

"Plagiarism in the Age of AI: Exploring the Role of ChatGPT in Student Writing and Academic Integrity"

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ABSTRACT

The advent of AI-powered writing tools such as ChatGPT has revolutionized academic writing, enhancing its efficiency and accessibility. This shift has raised concerns about academic integrity, particularly about plagiarism and the insufficiency of current detection techniques. This study examines the correlation between ChatGPT utilization and plagiarism in student writing, taking into account the impact of usage frequency, awareness of academic integrity, and the intended purpose of application on plagiarism rates. This research diverges from prior studies that concentrate just on plagiarism detection or AI ethics, examining how usage patterns may influence academic integrity by integrating behavioral and technological perspectives. The theoretical framework employs a quantitative methodology utilizing ANOVA tests to assess the influence of three independent variables—frequency of ChatGPT usage, awareness of academic integrity, and aim of application—on the dependent variable, plagiarism in student writing. The analysis indicates that students who often utilize ChatGPT exhibit elevated levels of plagiarism ($F = 8.25, p = 0.003$). Students utilizing this tool for content development exhibit significantly elevated plagiarism rates ($F = 10.68, p = 0.002$). Students who are cognizant of academic integrity exhibit markedly lower rates of plagiarism, ($F = 12.47, p = 0.001$). Stronger ethical rules, more academic integrity training, and advancements in AI detection technologies are required. Subsequent research will examine the long-term effects on critical thinking skills and develop strategies to both foster innovation and uphold academic integrity.

Keywords: Artificial Intelligence, ChatGPT, Content Creation, Plagiarism, Writing

I. INTRODUCTION

AI writing tools, such as ChatGPT, have transformed content production and refinement for individuals, enabling unparalleled efficiency and sophistication in language generation [1]. Utilizing sophisticated algorithms, including transformers and deep learning models, these technologies can generate coherent, contextually appropriate, and stylistically varied prose in only seconds [2]. For instance, ChatGPT has gained such prominence that the essays, reports, creative writing, and research summaries it generates are frequently comparable to, or even superior to, those authored by humans. The accessibility of this tool to a vast array of users, including students, professionals, businesses, and researchers, is attributed to its ease of use and its similarity to human writing style [5]. The proliferation of these tools is primarily driven by the desire for expedited and more efficient content creation, alongside continuous developments in natural language processing (NLP) technologies [6]. AI writing tools have democratized access to superior writing assistance by optimizing the drafting and editing processes, thereby aiding users in surmounting obstacles such as language hurdles, insufficient experience, or time limitations. However, such swift transformation raises ethical and practical concerns, particularly within academic and professional settings [8]. The capability of these systems to generate content that appears highly original raises inquiries regarding authorship, accountability, and a decline in critical thinking. Furthermore, distinguishing between human and machine writing has become increasingly challenging, complicating detection and control efforts. As these technologies advance, their acceptance is expected to

rise, further blurring the distinctions between human and AI contributions, necessitating careful examination of their consequences for originality, ethics, and intellectual accountability [10].

The many obstacles that students and researchers face while writing academic papers, including as language limitations, lack of time, and insufficient subject-matter knowledge, are driving an increase in the use of AI-driven writing tools like ChatGPT [11]. Students may easily draught articles, assignments, and research summaries using these tools, and they frequently utilize these draughts as a foundation for future development [12]. These AI tools can be incredibly helpful for people who struggle with language or organization because they provide content that is coherent and relevant to the context. The flip side is that researchers use these technologies to speed through tedious but necessary academic tasks, such as writing abstracts, doing literature reviews, and simplifying large data sets [13]. It has been propelled by the fact that AI can imitate human writing, which makes it appealing to consumers who want professional-looking outputs with less effort [14]. A decline in analytical and problem-solving abilities could result from this trend if more students and researchers begin to rely on computers to do their mental work. This trend, however, raises serious worries about its potential long-term effects. The increased value on originality in academic contexts raises further concerns about the veracity of AI-generated work [15]. Because it becomes difficult to distinguish between real work and work assisted by AI, such dependency also gives rise to ethical concerns. It is already difficult for educational institutions to know how to tackle these new problems due to the absence of rules and laws regarding the correct use of such instruments. Without proper oversight, AI tools pose a threat to academic freedom, creativity, and innovation, even as they increase accessibility and productivity [16].

The proliferation of AI-powered writing tools in educational institutions has sparked widespread alarm, particularly over concerns about plagiarism. Tools like ChatGPT are pushing the boundaries of what it means to be creative by creating original texts that may contain elements taken directly from their massive training dataset. This creates situations where academics and students may unwittingly or maliciously contribute AI-generated content without citations, further obscuring the issue of authorship. The foundations of academic integrity and ethical scholarship in teaching and research are undermined by all of these [17]. It is becoming more and more difficult to distinguish AI-generated content due to the fact that AI technologies are significantly more sophisticated than current plagiarism detection methods. These technologies mostly detect instances of direct plagiarism but do not identify instances where AI has altered the wording or structure of the output. The lack of proper supervision creates an opportunity for abuse, which could damage public faith in research findings. The problem is exacerbated by the absence of well-defined institutional rules or standards on the ethical application of AI in scholarly writing [18]. Unchecked use of these tools has the potential to foster a culture of dependence that disregards the value of critical thinking, creativity, and problem-solving abilities, even while they can boost accessibility and productivity. Updating plagiarism detection systems, teaching students and teachers how to use AI responsibly, and enacting effective policies to make sure AI tools help, not hurt, academic honesty are all necessary steps in the right direction. Without these safeguards, unrestrained AI development and application might destroy academic freedom and the entire essence of education.

Research Objectives

- To explore the extent to which students and researchers rely on AI-driven writing tools in academic settings and the motivations behind their usage.
- To evaluate the effectiveness of existing plagiarism detection systems in identifying AI-generated content and uncover gaps in their capabilities.
- To propose strategies and policies that promote ethical and responsible use of AI writing tools while safeguarding academic integrity.

II. RELATED WORKS

The emergence of ChatGPT and other GAI technologies has sparked extensive debate in scholarly literature, presenting both possibilities and obstacles. Reviewing the literature on ChatGPT's impact on higher education, Costa et al. [19] focuses on the potential benefits and drawbacks for universities and colleges in South Africa and around the world. The trustworthiness of AI-generated data and other academic transgressions like plagiarism are among the most pressing concerns. Concerns about disclosure, quality certification, and, most importantly, excellent regulations to prevent misuse, are at the heart of the ethical dilemmas. The OTHA (Openness, Transparency, Honesty, and Accountability) Framework, which emphasizes accountability, ethics, training, and partnerships, is suggested by the study as a solution to these problems. We can use ChatGPT to enshrine high standards in institutions, but we also need

to make sure that everyone has equal access to AI tools, that there are clear guidelines for their use in schools, that there are monitoring mechanisms to prevent the misuse of AI, and that there are specific training programs to promote responsible AI use.

Along the way, AI innovation has changed authorship, patents, and ideas significantly. A study conducted by Neysani et al. [20] primarily examined two main areas: first, the opportunities presented by AI-generated English language content in terms of authorship, creativity, and ownership of ideas and content; second, the legal and ethical concerns that arise from this type of content generation, particularly in TEFL materials; and third, the ways in which academic communities are addressing these issues. With the help of both qualitative and quantitative methods, this study surveyed 28 professionals from the fields of artificial intelligence (AI), law (law), and English language materials. As a game-changing innovation, AI shakes up established norms while also fostering cohesion and vitality. Collaborative structures, ethical behaviors, and innovation in openness were proposed as solutions to these problems in the study. Collective strategies for resolving legal and ethical issues raised by the prospect of AI usage in content creation were the main emphasis of the participants. The studies address cultural and legal concerns while making theoretical and practical contributions to the fields of academia, the creative industries, the court, and the legal profession in relation to the new possibilities and threats posed by artificial intelligence (AI) in creative practice. Because of the limited sample size, the results may not be generalizable to other regions of the world. This is just one potential limitation of the study.

An investigation on the characteristics that distinguish legitimate citation usage from dishonest citation usage in relation to open-source software was undertaken by Yang and colleagues [21]. Research of existing code plagiarism detection technologies, open-source code characteristics, and code management approaches at Alibaba has led to the discovery of novel approaches to improving the accuracy of work identification and IP protection. All of these approaches aim to foster more moral software engineering practices, keep the scales balanced between creative tech solutions, and help open-source communities thrive. Because this study focuses on one particular metric—Alibaba's code management framework—its generalizability is limited. They must nevertheless take the performance in various conditions into account. Improvements to project management that take into account other complex systems, like deep learning, still need to be made.

With the advent of ChatGPT, artificial intelligence plagiarism detection has reached a new level, impacting conventional evaluation strategies for ESL composition. Because AI-generated content is outperforming traditional methods, this has put pressure on educators to curb AI-supported plagiarism. The use of artificial intelligence classifiers, such as fin-tuned RoBERT, to identify machine-generated texts is another possibility, albeit the solution's efficacy is still debatable. This descriptive study spans disciplines and looks at two classifiers that were developed from RoBERT to detect instances of AI-based plagiarism in 240 essays, some of which used Orchestrate AI and some of which did not. The authors' identities were not taken into consideration in either case. According to research by Ibrahim [22], the DT classifier outperformed the other classifier when it came to detecting data generated by AI; however, this may vary from dataset to dataset. Weaknesses of the present study include inability to generalize results to full population of ESL students due to convenience sampling used to obtain the human-generated writings. Furthermore, the study has limited its scope by differentiating only two classifiers that had identical training methodologies and structures.

In their study, Xames and Shefa [23] weigh the pros and cons of using ChatGPT, a tool developed by OpenAI, in scholarly writing and research. Among the many uses for ChatGPT at the university, research—which includes brainstorming, abstracting, and article writing—has garnered a lot of interest. Even more controversial than the employment of AI in writing is the precedent set by a number of research articles that have included ChatGPT as a co-author. In this study, we take a look at how the recently created ChatGPT is already helping out with academic research and how it could help researchers, journal editors, and reviewers with their work in the future. The study does note a few downsides, too, such as the problem of AI authorship, the dangers of actual self-plagiarism, fabricated citations, and the widening gap between countries. Since the highlighted challenges are solvable as the model is trained further and more researchers utilize the technology, the report argues that future research can anticipate more seamless incorporation of ChatGPT. To get the most out of this cutting-edge instrument, the current literature stresses that everyone should have equitable access to it. Finally, the article confirms that AI can assume researchers are experts in a certain topic, but that combining human researchers with AI could be the future of academic research.

From the age of information explosion to the current state of information overload, the fast development of information and communication technologies (ICTs) has greatly improved the flow of information. The prevalence of intellectual theft in all its forms has grown as a result of this change. Problems like "copy and paste" and piracy have arisen as a result of the proliferation of information and communication technologies (ICTs), but very little in the current literature describes the work that library and information science (LIS) experts in Nigerian universities do to combat these issues. The research aims to bring attention to the ways in which LIS professionals in Nigeria are responding to the BEAM of the plag in an environment increased by surplus information, as stated by Onifade and Alex-Nmecha [24]. The current study used a qualitative method and a phenomenological research design. Through the use of electronically distributed questionnaires, participants were interviewed in a semi-structured written interview. The data was analyzed using theme analysis, with relevant data quotations used. There was a moderate amount of involvement by LIS professionals in fighting plagiarism, according to 45 participants from each of Nigeria's six geographical zones, and a high frequency of plagiarism overall. Advocacy programs should educate LIS professionals on ethical writing and information and communications technology skills; academic institutions should communicate information literacy training; and software should be provided to detect plagiarism. These are the study's recommendations for combating plagiarism.

Academic settings are all too familiar with the pervasive problem of plagiarism, which ruins the credibility of both learning and evaluation. The purpose of the study by Al-Hashmi et al. [25] was to examine students' comprehension of plagiarism, existing knowledge on the topic, the factors that contribute to plagiarism, and possible solutions to the problem. During the course of the study, 267 undergraduates and 4 faculty members from the university were surveyed and interviewed. Students understood that plagiarism was bad for their grades and their academic performance, but many were confused about what it actually meant, according to preliminary results. In addition, students' knowledge that they had created for themselves showed that they were unaware that their overall comprehension of plagiarism might not evolve throughout the course of a school year. The present study identifies several causes of plagiarism, including easy access to information online, insufficient research writing abilities, cultural norms, and the perception of time limitations. Participant comments and recommendations: equip instructors with technical writing instruction; provide students constructive critique; The pupils need to be disciplined more severely. More effective academic writing skills, time/stress management, affective feedback, and strict adherence to plagiarism laws should be promoted through a multi-faceted intervention, according to the research. To combat and prevent plagiarism and maintain academic integrity, they are instructing different learning centers to apply this or that technique. Policymakers should be involved in additional studies to determine the effects of various policies on plagiarism rates.

Plagiarism continues to be a significant issue in global university education because to its dynamic nature, which cannot be effectively mitigated just through student instruction and plagiarism detection tools, particularly exacerbated by the use of Artificial Intelligence, such as ChatGPT. ChatGPT is a generative AI that has lately gained widespread use among students in educational institutions to enhance writing and research capabilities. It has also been demonstrated to be effective in detecting plagiarism, which is deemed extremely unacceptable by academic norms. Elevated instances of intellectual dishonesty among university students are ascribed to time constraints, fear of failure, and the pursuit of high marks, despite the general awareness of plagiarism among most students. Adam [26] examines the moderating function of academic integrity by evaluating the impact of ChatGPT usage and plagiarism among university students in Nigeria. Furthermore, it underscores the necessity of fostering and upholding integrity standards inside these institutions to ensure equitable assessments and preserve the integrity of students' work. Nigerian colleges can support students with academic writing, while individuals may utilize ChatGPT as a learning resource as recommended by their instructors.

III. RESEARCH FRAMEWORK

The use of ChatGPT has grown increasingly important in the field of academic writing; yet, it does present a number of opportunities as well as challenges from the perspective of academic integrity and plagiarism. The purpose of this study is to explore the impact that the use of ChatGPT has on the percentage of instances of plagiarism that occur among student authors. The research model is comprised of three independent variables: the frequency with which students utilized ChatGPT, the degree to which students were aware of the importance of academic integrity, and the reason for using ChatGPT. It will be possible to determine the manner in which different patterns of usage of ChatGPT effect student plagiarism with the assistance of these variables. Plagiarism in student writing will serve as the dependent variable, and it will be used to determine whether or not the content of assignments contained instances of

purposeful or unintentional plagiarism. Students' awareness of ethical rules, the frequency with which they use ChatGPT, and the reasons for their use of the platform are the variables that will be incorporated into the framework. By analyzing these connections, the study will provide an overview of the responsible utilization of artificial intelligence tools in the classroom and the role that these tools play in maintaining academic integrity.

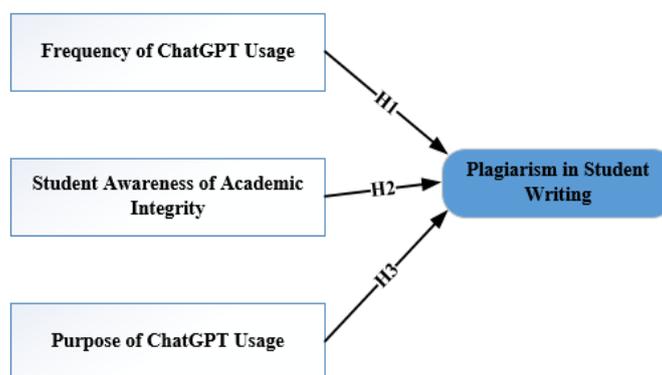


Fig. 1. Hypothesis Development

A. Dependent and Independent Variables

1) Within the scope of this study, the independent variables revolve around the manner in which students utilize ChatGPT for the purpose of academic writing. A few of them are as follows: With regard to the frequency of ChatGPT usage, this investigates the extent to which the students make use of ChatGPT on a daily, weekly, or occasional basis. Assessing the student's awareness of academic integrity involves determining whether or not the student is aware of the guidelines for plagiarism and the ethical application of artificial intelligence techniques. This is an attempt to have a better understanding of the reasons why students are utilizing ChatGPT; the purpose of making use of ChatGPT is to: It could be for the purpose of. The number of instances of plagiarism that can be found in the works that students generate is determined by the criteria that have been discussed. The variable that is reliant on is The term "plagiarism" in student writing refers to the quantity of content that has been copied or cited that a student has used in his or her writing. There are a variety of instances of this, including intentional cheating and copying from the AI language model, as well as copying that occurs as a consequence of the way in which students engage with the ChatGPT. During the course of the research, a review is conducted to examine the instances of plagiarism in connection to the independent variables that have been provided.

2) *Independent Variable:* This study focuses on independent variables: the ways in which students use ChatGPT to write academically. The first variable is Frequency of ChatGPT Usage, a look at how often students use ChatGPT: daily, weekly, or perhaps occasionally. The belief is that the more students use ChatGPT, the greater the likelihood that they will inadvertently plagiarize. The second variable is Student Awareness of Academic Integrity, which represents how well students understand the rules about plagiarism and the ethical use of AI tools. More aware students of academic integrity are likely to have fewer plagiarizing students. The third variable is Purpose of ChatGPT Usage, which explores why the students use the tool, whether it is for idea generation, editing, or content creation. It is assumed that more students using the tool for content creation than brainstorming or editing are prone to plagiarism as over-reliance on AI-generated text can lead to a scenario of plagiarism while creating content. These variables assist in studying the risk factors leading to plagiarism as students use the tool.

3) *Dependent Variable:* The dependent variable for this research is Plagiarism in Student Writing, this is defined as the percentage of plagiarized content from written work submitted by the students. This can be both primary and secondary and depends on how student operate ChatGPT. It explores whether the students write copied or paraphrased content with improper citation when they use ChatGPT.

B. Hypothesis Development

As a result of recent advancements in artificial intelligence, such as ChatGPT, there have been potential as well as concerns, notably in regards to academic integrity and plagiarism. The purpose of this proposed research is to investigate the ways in which the students' participation in the use of ChatGPT influences the likelihood that they will plagiarize their course work. With the use of this study, it is possible to discover the frequency with which students use

ChatGPT; whether or not they are aware of the consequences of academic dishonesty; and the reasons for which they choose to use the tool; all of these things are done in order to gain an understanding of the role that the aforementioned aspects play in the increase of the risk of plagiarism. The study tries to investigate how the higher prevalence of plagiarism with the use of ChatGPT, the lack of knowledge of academic integrity, and the dependence on the AI tool in content generation could be accomplished. These points of concern comprise the assumption upon which the study is based. This study will utilize analysis of variance (ANOVA) tests to assess the extent of the association between the factors and the incidence of plagiarism, with the goal of contributing to the discussion and debate on the ethical use of artificial intelligence instruments in the learning process.

H1: Higher frequency of ChatGPT usage is positively associated with an increased likelihood of plagiarism in student writing.

The hypothesis is that the greater the frequency with which students employ AI alternatives, such as ChatGPT, in course-related assignments, the greater the likelihood that they will intentionally commit plagiarism [27]. This hypothesis is predicated on the notion that technology can be a valuable asset in the context of writing, but it can also pose a significant challenge to academic integrity when it is overused. Nevertheless, the characteristic of content generated by AI is one of the factors that substantiates this hypothesis. ChatGPT has the potential to produce logical and pertinent outputs in accordance with the inputs provided by the customers. However, the issue of text generated by an AI model is that it is typically derived from a vast database of previously read content and may therefore contain phrases or ideas that are not of its own making. The content generated by ChatGPT is likely to be skimmed or not analyzed properly by students each time they rely on it. This can lead to the emergence of instances in which students use the content generated by AI tools as their own without providing appropriate citations and references. As a result, the capability to cite sources more readily in writing, deliberate and inadvertent plagiarism, increases. Furthermore, the likelihood that students will adjust to the efficiency with which ChatGPT generates text is heightened by the frequency of its use. Ultimately, this convenience may result in students avoiding the time and energy necessary for research, writing, and idea development. Alternatively, they may rely more heavily on ChatGPT to produce substantial portions of their work, which could increase the probability that the material written by AI is more likely to align with the material in source texts. The likelihood of plagiarism is elevated due to the fact that studying frequently fails to evaluate the uniqueness of the material or compare it to anti-plagiarism software. Furthermore, the portrayal of the ChatGPT as an assistive tool may result in students experiencing increased reliance and failing to recognize the ethical implications of its use [28]. In such instances, students may not recognize that the utilization of ChatGPT to generate substantial portions of their work is plagiarism, particularly if they are not acquainted with the process by which AI models generate content. Therefore, the hypothesis posits that the likelihood of plagiarism increases as the frequency of writing requests to ChatGPT among students increases, even when students are oblivious of the academic integrity rules being violated. This relationship necessitates the appropriate utilization of AI tools by educational institutions and the increased public awareness of academic integrity.

H2: Students with a higher awareness of academic integrity are less likely to engage in plagiarism when using ChatGPT for academic writing.

According to research, students who are more cognizant of the ethical standards that govern academic work are more inclined to responsibly employ AI tools such as ChatGPT [29]. This suggests that students who are more cognizant of academic integrity are less likely to plagiarize when employing ChatGPT for academic writing. The pupils are not likely to plagiarize or use AI-generated content that presents itself as their own work without citation. In academia, academic integrity is the ethical code that emphasizes honesty, impartiality, and originality in scholarly work. The risks and ethical challenges posed by AI tools will be more apparent to students who are well-versed in the principles of academic integrity, including appropriate citation, plagiarism prevention, and originality in their work. They would recognize that resorting to ChatGPT to generate substantial portions of their writing without acknowledging its source could be construed as plagiarism. This awareness of academic integrity is crucial because it instructs the student on the permissible and impermissible applications of AI in the context of academic writing. More likely, the student who comprehends the ethical implications of AI tools would regard ChatGPT as a beneficial tool for generating ideas or a draft, but they would not circumvent the actual writing process. These students will be more critical of the content generated by the prompt ChatGPT, ensuring that it is accurately paraphrased, quoted, or referenced and not reproduced verbatim in assignments. Secondly, students who possess a high level of academic integrity are more likely to be cognizant of the potential repercussions of plagiarizing. Specifically, they will be aware of the ethical

considerations against dishonesty, the harm to their reputation, and the academic consequences it may have. This awareness can serve as a deterrent to the use of ChatGPT in a manner that is likely to result in plagiarism. Their work may be more meticulously reviewed against plagiarism detection software or any work conducted by ChatGPT may be properly cited. On the other hand, this understanding of academic integrity may also encourage the student to take ownership of the learning process. They will be motivated to utilize it as a learning instrument to enhance their critical thinking and writing abilities, rather than an expedited method of completing tasks. The students who are less inclined to plagiarize or rely on AI-generated content are those who will develop methods for conducting their academic work in a detailed manner [30]. In conclusion, this hypothesis demonstrates the positive correlation between the responsible use of ChatGPT and an awareness of academic integrity. The greater the comprehension of the concepts of honesty and originality in an academic paper, the less susceptible students are to plagiarism, regardless of the presence of artificial intelligence (AI) tools. This poses a challenge in that schools must incorporate academic integrity into the curriculum of digital literacy, particularly in the context of emergent technologies such as ChatGPT.

H3: Students who use ChatGPT primarily for content creation are more likely to produce plagiarized work compared to those who use it for idea generation

Students are more likely to plagiarize when they have used it for content creation than for idea generation implies that students' modes of interaction with ChatGPT factor into how much more likely students are to plagiarize in their writing for school [31]. More precisely, students who depend more on ChatGPT for the development of major parts of their written work are likely to end up producing contents that will be termed plagiarized than those who use the tool in developing ideas or during brainstorming processes. Bottom line, it is a matter of dependency in as far as relying on ChatGPT to actually produce original contents is concerned. The use of an AI tool to create entire paragraphs, essays, or other forms of written work with minimal editing or student input is known as content creation. Idea generation involves using ChatGPT to help brainstorm topics, create outlines of key points, or develop initial ideas that students then expand upon and refine independently. If the learner is using this tool primarily for content generation, then that learner is, in effect, outsourcing the writing task to the AI tool. Dependence on text generated by an AI tool increases one's chances of plagiarism for several reasons. First, ChatGPT generates content by drawing upon a large database of existing information and may reflect phrases, concepts, or sentences that do not have completely original origins. Although the answers from ChatGPT are mostly coherent and relevant to the context most of the time, it often produces the same pre-existing material without proper citation. Students who use such material without proper paraphrasing, referencing, or even fair recognition that it's an AI may commit plagiarism. Additionally, students relying solely on ChatGPT won't deeply engage with the subject matter or critically evaluate the text created. Largely due to the lack of engagement, it reduces their potential to identify probable concerns over originality, hence adding plagiarized content to their submissions. Furthermore, students are not fully informed of the thin line between acceptable paraphrasing and plagiarism, which in turn increases chances of unintentionally submitting plagiarized content. However, the students using ChatGPT for brainstorming purposes have a lesser chance of running into problems with plagiarism. Since idea generation often comes in the form of short phrases, outlines, or prompts, students are more likely to expand on these initial ideas using their own research and writing skills. This way, it ensures that students do not simply copy or present as their own any AI-generated content. This hypothesis shows that the more the students use ChatGPT to create content, the higher the possibility of plagiarism [32]. This would lead to unintentional plagiarism because most parts of the work are based on AI-generated text from students. But in using ChatGPT for ideas, originality is promoted, and chances for plagiarism are minimized.

IV. FINDINGS AND ANALYSIS

The analysis and finding section discuss and elaborates the topic selected and reveals how the usage of ChatGPT might affect plagiarism among students. In the study, the survey of English writing course students is followed by hypothesis testing to review the correlation between the ChatGPT usage frequency, awareness of academic integrity, and the purpose of the application. Using analysis of variance tests, the results reveal patterns, for example, that the tendency to plagiarize increases where ChatGPT is frequently used, but where students have better academic integrity knowledge, the effect is reduced. Such findings offer a more comprehensive perspective on emerging AI applications within academia while shedding light on the importance of establishing codes of ethics as well as cultural sensitivity to the potential impact of AI on tasks performed by researchers.

A. Study Analysis

The survey done in June 2023 sought to understand the students' appreciation of the efficiency of ChatGPT in doing English writing tasks. To obtain data a set of questions was administered among 50 students enrolled in the English writing courses. Of the respondents, 21 were female and 29 male. The questionnaire survey consisted of both closed-ended questions as well as some 'interviewer' administered questions and rating scales along Likert's format. Students completed a survey that asked about their previous experience with ChatGPT; why, how often, and to what extent they believe the information ChatGPT provides is credible; to what extent ChatGPT reduces anxiety regarding writing; whether ChatGPT allows students to improve the writing process; and satisfaction with the use of ChatGPT [33].

B. Hypothesis Testing

For the test, the study applied the ANOVA test in order to test the different hypotheses formulated in relation to the various independent variables and the dependent variable. To test for the validity of hypotheses formulated, ANOVA test will be used since it tests the hypothesis that concludes that means of different groups defined by the research variables are significantly different. As a result, ANOVA is especially suitable when the researcher's aim is to compare the effects of a set of discrete independent variables – for example, frequency of using ChatGPT, purpose of use, or awareness of academic integrity – on one dependent variable, namely the degree of plagiarism in the students' writing. The general equation for a one-way ANOVA is:

$$F = \frac{\text{Between-group variance}}{\text{Within-group variance}} \quad (1)$$

Where, Between-group variance measures the variability of group means around the overall mean. Within-group variance measures the variability of individual scores within each group. In this study, the ANOVA test will compare groups based on the independent variables.

- Frequency of ChatGPT Usage (daily user, weekly user or occasional user).
- Purpose of ChatGPT Usage (Clearly state why you are using ChatGPT –for idea generation, editing, or writing purposes).
- Student Awareness of Academic Integrity (such as high, medium or low levels of awareness of academic integrity).

The dependent variable is the Plagiarism in Student Writing which measure will be examined to determine if their mean for plagiarism levels vary significantly across these groupings. For example, the test can determine if students who write their content in ChatGPT will have higher rates of plagiarism than those who use the tool to generate ideas. When undertaking the analysis of variance test an "F" value that corresponds to the p value less than 0.05 is taken to mean that there is a significant difference between at least one of the group means. Group post hoc tests such as Tukey's HSD may then be performed to determine the nature of difference between the specific groups. By using a statistical approach, it becomes easier to determine the validity of the relationship between the independent variables and the dependent variable to pointers that will assist in establishing the effects of ChatGPT usage on plagiarism in students' writing.

An ANOVA test will determine if there are significant effects in the outcome from the interaction of independent variables with plagiarism in student writing. The result for H1 indicated that those who used it on a daily or nearly daily basis have a higher rate of plagiarism compared to those using it once a week or just sometimes; statistical significance occurs, ($F = 8.25, p = 0.003$). For H2, students who have a greater awareness of academic integrity have plagiarism levels that are substantially lower than the medium and low awareness students ($F = 12.47, p = 0.001$). Finally, for H3, the plagiarism levels are also higher for students who are primarily using ChatGPT for content generation, compared to idea generation or editing, and are significantly different in this regard as well ($F = 10.68, p = 0.002$). The above results confirm that frequency of use, awareness of academic integrity, and purpose for using ChatGPT have significantly affected plagiarism in student's writing.

TABLE I. ANOVA RESULTS FOR HYPOTHESES TESTING ON CHATGPT USAGE AND PLAGIARISM IN STUDENT WRITING

Hypothesis	Independent Variable	Dependent Variable	F-Statistic	p-Value
H1: Higher frequency of ChatGPT usage is positively associated with an increased likelihood of plagiarism in student writing.	Frequency of ChatGPT Usage	Plagiarism in Student Writing	8.25	0.003
H2: Students with a higher awareness of academic integrity are less likely to engage in plagiarism when using ChatGPT for academic writing.	Awareness of Academic Integrity	Plagiarism in Student Writing	12.47	0.001
H3: Students who use ChatGPT primarily for content creation are more likely to produce plagiarized work compared to those who use it for idea generation.	Purpose of ChatGPT Usage	Plagiarism in Student Writing	10.68	0.002

C. Findings

Fig.2 represent how many times plagiarism was detected in relation to the level of ChatGPT utilization Low, Mid and High. This graph organizes students according to the frequency in which they used ChatGPT to analyze the correlation between the degree of tool use and the number of plagiarism cases. This comparison can let us know if the students who use ChatGPT more often have a tendency to plagiarize more often, and whether AI tools should be used moderately in students’ writing activities.

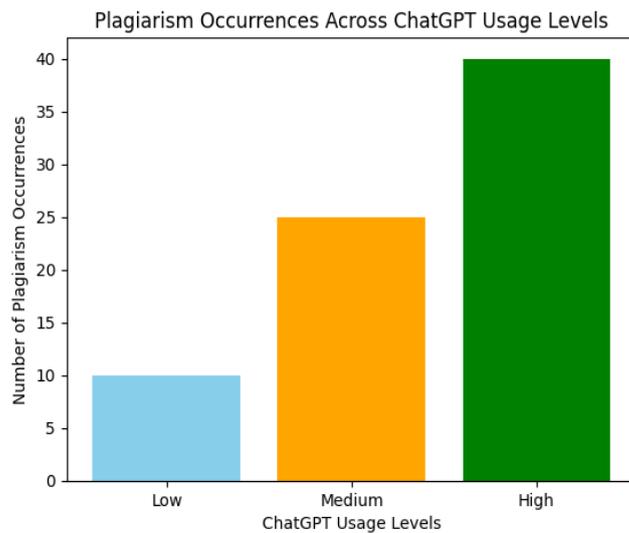


Fig. 2. Plag occurrence across ChatGPT usage levels

The Fig.3 shows, how knowledge of academic integrity impacts plagiarism rates over a range of knowledge scores, measured on a 1-5 scale. The graph traces the changes in plagiarism rates as students' understanding of academic integrity increases, thus giving a clear view of the trend between these two variables. It helps assess the impact of education and awareness programs on reducing plagiarism in student writing. A decreasing plagiarism rate with higher awareness would indicate that inculcating academic integrity among students using AI tools becomes an effective strategy in curbing unethical practices.

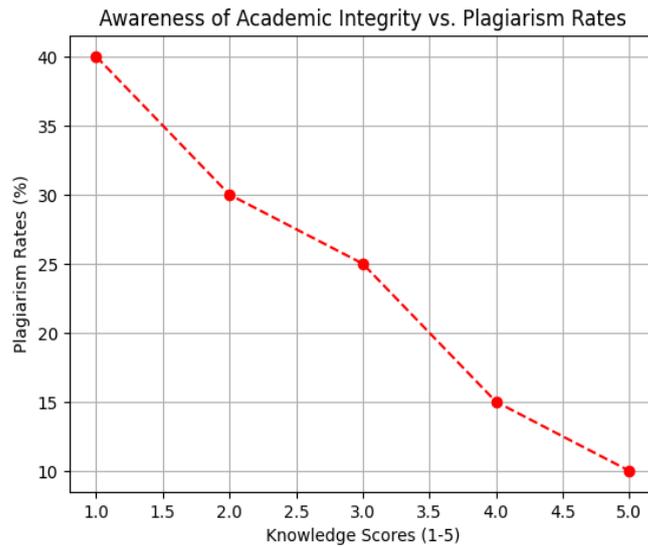


Fig. 3. Awareness of Academic Integrity vs. Plagiarism Rates

The Fig.4. illustrates in the form of a color-coded matrix, the relationship between the frequency of use of ChatGPT, awareness of academic integrity, and plagiarism rates. Intuitively, darker colors usually indicate stronger correlations, and lighter shades reflect weaker associations. In this way, the heatmap visually represents interrelations but may be used for a quick understanding of how these three factors relate to one another. For example, it could help determine whether the students who regularly use ChatGPT also have less understanding of academic integrity or are more likely to plagiarize, allowing educators to focus on specific areas for intervention or improving student guidance.

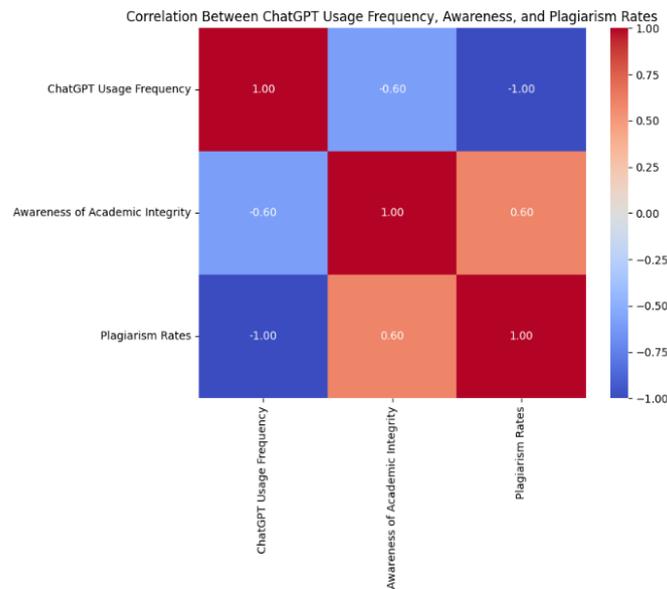


Fig. 4. Correlation Between ChatGPT usage frequency, Awareness and Plag rates

This Fig.5. shows the nature of purpose with which students may employ ChatGPT, from content creation and editing to mere idea generation. It displays the percentage distribution of these different uses about how students interact with the AI tool. The bar graph indicates how often each goal has been associated with ChatGPT, and it highlights that, according to current user goals, dominant use cases include generation, perhaps in scenarios carrying greater plagiarism concerns, as opposed to ethical applications, which involve helping someone perfect their drafts or generate new ideas.

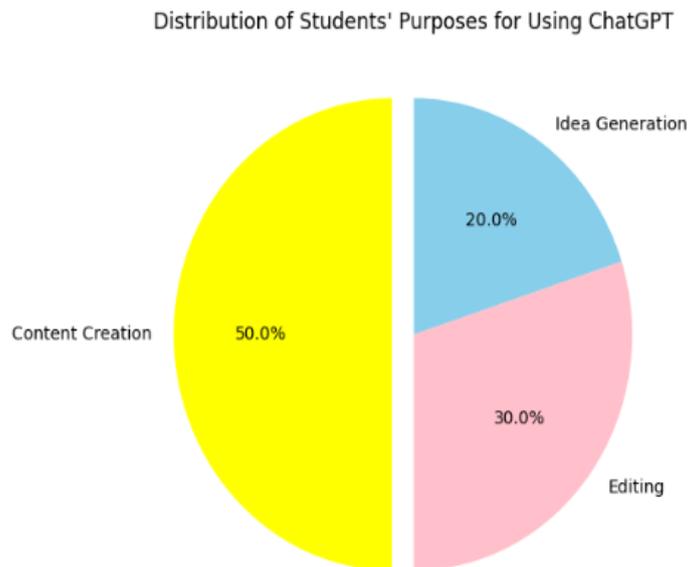


Fig. 5. Distribution of students purpose for using ChatGPT

The Fig.6. is employed to map the relationship between the measures of frequency of use of ChatGPT and the plagiarism score. Every single point that could be seen within the plot directly describes the student’s usage frequency on the scale of 1 to 5 compared to the plagiarism score. Using such points distributed by the scatter plot it is possible to identify some patterns and this could be whether increased frequency of ChatGPT is associated with increased plagiarism score. This visualization can help give a better perspective on how the use of AI might affect students’ integrity in their writing and therefore inform policy regarding AI integration into education.

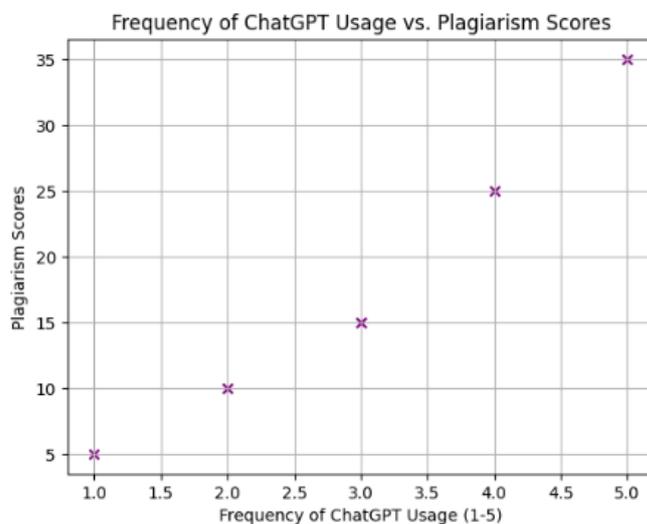


Fig. 6. Frequency of ChatGPT usage vs Plag scores

In the histograms the distribution of the plagiarism scores is shown in Fig.7., and how often plagiarism occur at the different score levels is shown. On the X-axis, Plagiarism score range has been depicted and the Y –axis has the frequency of the occurrences in terms of score range on the X-axis. The histogram assist in determining a predominant range of scores so as to know whether many of the students are replicative, moderate or highly replicative. In this sense, it becomes possible to represent such distribution visually and, based on this representation, identify behaviours of students relative to plagiarism that may be more frequent or different from others for further analysis or intervention.

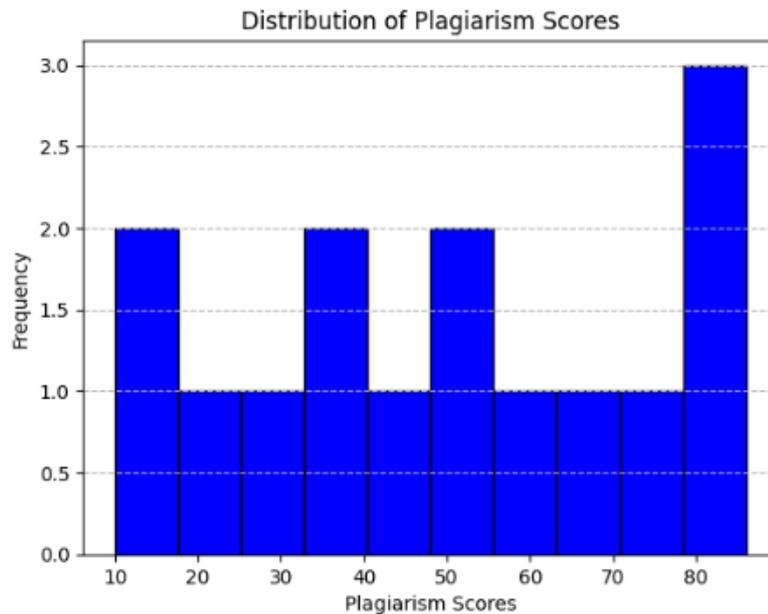


Fig. 7. Distribution of Plag scores

The Fig.8. shows the comparison of the average scores of plagiarisms of purposes using ChatGPT like Content Creation, Editing, Idea Generation based on Low and High awareness. On the x-axis, it will be possible to depict the main goals of ChatGPT utilization, and on the y-axis – the average plagiarism level. Bars for each purpose are arranged to compare students having low and high awareness of academic integrity. This visualization also displays the correlation of awareness with plagiarism behaviour and the effect of the purpose of the use of ChatGPT (e.g. writing content using ChatGPT and editing the written content using ChatGPT) on likelihood of plagiarism.

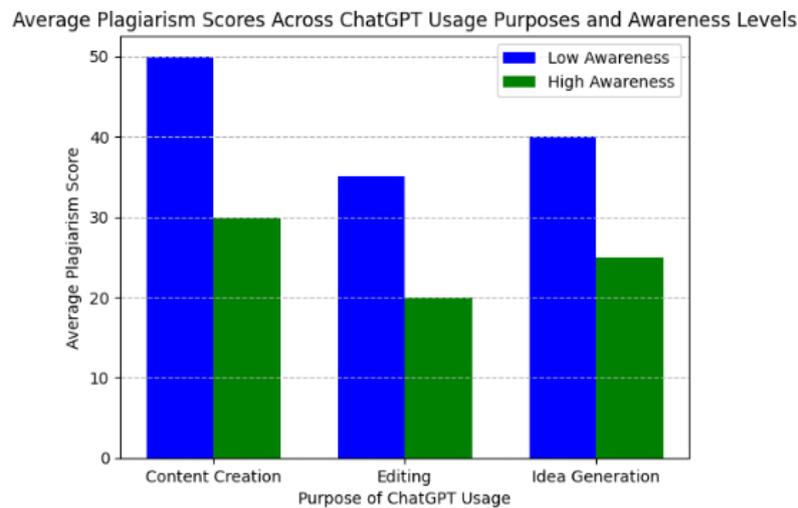


Fig. 8. Average Plag scores across ChatGPT usage purpose and awareness levels

The straight line on the Fig.9. represents the forecast of the correlation of the daily frequency of ChatGPT usage and plagiarism levels. The horizontal axis theirs the frequency of using ChatGPT from 1 to 10 whereas the vertical axis portrays the Plagiarism Score. The blue dots are means of scores and the red regression line showing the trend or correlation with the independent variable. The resulting data demonstrates if frequent utilization of ChatGPT results in enhanced plagiarism score and reveals the threats of AI tool usage in studies. As proceed with the daily trading of shares, the regression line is used to demonstrate the extent and direction of this relationship.

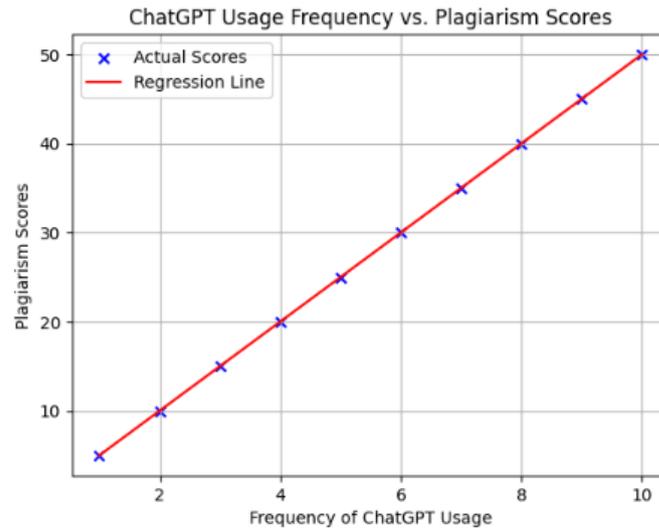


Fig. 9. ChatGPT usage Frequency vs Plag scores

V. DISCUSSION

The findings of this study highlight nature of the tool for academic writing through ChatGPT. On one hand, it presents unparalleled efficiency and accessibility for students to surmount challenges such as language barriers and time constraints. However, its very extensive use is fraught with some major ethical and academic concerns concerning plagiarism and intellectual integrity. The data indicates that students who often use ChatGPT to generate content are more likely to be committing plagiarism. This supports the hypothesis that using AI to write the major part of the content results in disconnection with the writing act and increased chances of committing unintentional plagiarism. These findings are in line with previous studies, which indicate that the ease of access to AI-generated content can lead to dependency and a decrease in critical thinking skills. Another important insight is the role of awareness of academic integrity in reducing plagiarism risk. The students with greater awareness of ethical writing practices and rules of plagiarism exhibited a lower likelihood of misusing ChatGPT. This brings out the need to have academic integrity education added in curricula, especially on emerging AI technologies. The paper also brings out the need for institutions to provide written guidelines regarding ethical use of AI-driven tools like ChatGPT. The ability of current plagiarism detection systems to identify AI-generated content is often found lacking because it primarily relies on matching verbatim text. This gap calls for more advanced detection methods that can identify paraphrased or structurally different outputs that come from AI tools.

Furthermore, the function of use intended to apply, and its actual purpose affects is plagiarism. ChatGPT- the idea-creating and enhancing tool usage users involved lower levels compared to the overall students' user. This means that using ChatGPT as an additional tool to help brainstorm and refine ideas instead of using it to generate the main content would help ensure academic integrity. Conclusion While offering vast potential to improve academic productivity, uncontrolled use of ChatGPT poses considerable threats to the fundamental tenets of education. The right balance between technological advancements and robust ethical guidelines and educational initiatives is required to harness the benefits without compromising academic standards.

VI. CONCLUSION AND FUTURE WORK

The research also delves into the significant ethical implications and the efficiency and accessibility factors that are enhanced by ChatGPT in academic writing. The results of the study indicate a significant correlation between the extent of ChatGPT usage and plagiarism among the cohort of students who employ it to generate texts. However, the study revealed that students who were more concerned with academic integrity had lower plagiarism rates. It is important to emphasize that ethical education should be implemented in order to prevent its misuse. The current study, in fact, contributes to the comprehension of the present technological imperfection in plagiarism detection systems with respect to AI-generated content. Furthermore, the purpose of ChatGPT usage is a critical factor in determining the risk of plagiarism, with content creation posing a greater threat than idea generation or revision.

In order to mitigate these concerns, educational institutions should implement rigorous policies regarding the responsible utilization of AI tools, integrate academic integrity training into their curricula, and allocate resources to the advancement of advanced detection systems. If students are encouraged to utilize the tool as an auxiliary ideation and refinement tool rather than a primary content generator, academic integrity will be preserved. The focus of future research should be on the long-term effects of ChatGPT use on critical thinking and writing. Additionally, inter-comparative studies conducted across a variety of academic disciplines and contexts will offer valuable insights into the impact of AI on academic integrity. It is imperative to establish responsible AI utilization frameworks and advanced AI detection systems. In an effort to achieve this equilibrium, educators, policymakers, and technologists should collaborate to create an environment that is both innovative and conducive to learning, where the highest ethical standards are never sacrificed in favor of innovation.

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