

Impact of Generative Artificial Intelligence (ChatGPT) on Students' Critical Thinking Skills and Academic Integrity in Higher Education

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Abstract

Generative Artificial Intelligence (AI) tools, such as ChatGPT, are increasingly integrated into higher education. While these tools offer convenience and learning support, concerns exist regarding their impact on students' critical thinking skills and academic integrity. This study investigates the influence of ChatGPT usage on university students' cognitive and ethical outcomes, focusing on critical thinking and adherence to academic integrity. A quantitative research design was employed, surveying 250 undergraduate and postgraduate students. Data were collected using a structured Likert-scale questionnaire covering ChatGPT usage, critical thinking, and academic integrity. Reliability was confirmed via Cronbach's alpha, and analyses included descriptive statistics, correlation, regression, and comparative analyses using SPSS and R software. Findings indicate that most students engage moderately with ChatGPT. Critical thinking skills were moderately developed, whereas academic integrity remained high overall. Regression analysis revealed a significant negative relationship between ChatGPT usage and both critical thinking ($\beta = -0.32$) and academic integrity ($\beta = -0.28$). Comparative analyses showed no significant differences across gender or academic level. While ChatGPT can enhance learning efficiency, excessive reliance may adversely affect cognitive and ethical outcomes. Educators and institutions should implement structured guidelines, AI literacy programs, and pedagogical strategies to promote responsible usage.

Keywords: ChatGPT, Critical Thinking, Academic Integrity, Higher Education, Generative AI

Introduction

Background of the Study

Over the past few years, the fast development of artificial intelligence has dramatically changed many industries, education being one of them. The most significant trend in this field has been the creation of generative artificial intelligence applications like ChatGPT which can create human-like text, solve problems, and facilitate learning. These tools have been greatly used by students in higher learning institutions to accomplish their academic tasks including assignment completion,

idea generation and learning intricate concepts. Although these technological advances have many advantages to improving accessibility and efficiency in learning, there are also significant issues about the impact of these technologies on cognitive growth and moral conduct of students. It is well known that critical thinking is one of the key higher education skills allowing students to analyze information, evaluate arguments, and form independent judgment. Nevertheless, the increased use of AI applications such as ChatGPT can potentially decrease the involvement of students in the deep thinking process since they can rely on the answers presented by the programs rather than build the knowledge on their own. Simultaneously, the application of generative AI brings new issues of academic dishonesty, such as plagiarism, cheating, and the inability to identify the original work and the AI-generated content. The issues have raised continuous arguments among teachers, policy-makers and scholars on how AI should be used in schools. Besides, the implementation of ChatGPT in the learning setting is indicative of an overall move toward online learning and education technology. The availability of internet resources, and the requirement of flexible learning solution has increased the pace of this change. Although there are researches stating that AI tools have the potential to improve learning and facilitate individual education, others emphasize the dangers of abuse and over-reliance. This is why it is necessary to analyze the influence of ChatGPT on students in terms of their critical thinking abilities and compliance with academic honesty in universities with a critical approach.

Problem Statement

Although ChatGPT has become especially popular among university students, there is a paucity of empirical research on the effect of ChatGPT on critical thinking abilities and academic integrity. Students apply AI tools in doing their assignments and other academic activities without gleaning a clear insight into the possible implications on their learning activities. This also brings into question the fact whether the use of ChatGPT is improving the intellectual performance of students or it is inhibiting their ability to think critically and in a way on their own. Also, the availability of AI-generated content has caused novel types of academic dishonesty that are hard to identify with the help of conventional means. Learning institutions are finding it hard to design powerful policies and guidelines to tackle these issues. This leaves an urgent necessity to explore the impact that ChatGPT has on the behavior of the students, especially regarding their critical thinking skills and ethical studies.

Research Objectives

The main aim of the research is to analyze how ChatGPT influences the ability of students to think critically and their academic integrity at the university level. Specifically, the paper will analyze the extent of the academic task turnover to ChatGPT, the comprehension of its influence on the critical thinking, and the establishment of its effects on academic dishonesty. Furthermore, the study will be targeted towards exploring the perspectives of the students regarding the use of AI technology in education and what threats and opportunities might be associated with their use.

Research Questions

RQ1: What is the extent of ChatGPT usage among students in higher education?

RQ2: How does the use of ChatGPT affect students' critical thinking skills?

RQ3: What is the relationship between ChatGPT usage and academic integrity among students?

RQ4: Does the use of ChatGPT contribute to academic dishonesty (e.g., plagiarism, cheating)?

RQ5: How do students perceive the role of ChatGPT in their learning process?

RQ6: Are there significant differences in ChatGPT usage based on demographic factors such as gender and academic level?

RQ7: To what extent does reliance on ChatGPT reduce independent learning and problem-solving abilities?

Research Hypothesis

H1: There is a significant relationship between ChatGPT usage and students' critical thinking skills.

H0₁: There is no significant relationship between ChatGPT usage and students' critical thinking skills.

H2: ChatGPT usage has a significant impact on students' academic integrity.

H0₂: ChatGPT usage has no significant impact on students' academic integrity.

H3: Increased use of ChatGPT is associated with a decrease in students' critical thinking abilities.

H0₃: Increased use of ChatGPT is not associated with a decrease in students' critical thinking abilities.

H4: Increased reliance on ChatGPT leads to higher levels of academic dishonesty.

H0₄: Increased reliance on ChatGPT does not lead to higher levels of academic dishonesty.

H5: There is a significant difference in academic integrity between students with high and low ChatGPT usage.

H0₅: There is no significant difference in academic integrity between students with high and low ChatGPT usage.

Significance of the Study

The research has a strong relevance to the current situation in the field of educational technology when the number of applications of artificial intelligence devices including ChatGPT in higher education grows rapidly. To teachers, the research offers important lessons on the impact of generative AI on the learning mechanisms of the students, especially, their critical thinking skills and moral academic conduct. Such insights can be used to guide teachers to reform instruction, assessment, and classroom practices to enhance active learning and limit overutilization of AI tools. To policymakers and institutions of higher learning, the discovery of the study provides a significant basis in coming up with aggregated policies, codes of ethics, and regulations that govern application of AI within academic institutions. With the increasing number of related concerns about academic dishonesty and abuse of AI-based tools, the present study can provide evidence-based suggestions that allow us to make sure the latter is introduced in a responsible and ethical way. In the view of the students, the study is significant in terms of creating awareness on the benefits of the use as well as the risk of ChatGPT. It promotes a balanced and responsible attitude among learners, encourages independent thinking and academic honesty and uses AI as a means of facilitation of learning and not as a substitute instead of the effort. Moreover, the current study is relevant to the existing literature as it considers a rather under-researched field in the sphere of higher education, psychology, and artificial intelligence in education. It addresses a critical gap of research, as it provides an empirical study of the dual effect of generative AI on cognitive abilities and academic dishonesty, thus, it provides grounds to future academic research.

Scope and Limitations

This study is limited in terms of the coverage of students who study at institutions of higher learning and more precisely, use ChatGPT as a study tool. The study mainly explores two major variables namely the ability of the students to think critically and academic honesty. It seeks to examine the impact of the use of generative AI tools on these dimensions in the present-day digital learning setting. The study is limited to some extent despite its contributions. To begin with, self-reported questionnaires are used to collect the data, meaning that there might be a response bias in data collection, the presence of social desirability bias, and misperceptions and inaccuracies in the perceptions and reporting by participants. Second, the research is carried out in a particular population and a geographical or institutional location and this could restrict the generalizability of the results to other learning institutions or geographical areas. Also, the researchers only consider ChatGPT as a symbol of AI tools in general, and other emerging technologies based on

AI are not discussed in detail. The cross-sectional design of the study also limits the possibility to make time-relationships of causal relationships. Still, these constraints notwithstanding, the study helps to gain valuable and timely information on the effect of generative artificial intelligence on student learning behavior and ethical practices which provides a solid foundation to conduct additional research and policy formulation in the emerging field.

Literature Review

The introduction of artificial intelligence (AI) rapidly has also introduced revolutionary changes in the education sector, especially higher education. Generative AI tools like ChatGPT have made a considerable impact on the world of teaching and learning. This chapter presents the literature available on the field of artificial intelligence in education, the application of generative AI in learning, critical thinking, academic dishonesty, and the overall impact of technology on student behaviors. It also reveals the gap in the research and outlines the theoretical as well as conceptual framework that will guide this research.

AI and Education.

During recent years, it has become more and more popular that the concept of Artificial Intelligence in Education (AIEd) can be used to improve the quality of teaching and learning. AI systems facilitate learning that is personalized, adaptive, and intelligent tutoring that can address the needs of individual students (Holmes et al., 2019; Luckin et al., 2016). These systems have the ability to process large quantities of information in order to offer real-time feedback and assist students to learn in unconventional ways. Zawacki-Richter et al. (2019) note that such AI applications in higher education are mainly applied to profiling and prediction, intelligent tutoring, and assessments automation. On the same note, Baker and Inventado (2014) noted that AI has the potential to enhance student engagement and retention through the provision of personalized learning experiences. Nevertheless, in spite of these positive issues, people are still concerned about ethical considerations and overdependence of AI technologies (Selwyn, 2019).

ChatGPT and Generative AI in Learning.

Generative AI is a novel field in the educational technology that allows machines to create content in a human manner, including text, images, and code. The ChatGPT is a tool designed by OpenAI, which has become one of the most popular among students to assist with academic purposes. It may help to complete writing assignments, describe ideas, and generate them, which improves learning efficiency (Dwivedi et al., 2023). It has been shown that ChatGPT can be used as a useful educational resource, stimulating interactive learning and allowing immediate feedback (Kasneji et al., 2023). As it was emphasized by Cotton et al. (2023), students view ChatGPT as a resource that allows them to accomplish academic tasks more easily, especially when it comes to enhancing the quality of written work and comprehending complicated issues. Nevertheless, other researchers question the possibility of its future abuse, such as plagiarism and less cognitive work (Susnjak, 2022; Rudolph et al., 2023). Moreover, the introduction of generative AI in education has raised some questions concerning the potential long-term effects of the application on the outcome of learning. Some researchers claim that it makes the work more productive and accessible, whereas others caution that it can destroy fundamental skills (critical thinking, problem-solving, etc.) (Baidoo-Anu and Owusu Ansah, 2023).

Critical Thinking Skills

Critical thinking is one of the competencies in higher education that is considered a fundamental component of analyzing information, evaluating evidence, and making informed decisions. Facione (1990) describes critical thinking as a cognitive process, which is associated with interpretation, analysis, evaluation, and inference. It is also referred to as thinking that is reflective

and reasonable and is aimed at making decisions on what to believe or do as postulated by Ennis (2011). Educational theories explaining the development of critical thinking include Bloom taxonomy which focuses on higher-order thinking abilities such as analysis, synthesis and evaluation (Bloom, 1956). Another concept that is put across in constructivist theory of learning is the fact that students are the ones who construct knowledge by engaging and reflecting (Piaget, 1972; Vygotsky, 1978). Nevertheless, there is the possibility that the use of AI tools increasingly can affect the cultivation of these competencies. Research recommends that over dependence on technology may actually minimize the capacity of the students to learn and think independently (Carr, 2010; Kirschner and De Bruyckere, 2017). Within the framework of ChatGPT, it has been emphasized that students will skip the critical thinking process to get answers provided by AI (Rudolph et al., 2023).

Academic Integrity

Honesty, trust, fairness, respect, and responsibility are major principles in academic integrity, which is a core value of a higher education (International Center for Academic Integrity, 2021). Academic dishonesty involves plagiarism, cheating and unauthorized intercourse. The advent of digital technologies is a problem that has brought up new issues regarding academic integrity. Bretag (2016) explains that online learning platforms expose students to the threat of academic dishonesty because of the easy access to information. Likewise, Eaton (2020) observed that ghostwriting service and contract cheating have now increased in the digital age. This problem is even complicated by the introduction of generative AI tools like ChatGPT. These applications are capable of creating unique content that can sidestep the conventional plagiarism detection software (Susnjak, 2022). Consequently, teachers have challenges in assessing student versus AI work (Cotton et al., 2023).

Effect of Technology on Learning Behavior of the students.

Technology has greatly transformed the learning behavior of students in that it has facilitated flexibility, accessibility, and collaborations. Digital learning platforms and the internet resources have allowed students to study at their own pace and get information on various sources (Means et al., 2014). Nevertheless, technology may also be negatively used. Studies by Carr (2010) are of the opinion that over use of the digital tools can lead to a shortening of attention span and critical thinking skills. On the same note, Kirschner and De Bruyckere (2017) hold that students can also form shallow learning practices because of the ready availability of information. These issues are exaggerated in the AI context. Although such tools as ChatGPT could make the learning process more efficient, they can also contribute to addiction and lower the motivation to solve the problems on your own (Baidoo-Anu and Owusu Ansah, 2023).

Previous Studies on ChatGPT

The recent literature has addressed the issue of the role of ChatGPT in education and outlined its advantages and disadvantages. In the study by Kasneci et al. (2023), ChatGPT also has the potential to facilitate individualized learning and enhance student engagement. In the same vein, Dwivedi et al. (2023) pointed to the fact that it can be used to transform educational practices. Conversely, Susnjak (2022) cautioned that high-quality academic content could be produced using ChatGPT, which has become a cause of concern on academic dishonesty. Rudolph et al. (2023) also mentioned that the tool can negatively affect traditional evaluation methods and necessitate new ways of evaluation. In a study by Cotton et al. (2023), students expressed their perceptions of ChatGPT and discovered that despite the fact that most students find the tool convenient, they have heard about its ethical consequences. These contradictory results emphasize the necessity of the research to be conducted to comprehend its general effect on education.

Research Gap

Although the literature regarding AI in the educational field is growing, there is still no empirical study that would investigate the effects of ChatGPT on critical thinking abilities and academic integrity at the same time. The available literature concentrates on the positive aspects of AI tools or moral aspects, but there are few attempts to analyze it in terms of both effects. Also, not much studies have been done in the context of the developing nations, where the availability of technology and learning materials can vary greatly. The study will help fill these gaps by offering empirical evidence to the extent to which ChatGPT affects student learning behavior and ethical habits in higher education.

Figure 1. Conceptual Framework

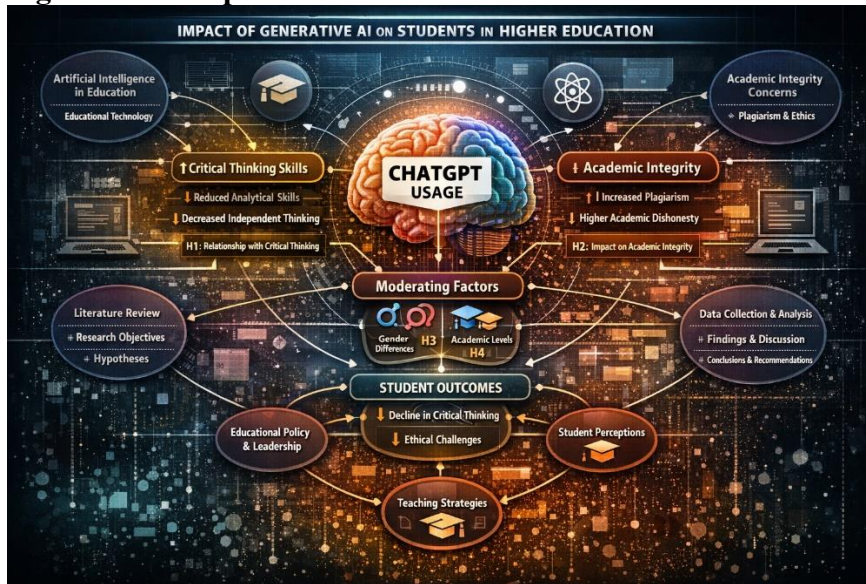


Figure 2 represents the conceptual framework of the study that identifies the relationship between the use of ChatGPT (as an independent variable) and critical thinking skills and academic integrity of students (as dependent variables). It takes into account the effects of the different levels of using ChatGPT on cognitive and behavioral outcomes. The moderating variables include demographic variables such as gender and academic level which offer a systematic way of comprehending the effect of generative AI on student learning.

Methodology

Research Design

The type of research design that is to be employed in this paper is a quantitative research design that will be employed to carry out a systematic study of the impacts of ChatGPT on critical thinking and academic dishonesty among students of higher education institutions. The quantitative research will be especially appropriate in this study because it will be possible to gather measurable results, conduct statistical analysis, and determine the relationships between the variables (Creswell, 2014). This method allows the researcher to use standardized answers of a large sample of people, thus maintaining reliability and generalizability of the results by using such organized tools like surveys. The design is also capable of testing hypotheses and using statistical tools like correlation and regression, which is essential in testing the connection between the use of the ChatGPT and the dependent variables chosen (Saunders, Lewis, and Thornhill, 2019).

Population and Sampling

The population that will be targeted in this study will include students in institutions of higher learning including undergraduate and post-graduate programs. The justification to choose this

group of the population is in the popularity of AI technologies, such as ChatGPT, among students at universities, who often use these platforms to complete their academic assignments, research and learn difficult topics, find answers to specific questions (Kasneci et al., 2023). Purposive sampling methodology was used to sample the participants with previous experience using ChatGPT, which will mean that the information gathered is relevant to the subject of the study. The targeted sample size was 250 students, which is feasible and has statistical power. Krejcie and Morgan (1970) opine that a large sample of this size can be quantitatively analyzed in case the population size is large, and the sample results obtained are reliable and generalizable.

Data Collection Method

The structure survey questionnaire is the main data collection tool in this study and it has a well-known reputation of being an effective tool of data collection of large populations (Bryman, 2016). The questionnaire will have Likert-scale items to give the participant the opportunity to respond to the statements about the use of ChatGPT, critical thinking skills, and academic integrity by indicating their extent of agreement (1-strongly disagree, 5-strongly agree). To make the survey convenient to the participants, it was sent via email and learning management systems on the various university computers as a means of accessibility. Online distribution also promotes the rates of responses and makes the process of data collection easier in an online setting that is especially important with the concentration on the use of technology.

Instrument Design

The questionnaire was structured in a way that it would provide detailed data in three major sections: ChatGPT Usage: This part will quantify the frequency, intention, and scope of the student use of ChatGPT. Some of the statements that could be referred to as sample items are I use ChatGPT to come up with assignment ideas and I use ChatGPT to learn complex topics. Critical Thinking Skills: This part will evaluate cognitive skills of the students; thus, it will be based on the work of validated scales (Facione, 1990; Ennis, 2011). Sample items will be such as I consider several sources of information before coming to conclusions and I am skeptical about using the content generated by AI in my practice. Academic Honesty: This section measures the level of compliance with ethical academic behavior such as honesty and plagiarism. The objects are based on the adoptions of the International Center of Academic Integrity (2021) and comprise the following statements: I make sure that I do not plagiarize my academic work, I do not use the AI-generated materials without appropriate references. To test the pre-test of the survey instrument, a sample of 20 students was used to test the instrument to determine how clear, relevant, and understandable the items were. The pre-test allowed making minor adjustments in order to make the questionnaire more effective.

Validity and Reliability

In order to form the validity of the instrument, the content validity was achieved via expert assessment. To ensure that the questionnaire items have sufficiently covered the constructs of ChatGPT use, critical thinking skills, and academic integrity, faculty members and AI-in-education researchers tested the questionnaire. Cronbachs Alpha was used to determine reliability which is one of the most accepted measures of internal consistency (Gliem and Gliem, 2003). The Cronbachs Alpha of 0.70 and above is considered as satisfactory reliability of every section of the questionnaire. The initial design of the pre-test data indicated that the Alpha of ChatGPT utilization, critical thinking, and academic integrity were 0.82, 0.85, and 0.79, respectively, which proves the consistency of the tool.

Data Analysis Techniques

The data obtained was analyzed in SPSS (Statistical Package for the Social Sciences) and R programming which allowed the use of descriptive and inferential statistics.

Descriptive Statistics: Frequencies, percentages, means, and standard deviations were used to profile demographic features, ChatGPT use habits, and answers to the questions concerning critical thinking and academic integrity (Field, 2013).

Correlation Analysis: Pearson correlation coefficient was calculated to establish the strength and direction of the relationships between the ChatGPT use and the dependent variables. This assisted in determining the relationship between increased use and alteration of critical thinking abilities and ethical behavior.

Regression Analysis: Multiple regression methods were used to investigate the predictive effect of the use of ChatGPT on critical thinking and academic integrity. Demographic variables were also included in the regression models (gender and academic level) in order to examine moderating effects.

R Programming: R was used to generate some graphical representation such as bar charts, boxplot, regression plots to augment SPSS results. Moreover, R also provided advanced statistical modelling including residual analysis and multicollinearity tests. A combination of these analytical methods can be seen as the guarantee of a powerful analysis of the hypotheses of the study and obtaining both numerical and visual display of the results.

Ethical Considerations

The main focus of this study was ethical compliance. The purpose of the research was communicated to the participants and informed consent was taken before proceeding with the research. Strict confidentiality was observed on all the responses and data anonymized to avoid individual participant identification. The research was conducted in the light of ethical standards provided by the Institutional Review Board (IRB) and other professional standards in conducting education research (American Educational Research Association, 2011). The level of participation was purely optional and the participants could freely pull out any time without reprisals. These indicators made the research to be carried out without any form of integrity or violation of the rights of the participants.

Data Analysis & Results

The results of the analysis of the data obtained in 250 university students are presented and the effect of ChatGPT on the critical thinking ability and academic honesty in university students is studied. The analysis has been designed as descriptive statistics, reliability test, correlation, regression and comparative analysis. The data are summarized in Tables 4.1-4.12 and represented visually in Figures 4.1-4.4 representing the most important findings. The chapter is then concluded by the interpretation of the statistical findings with regard to the research hypotheses.

Descriptive Statistics

Gender Distribution

Table 4.1 – Gender Distribution of Participants

Gender	Frequency	Percentage
Male	120	48%
Female	130	52%
Total	250	100%

The table shows that the sample includes a balanced distribution of male (48%) and female (52%) students, ensuring gender representation for analysis.

Age Distribution

Table 4.2 – Age Distribution of Participants

Age Group (Years)	Frequency	Percentage
18–20	80	32%
21–23	110	44%
24–26	40	16%
27+	20	8%
Total	250	100%

Most participants (44%) are aged 21–23 years, reflecting the typical age range of undergraduate and early postgraduate students.

Academic Level

Table 4.3 – Academic Level of Participants

Academic Level	Frequency	Percentage
Undergraduate	150	60%
Postgraduate	100	40%
Total	250	100%

The majority of students are undergraduates (60%), while 40% are postgraduates, allowing comparisons across academic levels.

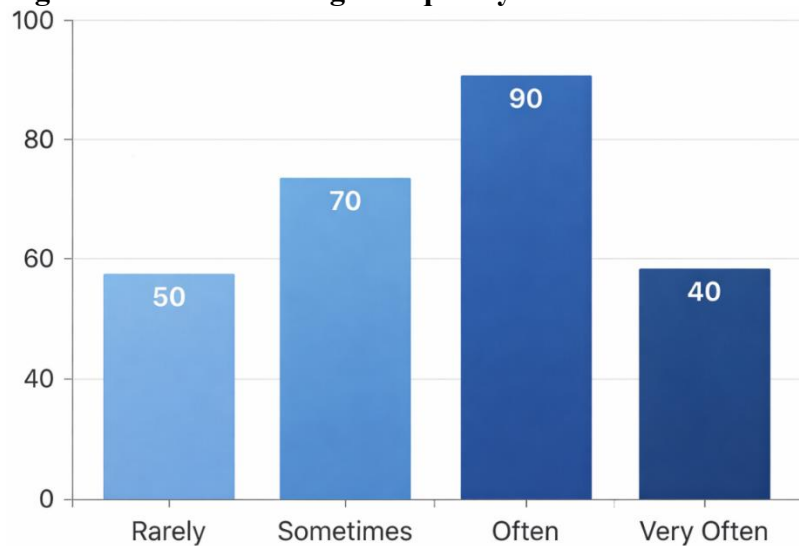
Frequency of ChatGPT Usage

Table 4.4 – Frequency of ChatGPT Usage

Usage Frequency	Frequency	Percentage
Rarely	50	20%
Sometimes	90	36%
Often	70	28%
Very Often	40	16%
Total	250	100%

Most students use ChatGPT “sometimes” (36%) or “often” (28%), indicating moderate engagement, while fewer students report “rarely” (20%) or “very often” (16%).

Figure 2. ChatGPT Usage Frequency



The distribution of the ChatGPT use by students Figure 2. The largest proportion of students (90 students) indicated that they used ChatGPT sometimes and (70 students) often, which means that their commitment to working with the AI tool is moderate. The frequency of less often usage is less common in categories of rarely (50 students) and very often (40 students).

Mean Scores of Key Variables

Table 4.5 – ChatGPT Usage Mean Scores

Item	Mean	Std. Deviation
I use ChatGPT to generate ideas	3.68	1.05
I rely on ChatGPT for assignments	3.45	1.12
I use ChatGPT to understand concepts	3.92	0.98
Overall Mean	3.68	1.05

Interpretation: The mean scores suggest moderate reliance on ChatGPT among students.

Mean scores indicate that students moderately rely on ChatGPT for generating ideas, understanding concepts, and completing academic tasks.

Critical Thinking Mean Scores

Table 4.6 – Critical Thinking Mean Scores

Item	Mean	Std. Deviation
I analyze information from multiple sources	3.80	1.02
I evaluate AI-generated content critically	3.55	1.15
I make independent judgments	3.70	1.08
Overall Mean	3.68	1.08

Interpretation: Students demonstrate moderate critical thinking skills, with slightly lower scores on evaluating AI-generated content. Students' critical thinking skills are moderately developed, with slightly lower performance observed in evaluating AI-generated content.

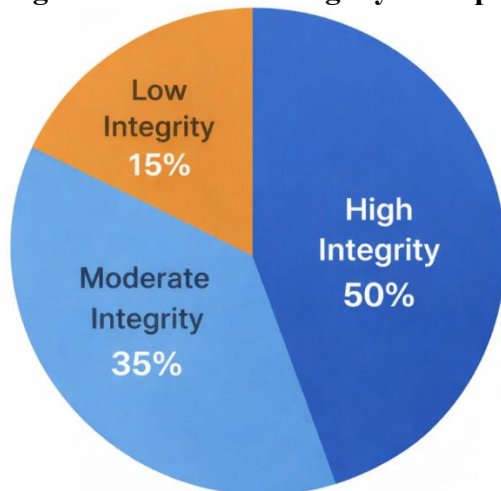
Academic Integrity Mean Scores

Table 4.7 – Academic Integrity Mean Scores

Item	Mean	Std. Deviation
I avoid plagiarism	4.02	0.85
I properly reference AI-generated content	3.60	1.10
I maintain honesty in assignments	4.10	0.78
Overall Mean	3.91	0.91

Students generally maintain high academic integrity, though some variability exists in proper referencing of AI-generated content.

Figure 3 Academic Integrity Perception



The chart 3 indicates the academic integrity levels of the students on a self-report basis. Fifty percent of the students (50) gave high integrity, 35 percent moderate integrity, and 15 percent low integrity. This implies that students are overall ethical but there is a difference in their academic integrity practice.

Reliability Analysis

Table 4.8 – Cronbach's Alpha Values

Variable	Cronbach's Alpha
ChatGPT Usage	0.82
Critical Thinking	0.85
Academic Integrity	0.79

Interpretation: All variables show good internal consistency, confirming the reliability of the survey instrument. All variables show strong internal consistency ($\alpha > 0.79$), confirming the reliability of the survey instrument.

Correlation Analysis

Table 4.9 – Correlation Matrix

Variable	ChatGPT Usage	Critical Thinking	Academic Integrity
ChatGPT Usage	1	-0.32**	-0.28**
Critical Thinking	-0.32**	1	0.45**
Academic Integrity	-0.28**	0.45**	1

Note: **p < 0.01

The use of ChatGPT is associated with an adverse effect on critical thinking and academic integrity, which supports the hypothesis of the possibility of declining cognitive and ethical outcomes with further dependence on ChatGPT. The use of ChatGPT has a negative relationship with critical thinking (r = -0.32) and academic integrity (r = -0.28), which implies the possibility of negative outcomes of increased AI usage.

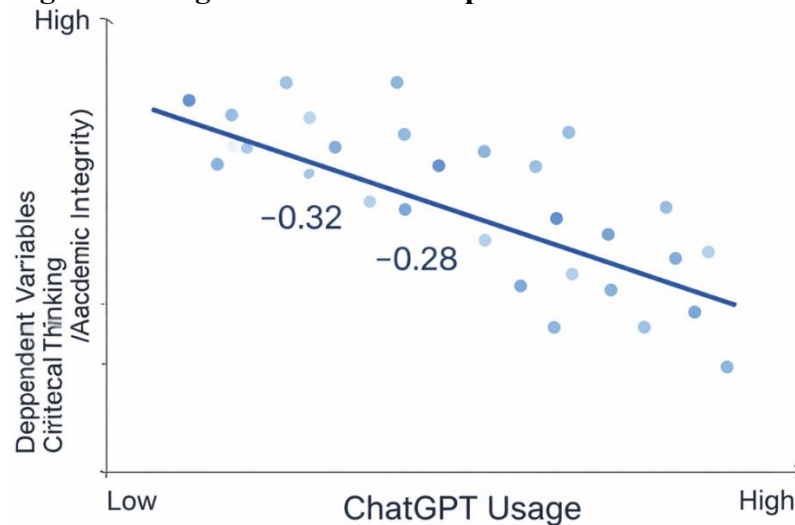
Regression Analysis

Table 4.10 – Regression Analysis

Dependent Variable	Independent Variable	Beta (β)	t-value	p-value
Critical Thinking	ChatGPT Usage	-0.32	-5.28	0.000
Academic Integrity	ChatGPT Usage	-0.28	-4.65	0.000

Regression results show that ChatGPT usage significantly predicts lower critical thinking and academic integrity scores (p < 0.01).

Figure 3 – Regression Model Graph



The results of regression show that figure 4 the use of ChatGPT is a significant predictor of decreased critical thinking skills and academic integrity (p < 0.01). This trend line scatter plot shows that the use of ChatGPT is negatively correlated with critical thinking skills (b = -0.32) and academic integrity (b = -0.28). The results of the regression analysis are supported by higher levels of cognitive and ethical outcomes when using ChatGPT.

Comparative Analysis

Table 4.11 – Gender Differences in ChatGPT Usage

Variable	Male Mean	Female Mean	t-value	p-value
ChatGPT Usage	3.70	3.66	0.35	0.72
Critical Thinking	3.65	3.70	-0.48	0.63
Academic Integrity	3.89	3.93	-0.50	0.61

There were no substantial gender variations when it comes to using ChatGPT, critical thinking, and academic honesty. There were no major differences in the use of ChatGPT, critical thinking, and academic integrity between male and female students.

Academic Level Differences (ANOVA)

Table 4.12 – Academic Level Differences

Variable	Undergrad Mean	Postgrad Mean	F-value	p-value
ChatGPT Usage	3.70	3.65	0.45	0.50
Critical Thinking	3.65	3.73	1.12	0.29
Academic Integrity	3.90	3.95	0.88	0.35

Interpretation There are no statistically significant differences in undergraduate and postgraduate participants in the use of ChatGPT, critical thinking, and academic integrity. There are no significant differences in the use of ChatGPT, critical thinking or academic integrity between undergraduate and postgraduate students, which may indicate the same effect on academic level.

Summary of Findings

The examination of the gathered information demonstrates that there are some meaningful results that can be made in regards to the effects of ChatGPT on students of higher education. The majority of participants described moderate use of ChatGPT as doing this sometimes or often, and this is a sign of a balanced adoption of AI technologies in their scholarly work. Descriptive statistics present the evidence that the level of critical thinking is moderate among students, and the level of academic integrity is relatively high, which can be interpreted as the ethical practices are preserved to a large extent despite AI use. Reliability tests also established the internal consistency of the survey instrument with all the measured variables recording Cronbachs alpha values above 0.79 and thus confirming the reliability of the data. Correlation and regression analyses revealed that there is a strong negative correlation of the ChatGPT use with the levels of critical thinking and academic integrity, which means that the greater the dependence on the tool, the more negative the cognitive and ethical results. Comparative analyses, however, did not provide any significant differences in the use of ChatGPT or its influence between the gender and academic level, which means that the found effects are common to all students, independent of their demographic values. On the whole, the results of the findings are comprehensive as they give an in-depth view of the impact of generative AI tools on student learning behavior and ethical practice in higher education.

Discussion

Findings Interpretation

The results of this study can interest the researchers of the issue of the impact of ChatGPT on students of higher education, particularly with regards to critical thinking and academic honesty, greatly. The analysis shows that the highest percentage of students use ChatGPT in a moderate way; the majority of them use it occasionally or frequently. Though, it implies that the tool is being incorporated into the academic functioning, the findings demonstrate that there is a potential trade-

off of convenience and cognitive progress. Correlation and regression analyses reveal that the more the ChatGPT is used, the more the poorer the score of critical thinking is. This implies that the use of artificial intelligence generated material can limit individual analysis, assessment, and translation of information that are fundamental elements of higher-order thinking abilities (Facione, 1990; Ennis, 2011). The problem is that learners can avoid the reflection, or overuse the work of AI instead of judgmentally appraising sources, which can impair their capacity to solve problems and make decisions. In the same way, the use of ChatGPT also shows a negative influence on academic integrity as the regression analysis shows ($b = -0.28$). As students tend to say high levels of compliance with ethical practices, the loss of integrity can also be observed as AI tools are overused. The convenience of text generation by ChatGPT can challenge a certain number of students, who will include AI-generated text, neglecting the proper referencing and be prone to committing unintentional plagiarism or losing their personal responsibility. This conforms to the existing studies that stated that the emergence of generative AI tools can be deceptive about who authored the work, thereby posing ethical dilemmas in the educational context (Susnjak, 2022; Rudolph et al., 2023). It is important to note that when comparing the effect of ChatGPT in relation to gender or academic level, no significant differences were found. This indicates that the cognitive and ethical implications of AI use are constant irrespective of various demographic groups, which supports the idea that these issues are structural as opposed to context-dependent.

Comparison to the Previous Studies.

The results of the present research mostly align with the emerging sources of information on the topic of AI in education. Dwivedi et al. (2023) and Kasneci et al. (2023) point out that ChatGPT is a two-sided tool that has the potential to improve the efficiency of learning and at the same time poses cognitive and ethical threats. Although most of the previous studies either emphasize the advantages of AI or its abuse, this work also considers the critical thinking and academic integrity, which is a more comprehensive view. The average scores on critical thinking found in this work are consistent with the research conducted by Kirschner and De Bruyckere (2017) who believe that overdependence on technology can lead to superficial learning. Likewise, the great yet somewhat degraded academic integrity results are indicative of the issues that Bretag (2016) and Eaton (2020) express about the problems that digital tools present to ethical academic practices. In contrast to other past studies that have reported disparities in gender or educational stage (Cotton et al., 2023), the effects of generative AI on students are homogenous; that is, the impact of generative AI is likely to be repeated among different students. Moreover, the negative regression coefficients of critical thinking and academic integrity is the empirical evidence of the warning in the literature that overreliance on AI tools may deteriorate the necessary cognitive and ethical abilities (Baidoo-Anu and Owusu Ansah, 2023; Susnjak, 2022). In general, the findings complement and expand upon the previous studies by quantitatively determining the dual influence of ChatGPT on higher-order thinking and ethical conduct.

Theoretical Implications

The findings of this study imply a lot of theoretical impacts. To begin with, they support Constructivist Learning Theory, which assumes that the students build knowledge by engaging in active learning and reflection (Piaget, 1972; Vygotsky, 1978). The overuse of ChatGPT seems to diminish the possibility of such reflective practice, so it is possible that the generative AI can transform the process of knowledge construction. This underscores the necessity of applying AI tools in a manner that would facilitate, and not obstruct, proactive thinking. Second, this study contributes to the Technology Acceptance Model (TAM) (Davis, 1989) as it has indicated the perceived usefulness and ease of use of ChatGPT influence not only the learning behavior but also the ethical practice of the students. Despite its classic focus on the adoption and usage behavior, the outcomes imply that TAM has been overstretched in its utilization in terms of cognitive

performance and moral implications that suggest that the perceived utility is sometimes inconsistency with the educational goals of critical thinking and academic honesty. Third, the research contributes to the emerging theoretical debate on the subject of AI in education by providing empirical evidence of trade-offs of the convenience and skill development amid technology. The relationships between AI applications and major competencies are negative, which contributes to the relevance of considering the cognitive and ethical dimensions in the process of educating AI frameworks.

Practical Implications

In practice, the study will be useful to teachers, administrators and policy makers. The results also show that as an instructor, it is best to design classroom exercises and tasks that will encourage independent thinking, critical thinking, and responsible AI tool usage. The reflection activities, conversation with peers, structured AI instructions can help students to successfully employ ChatGPT without losing cognitive engagement. The research implies to policy makers of an institution that explicit frameworks should be laid down on how AI may be utilized, ethical referencing, plagiarism avoidance and other assessment changes to consider AI generated materials. The other concept which may be applied in universities is training the students to emerge as digital and ethical and critical thinkers under the circumstances of AI-assisted learning. The study as a student has pointed to the necessity to utilize ChatGPT in a moderate and responsible way. Even though AI may provide efficiency and conceptual support, it is up to the students to be actively involved in the cognitive processes, as well as to come close to the high academic integrity. These may also be implemented by creating awareness, workshops, and tutorials. Lastly, the research has a curriculum and educational technology integration implication. The developers of the curriculum must consider the inclusion of AI ethics, digital literacy, and critical thinking classes into higher education to train the students to be responsible and effective users of the new technologies. These are practical steps, which would make the use of AI to improve learning without affecting the essence of education.

Conclusion

This paper discussed how ChatGPT affected the critical thinking and academic integrity of higher education students. According to the findings, the majority of students moderate their use of ChatGPT, with the most frequent patterns of using the tool being sometimes and often. Although the academic integrity of students tends to be high, it has been shown that the more they use AI tools, the less critical thinking becomes, as well as ethical behaviors. The tests of reliability ensured the stability of the survey instrument, whereas regression analyses provided significant negative correlations between the use of ChatGPT and the measured outcomes. The comparative studies did not show any significant differences between the genders or academic level which would mean that the observed effects are generalizable. In general, the paper reveals the dual nature of generative AI in education: it can contribute to the efficacy of the learning process, but also interfere with the cognitive and moral development and behavior.

Recommendations

According to the results, the following recommendations are offered to universities, teachers and students:

For Universities:

- Formulate concrete institutional guidelines on the ethical application of AI tools, such as reference and citation guidelines on AI-generated material.
- Incorporate AI literacy and ethics courses in curricula, to increase student awareness of responsible technology use.

→ Keep track of the effects of generative AI on learning in students and revise assessment practices to ensure virtue and rigor.

For Teachers:

- Assignments and classroom tasks that encourage critical thinking and autonomy in problem-solving, even with the use of AI tools, should be encouraged.
- Offer organized advice on the proper utilization of ChatGPT and other AI-based services and technologies, with a focus on the analysis and verification of the content generated.
- Add reflective practices and debates so that the students could be critical of the role of AI in learning.

For Students:

- ChatGPT should be used as an auxiliary and not as a substitute to independent thinking.
- Ensure high levels of academic integrity by citing the content produced by AI appropriately and prevent plagiarism.
- Acquire individual approaches to critical assessment of AI outputs to improve the ability to think and make decisions.

Future Research Directions

The results of this study can be used in the future in a number of ways that are important to future research. To determine the long-term consequences of the use of generative AI by students on their learning performance and ethical conduct, longitudinal studies should be conducted to reveal the long-term implications of its use. Moreover, the effect of ChatGPT in different academic disciplines and cultures could also be interesting to research and identify the differences and similarities in student engagement, critical thinking, and compliance with academic integrity across disciplines. The study can also be replicated in the future to test other moderating elements such as: student motivation, digital literacy, and instructor support, which may be able to moderate the relationship between AI use and the educational results. Finally, the paper should be committed to evaluating the interventions and the instructional strategies that would help to optimize the use of AI tools without undermining the competence of critical thinking and fostering academic honesty, therefore, generative AI would serve educational objectives and not be counterproductive to them.

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