutions.

Similarly, Alenezi (2016) examined technology leadership through learning resource centers (LRCs) in Saudi Arabia. The study underscored the necessity of standardized technology leadership to effectively implement ICT reforms. Both Alenezi's study and the findings of the current research on ChatGPT emphasize the importance of structured technology integration, though Alenezi focused more on institutional leadership, whereas the current study on ChatGPT reflects a more decentralized, student-driven technology adoption.

4.9. AI in Education

Pham and Sampson (2022) and Peng et al. (2023) discussed the integration of AI in education from broader perspectives, stressing the importance of teacher preparation and the enhancement of students' thinking skills through AI applications. Both these studies align with the HCMUTE findings of the current study regarding the multifaceted use of ChatGPT for idea development, content creation, and language learning. Both of the aforementioned studies recognized the need for bridging the gap between rapid AI advancement and educational practices, though Pham and Sampson (2022) provided a more global view, while Peng et al. (2023) focused on primary and secondary education in China.

Ghamrawi et al. (2023) delved into the impact of AI on teacher leadership, revealing both expansion and regression in teacher roles. The dual nature of AI's impact –enhancing personalization

and curriculum development while potentially narrowing teacher roles— parallels concerns in the current ChatGPT study regarding overreliance on technology and its impact on independent thought and critical thinking.

4.10. Recent Trends and Challenges

Demirkol and Malkoc (2023) highlighted the growing scientific interest in ChatGPT, noting the shift from general AI discussions to specific applications of large language models (LLMs) like ChatGPT. Their findings on the emergent themes of plagiarism and research ethics resonate with the ethical concerns raised in the current ChatGPT study applied at HCMUTE. Both studies underscore the need for ongoing research to address these challenges, whilst maximizing the benefits of AI technologies in education.

Karakose and Tülübaş (2023, 2024) emphasized the transformative potential of ChatGPT and other AI technologies in education, advocating for maximizing benefits while mitigating risks through proper guidance and awareness. Their argument for a digital-friendly ecology in schools to support AI integration aligns with the practical recommendations from the current study, which calls for the proactive management of ChatGPT usage in order to avoid overreliance and to promote ethical practices in education.

4.11. Comparative Insights

Leadership and Structure: Davies (2010) and Alenezi (2016) focused on institutional leadership and structured technology integration, while the ChatGPT study highlights a more organic, student-driven adoption. This difference underscores the need for balanced approaches that incorporate both top-down leadership and grassroots innovation.

- *Teacher Roles and Preparation:* The impact of AI on teacher roles, as discussed by Pham and Sampson (2022), and also Ghamrawi et al. (2023), revealed a complex dynamic where AI can both enhance and diminish teacher leadership. The current study's findings on student overreliance on technology reflect similar concerns about maintaining a balance between AI assistance and independent learning.
- *Ethical and Practical Challenges:* Both the study by Demirkol and Malkoc (2023) and findings from the current research highlighted significant ethical concerns, such as plagiarism and data security. These challenges necessitate comprehensive guidelines and continuous research in order to ensure that AI technologies are used responsibly and effectively within the education context.
- *Future Directions:* The emphasis placed by Karakose and Tülübaş (2023, 2024) on preparing educational ecosystems for AI integration aligns with the practical implications of the current study. The consensus advocates for creating supportive environments that foster the positive aspects of AI while addressing its inherent risks.

The comparative analysis reveals that while the rapid adoption of ChatGPT offers numerous educational benefits, it also introduces challenges that mirror broader trends in educational technology integration. Effective leadership, balanced teacher roles, ethical guidelines, and supportive ecosystems are crucial in order to harness the full potential of AI in education. By learning from diverse studies, educators and policymakers can develop strategies to optimize AI's positive impacts while mitigating its risks.

4.12. Study Limitations

One of the main limitations of the current study is the relatively small sample size of 73 students, which may not fully represent all student experiences with ChatGPT at HCMUTE or in other Vietnamese universities. Additionally, the study focused exclusively on a single higher education

institution, which may limit the generalizability of the findings to other educational settings, both within and outside of Vietnam. The study was conducted over a short period, which may not adequately capture long-term effects and adaptations to the use of ChatGPT in educational settings. Longitudinal studies could therefore be used in the future to provide a more comprehensive insight into the sustained impact of ChatGPT usage on learning behaviors and academic integrity. While the mixed-methods approach used in the current study provided a balanced exploration of the topic, reliance on self-reported data has the potential to introduce certain biases, particularly in areas sensitive to social desirability such as admissions of academic dishonesty. Additionally, the quantitative analysis might benefit from more sophisticated statistical techniques in order to explore deeper relationships and potential causations rather than rely upon correlations.

4.13. Novelty Added to the Literature

The current study contributes novel insight to the literature by focusing on the impact of AI tools within a Vietnamese educational setting, a context that is often underrepresented in global AI education research. The study addressed cultural, technological, and pedagogical nuances specific to Vietnam, offering a valuable perspective that will enrich the global discourse on educational technology. By exploring both the benefits and challenges of ChatGPT, including its impact on academic integrity, the study adds to the relatively sparse literature on the ethical implications of AI tools in education. It provides empirical evidence on how such technologies can influence student behavior and academic practices, contributing to ongoing debates about the best practices for integrating AI into educational settings. The study innovatively applies two theoretical frameworks (TAM and Cognitive Load Theory) specifically to the use of AI in education. This interdisciplinary approach not only bridges gaps between technology acceptance models and educational theory, but also demonstrates how these frameworks can be adapted to better understand new technologies like ChatGPT.

5. Conclusion

In summary, the current study investigated the integration and impact of ChatGPT on student learning behaviors at Ho Chi Minh City University of Technology and Education (HCMUTE) in Vietnam, within the context of the Industrial Revolution 4.0. The study's findings clearly demonstrate that ChatGPT has become widely adopted by HCMUTE students, with a significant majority using it for educational purposes, particularly for learning and information searches. Notably, most students reported using ChatGPT for only brief periods daily, indicating a pattern of frequent but short-duration interactions.

Furthermore, the study revealed that a substantial proportion of students perceive the information provided by ChatGPT as reliable and useful for academic tasks such as idea generation, assignment completion, and language learning. This suggests that ChatGPT is viewed as a valuable tool by students to enhance their educational outcomes by providing quick and accessible information.

Moreover, ChatGPT has a notable impact on student learning behaviors, as evidenced by the high percentage of students using it to summarize lesson content, develop ideas, and to check information accuracy. However, there were concerns raised about an overreliance on ChatGPT, which may impede independent thinking and critical evaluation skills in students.

Additionally, the study highlighted several challenges associated with ChatGPT usage, including the potential for academic dishonesty, as well as reduced creativity and critical thinking. Ethical concerns such as plagiarism, information accuracy, and data privacy were also prominent among the students' concerns. These issues necessitate the development of stringent policies and guidelines to ensure responsible use of AI tools in educational settings.

It is also worth mentioning that faculty members at HCMUTE recognized the clear benefits of using ChatGPT to enhance teaching and learning processes. However, they also emphasized the need for balanced integration, ensuring that students develop independent problem-solving skills alongside their use of digital tools.

Importantly, the study's limited sample size and focus on a single institution suggest that further research is needed in order to generalize the findings across different educational contexts. Longitudinal studies could provide deeper insights into the long-term effect of using ChatGPT on learning behaviors and academic integrity.

In conclusion, the current study underscores the dual-edged nature of ChatGPT's integration into education, highlighting the need for a balanced approach that maximizes its benefits while mitigating the potential risks. This research contributes valuable insight that will help to inform policymakers, educators, and technology developers on the best practices for integrating AI tools within the education context, ensuring that technological advancements serve to enhance, rather than hinder, the educational experiences of students in Vietnam and beyond.

6. Suggestions

The findings of the current study on the integration of ChatGPT at Ho Chi Minh City University of Technology and Education (HCMUTE) contribute significant insights into the immediate impacts and potential challenges of using AI tools in educational settings. However, as AI technologies continue to evolve and become more embedded in educational processes, it is crucial to extend research efforts in order to understand the longer-term implications of their use and to establish robust frameworks for their ethical application. This section outlines several key suggestions for future research directions and policy development in order to ensure that AI tools like ChatGPT are utilized effectively and ethically within educational settings globally and within Vietnam.

6.1. Explore Long-term Impacts of AI Tools

- *Longitudinal Studies.* Future research should include longitudinal studies to assess the long-term impacts of AI tool usage on student learning outcomes, engagement, and academic integrity. Such studies could help in understanding how continuous and prolonged use of AI affects learning habits, cognitive development, and motivation among students. Longitudinal data can provide deeper insights into the progressive changes in educational dynamics influenced by AI and help in distinguishing between short-term trends and lasting impacts.

- *Diverse Educational Contexts.* It is essential to conduct studies across a variety of educational settings and disciplines in order to be able to generalize findings and tailor AI integration strategies accordingly. Research should explore how different fields, such as STEM versus the humanities, respond to and benefit from AI tools, considering the specific needs and challenges of each discipline.

- *Cultural Considerations.* Given the cultural nuances in educational practices, studies should also consider how cultural contexts influence the acceptance and effectiveness of AI tools. Research focused on diverse geographic and cultural settings can illuminate how local values and norms impact the integration of AI in education.

6.2. Develop Comprehensive Guidelines for Ethical Use

- *Ethical Frameworks.* The development of comprehensive ethical frameworks could help guide the use of AI tools in education. Such frameworks should address concerns related to equity, privacy, transparency, and accountability. Guidelines should ensure that AI tools are used to enhance educational fairness and inclusivity, such as by providing equal access to AI resources and preventing biases in AI algorithms.

- *Policy Recommendations.* Based on empirical research findings, policy recommendations should be formulated for educational institutions and governments. These policies should regulate

the use of AI tools to prevent academic dishonesty and ensure that students develop essential skills independently. Policies should also encourage the use of AI for pedagogical enhancement rather than replacement of human interaction and traditional learning methods.

- *Training Programs.* Training programs should be established for both educators and students on the ethical use of AI in educational settings. Such programs should educate stakeholders about the benefits and risks associated with AI tools, promote best practices, and to foster a culture of integrity and critical engagement with technology.

- *Stakeholder Engagement.* Various stakeholders, including students, educators, administrators, and technologists, should be engaged in the development of guidelines and policies on the ethical use of AI in educational settings. This collaborative approach will help ensure that the guidelines are practical, culturally sensitive, and widely accepted and adopted.

Declarations

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