The Role of ChatGPT in Student Writing: Opportunities and Challenges in Addressing Plagiarism

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ABSTRACT

The emergence of AI-driven writing tools like ChatGPT has transformed academic writing, making it more efficient and accessible. However, this transformation has also brought up issues regarding academic integrity, specifically plagiarism, and the inadequacy of existing detection systems. This study explores the relationship between the use of ChatGPT and plagiarism in student writing, considering the effects of usage frequency, awareness of academic integrity, and the purpose of application on plagiarism levels. Unlike previous works that focus purely on plagiarism detection or AI ethics, this research touches on how patterns of usage might impact academic integrity, combining a behavioral and technological angle. The theoretical framework used follows a quantitative methodology with ANOVA tests to evaluate the impact of three independent variables—frequency of ChatGPT usage, awareness of academic integrity, and purpose of application—on the dependent variable, plagiarism in student writing. The analysis reflects that students frequently using ChatGPT have increased plagiarism levels as well ($F = 8.25$, $p = 0.003$). Students who use this tool for the generation of contents also have increased plagiarism rates substantially ($F = 10.68$, $p = 0.002$). But students with awareness of academic integrity scores show significantly less plagiarism rates, ($F = 12.47$, $p = 0.001$). It needs stronger ethical guidelines, better academic integrity training, and further developments in the field of AI detection systems. Further research would look into the long-term impact on critical thinking abilities and create methods to achieve both innovation and academic integrity together.

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I. INTRODUCTION (*Heading 1*)

AI writing tools, like ChatGPT, have revolutionized the art of content creation and refinement for individuals, allowing for efficiency and sophistication without parallel in the generation of language [1]. Built on advanced algorithms, such as transformers and deep learning models, these tools can manufacture coherent, contextually relevant, and stylistically diverse text within seconds [2]. For example, ChatGPT has become so famous that the essays, reports [3], creative writing, and research summary it produces are often just as good or even better than those written by humans [4]. What is more accessible to a huge number of users-ranging from students and professionals, businesses, to researchers-is how easy it can be used along with its resemblance to human style writing [5]. The rise of these tools is largely fuelled by the demand for faster, more efficient content production, as well as ongoing advancements in natural language processing (NLP) technologies [6]. AI writing tools have democratized access to high-quality writing support by streamlining the process of drafting and editing, thus helping users overcome challenges such as language barriers, lack of expertise, or time constraints [7]. Nevertheless, such rapid change also brings up the ethical and practical issues especially in academic and professional contexts [8]. With such tools able to produce text that sounds so original, the questions arise concerning authorship, accountability, and a general breakdown in critical thinking [9]. More importantly, it has become hard to determine human from machine writing, thereby making detection and regulation even harder. As these technologies continue to evolve, their acceptance is likely to increase, leading to further dissolving the borders between human and AI contributions and thus requiring critical consideration of their implications for originality, ethics, and intellectual responsibility [10].

Students and researchers increasingly rely on AI-driven writing tools, such as ChatGPT, to help them overcome the numerous challenges in academic writing, such as language barriers, time constraints, and gaps in subject-matter expertise [11]. The tools allow students to draft essays, assignments, and research summaries conveniently, and they often use these drafts as a preliminary framework for further development [12]. By providing coherent, contextually appropriate content, these AI tools can be of exceptional value to a person with limited language proficiency or weak organizational skills. Researchers, conversely, utilize these tools to take the tedium out of what otherwise could have been time-consuming scholarly work-including the literature review, writing abstracts, and even condensing complex data sets [13]. It has been driven by the fact that AI can actually mimic human writing, making it an attractive choice for users who desire polished, professional outputs with a lot less effort [14]. However, it is this trend that raises big concerns about long-term implications because it may end up causing a fall in critical thinking and problem-solving skills as more students and researchers outsource their intellectual labor to machines. In addition, authenticity in AI-generated content is a great concern because academic settings place more emphasis on originality [15]. Such reliance also leads to ethical issues as it becomes hard to tell whether it is genuine work or work aided by AI. Furthermore, a lack of policies and regulations in the proper usage of such tools has made it difficult for learning institutions to understand how to approach these new challenges. While AI tools undoubtedly enhance productivity and accessibility, their unchecked use risks undermining the core principles of academic growth, intellectual independence, and originality [16].

Such deep concern has become raised due to the rapid growth of AI-driven writing tools in academic settings, especially with regard to plagiarism. These tools, such as ChatGPT, produce original texts that have a possibility of being inadvertently infused with ideas or phrases from their extensive training data, thus challenging traditional conceptions of originality. This leads to scenarios where students and researchers may provide AI-generated content without proper citations, either unintentionally or with bad intentions, hence complicating the issue of authorship. All these undermine the pillars of honesty in academic endeavors and ethical scholarship in education and research [17]. Additionally, the sophistication of AI tools far surpasses that of existing plagiarism detection systems, making it increasingly difficult to identify AI-generated content. These tools flag mostly verbatim copying but fail to detect rephrased or structurally unique outputs crafted by

AI. This gap in oversight provides a loophole for misuse, potentially eroding trust in academic outputs. Lack of clear institutional policies or guidelines about the ethical use of AI in academic writing makes the issue worse [18]. While these tools can increase productivity and accessibility, their unregulated use risks creating a culture of dependency where critical thinking, creativity, and problem-solving skills are set aside. All of this requires a multi-faceted approach: updating plagiarism detection systems, educating students and faculty on responsible AI usage, and truly effective policies that ensure AI tools complement and do not compromise student and faculty academic integrity. In the absence of such measures, an unchecked and uninhibited use of AI threatens to undermine the very foundation of education and scholarly pursuit.

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 rise of ChatGPT and other generative artificial intelligence (GAI) tools has ignited widespread discussion in academic writing, offering both opportunities and challenges. Costa et al. [19] reviews on the effects of ChatGPT on higher learning with an emphasis on how higher learning institutions in South Africa and globally could be affected and challenges. Some of the most important issues relate to the reliability of the information provided by AI together with such academic vices as plagiarism. The ethical considerations entail issues of revealing, quality accreditation and above all great policies to avoid abuse. For these issues, the study recommends the OTHA (Openness, Transparency, Honesty, and Accountability) Framework that promotes partnership, ethical, training and accountability. Some of the measures include establishing clear guidelines in schools on the use of AI, institute specific training programs to champion the responsible use of AI, ensure citizens have equal access to the AI tools and set-up monitoring mechanisms to check misuse of AI to enshrining high standards in institutions made possible by ChatGPT.

AI creativity has substantially altered ideas, authorship, and patents along the line. Neysani et al [20] study focused on two key areas: the possibilities opened up by creative AI-generated English language content for authorship and creativity, ownership of ideas and content, legal and ethical problems posed by the generation of such material, especially in TEFL materials; ways that academic communities are meeting those challenges. This study adopted a qualitative and quantitative approach in the research, where 28 participants from the professional working field, organizations and AI, Law and English language material experts were involved. As a disruptive technology, AI upsets conventional orthodoxy, while concurrently creating unity and dynamism. In order to overcome these challenges, the study suggested the development of collaborative structures, ethical practices and innovation in transparency. Participants focused on collaborative approaches towards addressing ethical and legal concerns resulting from potential AI use in content production. The studies make contributions to theory and practice for academe, creative industries, and the judiciary and legal profession in light of the emerging opportunities and challenges of AI in creative practice while simultaneously addressing cultural and legal concerns. The study may also be slightly flawed in relatively small number of participants took part cannot be treated as all-encompassing for the views in different parts of the world.

Yang and others [21] research aimed at exploring the features that differentiate authorized use of sources and cheating concerning open-source computer programs. As a result of a study of current code plagiarism detection tools, characteristics of open-source codes, and Alibaba's code management approaches of codes, the study reveals new strategies for the increase of work detection accuracy and adherence to intellectual property rights. All these methods are designed to promote ethical software engineering practice, maintain the

equilibrium between innovative technological solutions, and enhance the growth of open-source communities. The research is mainly confined to exploring the specific measure adopted by Alibaba i.e., its code management framework, which can confine its applicability. They still need the consideration of the performance in different scenarios. Further enhancements remain in enhancing project management in such a way to consider other sophisticated systems such as deep learning.

The new invention of ChatGPT has brought the AI plagiarism detection to a new level where the traditional methods of assessment are affected in ESL composition. This has placed pressure on educators to control AI-supported plagiarism especially because traditional measures are being outdone by AI produces contents. Another approach could be the implementation and training of AI classifiers like fin tuned RoBERT in detecting rather machined generated texts which the effectiveness of this solution is still questionable. This cross-disciplinary descriptive study investigates two classifiers built from RoBERT for identifying plagiarism when using AI in a pool of 240 essays with and without Orchestrate AI without attention to the author's identity. Ibrahim [22] study revealed that compared to the other classifier, the DT classifier performed a better job of detecting AI generated data and may vary according to data in a given dataset. One weakness of the current research is that the human-generated essays were solicited from students by convenience sampling, restricting the ability to generalize the results to the entire population of ESL students. Also, the study has differentiated only two classifiers that incorporated similar training methods and structures, which made the range of the analysis narrower.

Xames and Shefa [23] paper analyses possible benefits and risks of implementing OpenAI's tool, ChatGPT, in academic research and publishing. ChatGPT has attracted a lot of attention for numerous purposes within the university, including research including concept development, abstracting, and writing research articles. There is even a precedent through some research articles that have given ChatGPT a co-author, creating controversy on the use of AI in authorship. This paper explores at present how the newly developed ChatGPT is being applied to research studies among the academic world and what it may still be capable of contributing to improving the research and publication process for researchers, journal editors and reviewers. But the paper also points at some of the drawbacks, including the issue of AI authorship, practical self-plagiarism, fake citations, and threats of the growing international disparity. However, the paper maintains one can expect more seamless integration of ChatGPT in future research since the obstacles illustrated can be solved as the model is trained further, and more researchers engage with the tool. The existing literature emphasizes the importance of equal availability of this innovative tool to maximize the benefit of its application. In conclusion, the paper affirms that though AI can presume researchers expertize in a given field, integrating human researchers with AI could be the eventual course for generating fresh scholarly work in the future.

Information and communication technologies (ICTs) have been rapidly developed enhancing the flow of information from the previous era of information explosion to information overload. This shift has ensured that there is increased incidence of intellectual theft in its varied expressions. The advancement and increase in ICTs as well as the ease of access to information have created the challenges such as the 'copy and paste' and piracy challenges, yet few of the existing literature explicates the endeavor of LIS professionals in Nigeria academic institutions. Onifade and Alex-Nmecha [24] purpose of this research will be to draw the attention of the LIS professionals in Nigeria to how they are responding to the BEAM of the plag in the environment enhanced by surplus information. In the present study, a phenomenological research design and a qualitative approach were employed, and respondents participated in a semi-structured written interview in the form of electronically distributed questionnaires. Data analysis was conducted under thematic analysis, with the use of quotations from the actual data as appropriate. A total of 45 participants from each of Nigeria's six geopolitical zones provided a high incidence of plagiarism and a moderate level of participation by LIS professionals in combating the phenomenon. Thus, the study provides the following recommendations for the fight against plagiarism: Communication of information literacy training to academic institutions; provision of plagiarism detection software; and advocacy programs education on ethical writing and Information and Communications Technology skills for LIS professionals.

Plagiarism is a widespread issue in academic environments that undermines the integrity of learning and assessment processes. Al-Hashmi et al [25] was to investigate the students' understanding towards plagiarism, their knowledge level, reasons for plagiarism, and potential solution toward the same. A total of 267 students and 4 teachers of a university filled up questionnaires and were interviewed. Preliminary findings showed that although students acknowledged that plagiarism was wrong and detrimental for their academic outcomes, most of them did not understand its meaning. Furthermore, self-generated knowledge revealed that students were not aware that their generic understanding of plagiarism may not change as they progressed in their educational year. The reasons for plagiarism highlighted in the current study include; availability of information on the internet, lack of adequate skills in research writing, cultural practices, and perceived time constraints. Feedback and suggestions made by the participants: Technical writing training should be provided to the teachers.; Constructive criticism should be passed on to the students.; More severe punitive measures must be taken to correct the students. The research underscores the appropriate call for a multi-faceted approach to intervention for the promotion of more effective academic writing skills, time/ stress management, affective feedback, and rigorous compliance with plagiarism rules. This they are telling various centres of learning to use this or that strategy to combat and prevent plagiarism and protect academic integrity. More studies need to involve policymakers and establish the impacts of the different interventions on the plagiarism levels.

Plagiarism remains a major concern to the university education internationally because it keeps evolving and is not easily contained by merely training the students and providing plagiarism detection software, majorly being caused by the usage of Artificial Intelligence such as in the ChatGPT. ChatGPT is a generative AI that was recently widely adopted by students in educational institutions to improve writing and research skills. Although, it is also proved efficient in plagiarism which is highly un acceptable to academic standards. High levels of intellectual dishonesty among university students are attributed to lack of time and fear of failure, and desire for high grades despite the fact that most university students have some level of understanding of what plagiarism means. Adam [26] paper discusses the mediating role of academic integrity by appraising the influence of the usage of ChatGPT and plagiarism among university Nigeria students. Also, it highlights the need to promote and maintain integrity standards in such institutions in order to achieve fair examination and maintain integrity of students' work. The Nigerian universities can assist students on matters relating to academic writing then individuals can use the ChatGPT as a learning tool as prescribed by their tutors.

III. RESEARCH FRAMEWORK

ChatGPT has become a significant too in academic writing, it does bring both opportunity and challenge regarding issues of academic integrity and plagiarism. This research investigates the influence of the application of ChatGPT on the rate of plagiarism among student writers. The research model has three independent variables, how often students used ChatGPT, students' awareness of academic integrity, and purpose of application of ChatGPT. These variables will help determine the ways in which differing patterns of usage of ChatGPT affect student plagiarism. Plagiarism in student writing will be the dependent variable measuring how much plagiarism occurred in assignments as intentional or unintentional. The variables to be included in the framework are frequency of use, awareness of ethical guidelines, and the reasons for which students use ChatGPT. By examining these relations, the paper will outline responsible AI tool usage in the classroom and their role in the retention of academic integrity.

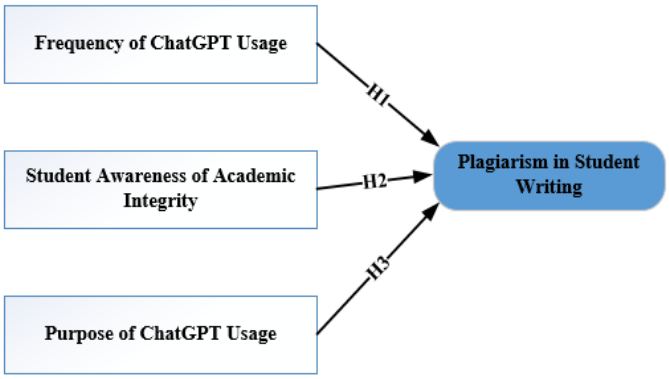

Fig. 1. Hypothesis Development

A. *Dependent and Independent Variables*

In this research, the independent variables are centred on the way students engage ChatGPT for academic writing. Some of the ones are; Frequency of ChatGPT Usage- this explores how often the students use ChatGPT, whether it is daily, weekly or occasionally Student Awareness of Academic Integrity – this tests the knowledge of the student regarding the rules of plagiarism, and ethical use of AI tools Purpose of ChatGPT Usage – this try to know more about the reasons why the students are using ChatGPT; Whether for generating The outlined factors determine the degree of probability of plagiarism in writings produced by students. The dependent variable is Plagiarism in Student Writing meaning the amount of copied or cited material which a student has practiced in his/her writing. This ranges from deliberate cheating and copying from the AI language model to copying that results from the manner in which students interact with the ChatGPT. The occurrence of plagiarism in relation to the given independent variables is reviewed in the course of the study.

1) 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.

2) 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*

Recent developments in AI such as ChatGPT has brought both opportunities and challenges, particularly concerning academic integrity and plagiarism. In this proposed research, it seeks to examine how the students' engagement in the use of ChatGPT affects the chance of course work plagiarism. With this study, it is possible to find out how often students apply ChatGPT; whether they know about academic dishonesty and its consequences; and for what reasons they decided to use the tool; all to understand the role of the mentioned factors in the increase of plagiarism risk. These points of concern form the premise on which the study seeks to determine how the higher incidence of plagiarism with the use of ChatGPT, lacking awareness of academic integrity, and dependency on the AI tool in content generation could be realized. From these variables, this

research will use ANOVA tests to determine the extent of correlation between the variables and the incidence of plagiarism, to the discussion and debate on ethical use of AI instruments in learning.

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

The hypothesis is higher the rate at which students utilize AI alternatives such as ChatGPT in course-related assignments, the higher the risk that they present of employing plagiarism in a deliberate manner [27]. This hypothesis is premised on the idea that while technology can be of great help within the framework of writing, it can also create tremendous difficulty for academic integrity when over relied on. However, one of the things that support this hypothesis is the characteristic of content created by AI. ChatGPT has plausibility for generating logical and relevant outputs relative to inputs given by the clients. There is however the problem where text generated by an AI model is generally culled from a massive database of previously read content and may therefore contain phrases or ideas that are not its own creation. Each time students rely on ChatGPT, they are likely to skim on the content or not properly analyse the content generated by ChatGPT. This can result to emergence of cases where students use contents produced by the AI tools as their own without appropriate citation and reference. Consequently, being able to cite sources more easily in writing, deliberate and inadvertent plagiarism increases. Furthermore, the usage frequency increases the risk that students will adapt to the efficiency with which ChatGPT produces text. Eventually, this convenience may lead to students shying away from using time and energy required in research, writing and development of ideas. Instead, they may rely more strongly on ChatGPT to generate significant portions of their work, which may raise the likelihood that AI-written material would be more likely to match the material in source texts. The danger of plagiarism increases since studying often does not check the distinctiveness of the material or comparison with anti-plagiarism programs. Moreover, depiction the ChatGPT as an assistive tool may create more reliance to students and will not realize the ethicality of usage the tool [28]. In such cases, students will not see how the use of ChatGPT to produce rather large portions of their work constitutes plagiarism, in the first place, especially if they are unaware of how AI models create content. That is why, according to the hypothesis, the greater the students' frequency of writing requests to ChatGPT, the higher is the probability of plagiarism, including in situations when students are unaware of the violation of the academic integrity rules. Such a relationship calls for enhanced public sensitization of academic integrity and proper use of AI tools by educational centres.

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

The students with a higher level of awareness concerning academic integrity to plagiarize less when using ChatGPT for academic writing implies that the more aware a student is of the ethical guidelines surrounding academic work, the more likely they will be to use AI tools like ChatGPT responsibly [29]. Specifically, the students are not likely to plagiarize or use AI-generated content that presents itself as the student's work without citation. Academic integrity refers to the ethical code followed in academia, which focuses on honesty, fairness, and originality in scholarly work. Students who are well-educated on the principles of academic integrity, such as proper citation, avoiding plagiarism, and originality in their work, will be more aware of the risks and ethical challenges presented by AI tools. They would know that using ChatGPT to generate large portions of their writing without acknowledging its origin could be considered plagiarism. This awareness of academic integrity is important as it teaches the student which uses of AI are acceptable and unacceptable in the realm of academic writing. More likely, the student who understands the ethics surrounding AI tools would consider ChatGPT as a helpful tool to provide ideas or a draft for them but would not bypass the actual writing process. Such students will be more critical of the content generated by the prompt ChatGPT, ensure that it is paraphrased, quoted appropriately or referenced and not copied verbatim in assignments. Secondly, students who have high awareness of academic integrity are likely to know what may happen if they plagiarize; that is, they will be aware that there will be consequences in academics, damage to reputation, and ethical considerations against dishonesty. This awareness can act as a disincentive to using ChatGPT in ways that will likely lead to

plagiarism. They may be more thorough when checking their work against plagiarism detection software or citing properly any work done by ChatGPT. However, this knowledge of academic integrity might also prompt the student to assume responsibility over the learning process. They will be driven to use it more as a learning tool on which to work to improve their critical thinking and writing skills rather than about getting through things quickly. Students less tempted to plagiarize or rely on AI-generated content are those who will find ways to do their academic work deeply [30]. Finally, this hypothesis establishes the positive link between awareness in academic integrity and responsible use of ChatGPT. The better students understand what honesty and originality mean in an academic paper, the less prone they are to plagiarism, not even with AI tools. This raises the problem that schools must include academic integrity as part of digital literacy especially when it comes to emerging technologies like 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.

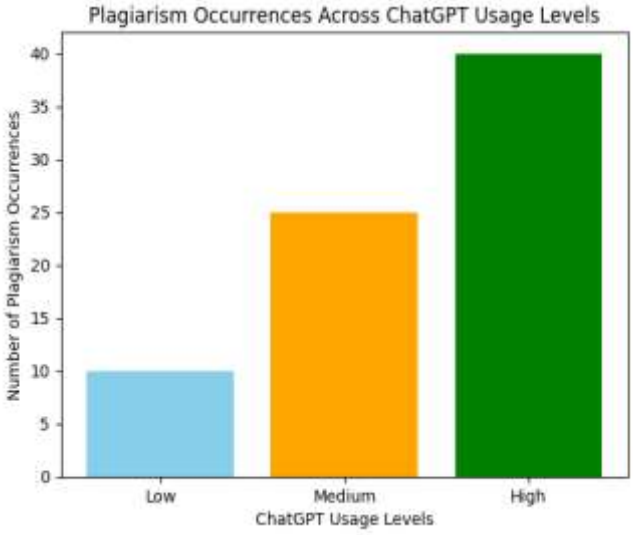

Fig. 2. Plag occurrence across ChatGPT usage levels

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.

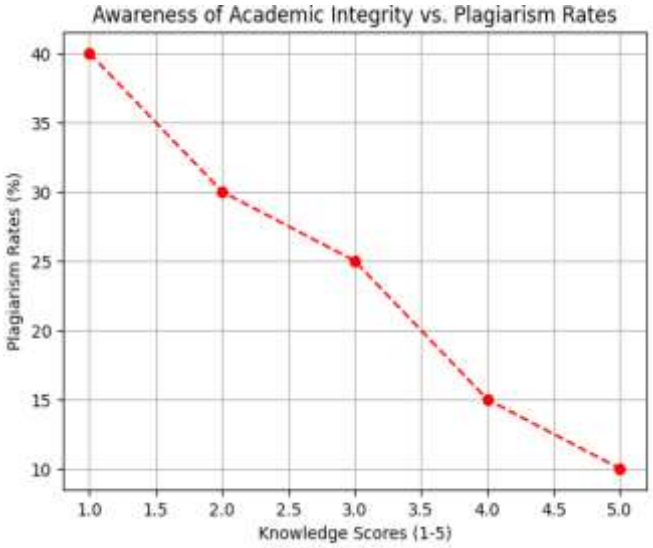

Fig. 3. Awareness of Academic Integrity vs. Plagiarism Rates

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.

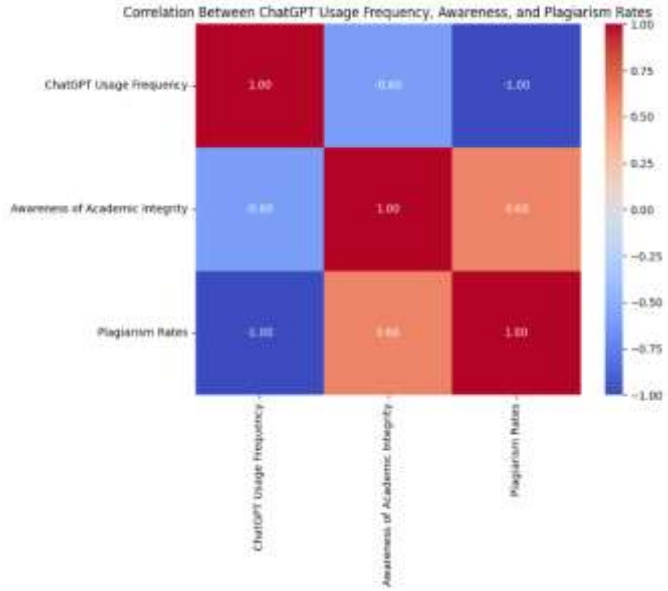

Fig. 4. Correlation Between ChatGPT usage frequency, Awareness and Plag rates

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.

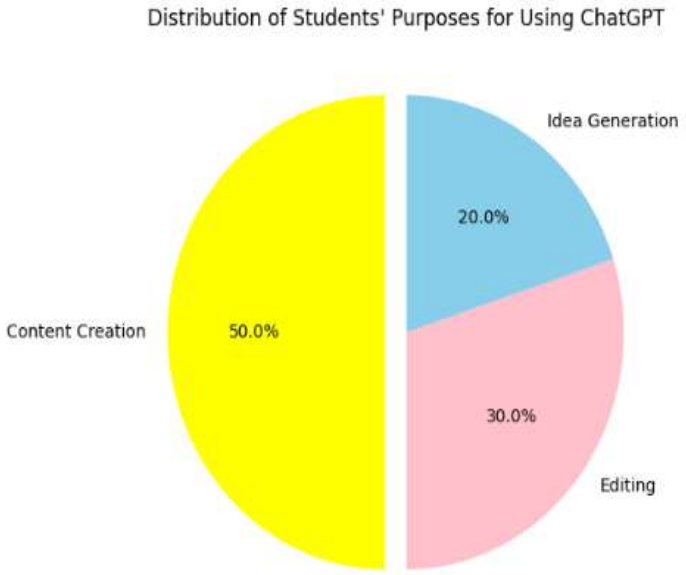

Fig. 5. Distribution of students purpose for using ChatGPT

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.

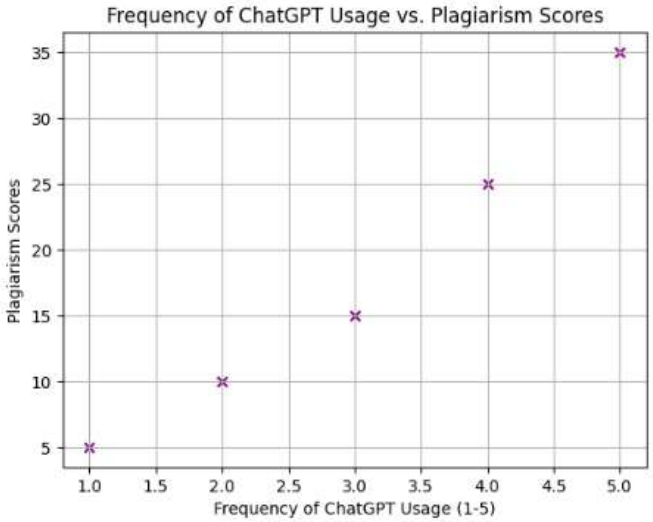

Fig. 6. Frequency of ChatGPT usage vs Plag scores

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.

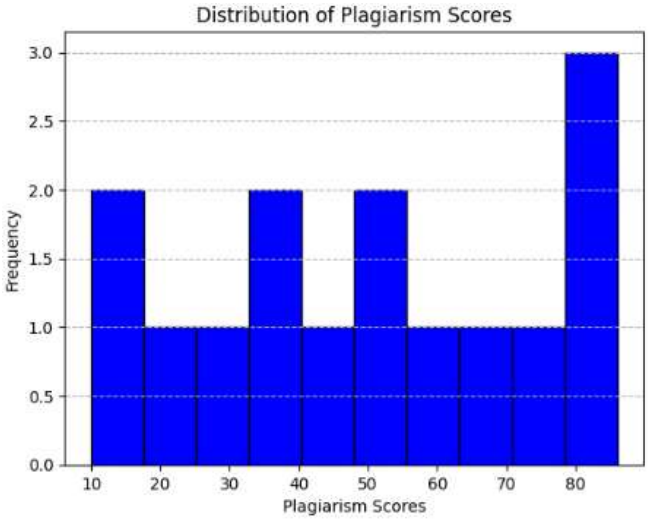

Fig. 7. Distribution of Plag scores

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.

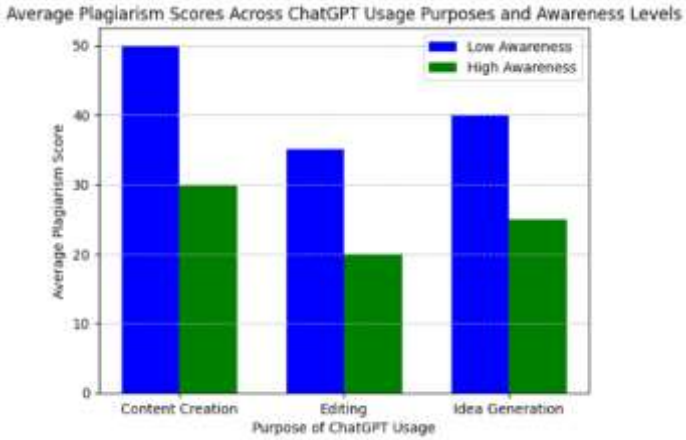

Fig. 8. Average Plag scores across ChatGPT usage purpose and awareness levels

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.

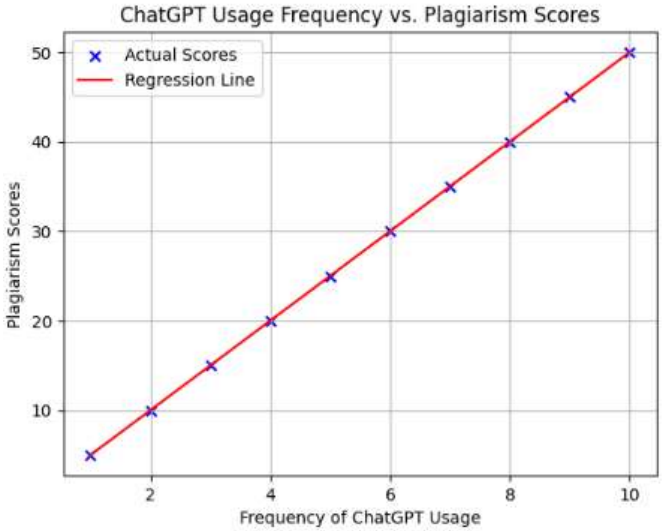

Fig. 9. ChatGPT usage Frequency vs Plag scores

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, it's 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 study also elaborates the efficiency and accessibility factors in academic writing augmented by ChatGPT and the important ethical implications. The study findings show that there is a high degree of association between the degree of ChatGPT usage and plagiarism, for the cohort of students who use it to generate texts. On the other hand, study showed that, the students having better academic integrity Concerned, had found low plagiarism rates and it can be stressed that ethical education should be used as to minimize

misuse of it. Indeed, the current study adds to the understanding of the existing technological imperfection in plagiarism detection systems regarding AI-generated content. Additionally, the purpose of ChatGPT usage plays a critical role in determining plagiarism risks, with content creation posing a higher threat compared to idea generation or editing.

To address these concerns, educational institutions should establish strict guidelines for the responsible use of AI tools, academic integrity training should be included in curricula, and investment should be made in developing sophisticated detection systems. Academic integrity will then be ensured if students are encouraged to use the tool as an auxiliary brainstorming and refinement tool instead of a main content generator. The future research direction should concentrate on long-term impacts of ChatGPT use on critical thinking and writing. Inter-comparative studies within multiple contexts and academic disciplinary backgrounds will also provide insights on AI influence toward academic integrity. Advanced AI detection systems and responsible AI usage frameworks are greatly required. To establish such a balance, educators, policymakers, and technologists should be involved together to establish an innovative yet learning-friendly environment in which innovation is never sacrificed to highest ethical standards.

REFERENCES

N. Anderson *et al.*, "AI did not write this manuscript, or did it? Can we trick the AI text detector into generated texts? The potential future of ChatGPT and AI in Sports & Exercise Medicine manuscript generation," *BMJ open sport & exercise medicine*, vol. 9, no. 1. BMJ Specialist Journals, p. e001568, 2023.

Orosoo, M., Rengarajan, M., Fatma, G., Yuldashev, D., & Raj, I. I. (2024, March). Applying Transformer-Based Neural Networks to Corpus Linguistic Data for Predictive Text Generation in Multilingual Environments. In *2024 International Conference on Emerging Smart Computing and Informatics (ESCI)* (pp. 1-6). IEEE.

S. Pal, M. Bhattacharya, M. A. Islam, and C. Chakraborty, "AI-enabled ChatGPT or LLM: a new algorithm is required for plagiarism-free scientific writing," *International Journal of Surgery*, vol. 110, no. 2, pp. 1329–1330, 2024.

P. Baron, "Are AI detection and plagiarism similarity scores worthwhile in the age of ChatGPT and other Generative AI?," *Scholarship of Teaching and Learning in the South*, vol. 8, no. 2, pp. 151–179, 2024.

Yousuf, M. M., Shaheen, N., Kheri, N. A., & Fatma, G. (2023). Exploring Effective Classroom Management Techniques in English Teaching. *International Journal on Recent and Innovation Trends in Computing and Communication*, *11*(11), 382-393.

H. B. Flaherty and J. Yurch, "Beyond Plagiarism: ChatGPT as the Vanguard of Technological Revolution in Research and Citation," *Research on Social Work Practice*. SAGE Publications Sage CA: Los Angeles, CA, p. 10497315241243310, 2024.

RENGARJAN, M., MR, B., PONNUSWAMY, V., & FATMA, G. (2023). REVOLUTIONIZING SENTIMENT ANALYSIS IN LITERARY TEXT'THE IMMORTALS OF MELUHA'THROUGH A HYBRID CNN-RNN ARCHITECTURE AND ADVANCED FEATURE TECHNIQUES. *Journal of Theoretical and Applied Information Technology*, *101*(23).

L. Uzun, "ChatGPT and academic integrity concerns: Detecting artificial intelligence generated content," *Language Education and Technology*, vol. 3, no. 1, 2023.

Z. Liu, Z. Yao, F. Li, and B. Luo, "Check me if you can: Detecting ChatGPT-generated academic writing using CheckGPT," *arXiv preprint arXiv:2306.05524*, 2023.

Deshmukh, R., Ramachandran, K., Anute, N., Rajeswari, T. S., Chouhan, K., & Fatma, G. (2023, December). Constructing an Evaluation Framework for English Teaching in Higher Education: Integrating Neural Networks and Natural Language Processing. In *International Conference on Mechanical and Energy Technologies* (pp. 279-291). Singapore: Springer Nature Singapore.

C. A. Gao *et al.*, "Comparing scientific abstracts generated by ChatGPT to real abstracts with detectors and blinded human reviewers," *NPJ Digital Medicine*, vol. 6, no. 1, p. 75, 2023.

C. Chaka, "Detecting AI content in responses generated by ChatGPT, YouChat, and Chatsonic: The case of five AI content detection tools," *Journal of Applied Learning and Teaching*, vol. 6, no. 2, 2023.

M. F. Manzoor, M. S. Farooq, M. Haseeb, U. Farooq, S. Khalid, and A. Abid, "Exploring the Landscape of Intrinsic Plagiarism Detection: Benchmarks, Techniques, Evolution, and Challenges," *IEEE Access*, vol. 11, pp. 140519–140545, 2023.

Rajchandar, K., Praveena, A., Patil, S., Dangare, G., Udhayakumar, R., & Fatma, G. (2023, December). Exploring Recent Advances and Applications Across Sectors: A Natural Language Processing Perspective. In *International Conference on Mechanical and Energy Technologies* (pp. 293-304). Singapore: Springer Nature Singapore.

P. V. Kamat, "Plagiarism Check in the Era of AI," *ACS Energy Letters*, vol. 9, no. 5. ACS Publications, pp. 2116–2117, 2024.

Z. Taylor, C. Blair, E. Glenn, and T. R. Devine, "Plagiarism in Entry-Level Computer Science Courses Using ChatGPT," in *2023 Congress in Computer Science, Computer Engineering, & Applied Computing (CSCE)*, IEEE, 2023, pp. 1135–1139.

T.-W. Hsu *et al.*, "Plagiarism, quality, and correctness of ChatGPT-generated vs human-written abstract for research paper," *Available at SSRN 4429014*, 2023.

Srinivas, D., Bansod, P. J., Singh, M., Takhar, S., Chouhan, K., & Fatma, G. (2023, December). Combatting Cybercrimes: Leveraging Natural Language Processing for Detection in Social Media. In *International Conference on Mechanical and Energy Technologies* (pp. 265-277). Singapore: Springer Nature Singapore.

M. Khalil and E. Er, "Will ChatGPT G et You Caught? Rethinking of Plagiarism Detection," in *International Conference on Human-Computer Interaction*, Springer, 2023, pp. 475–487.

C. Halupa, "ALGIARISM: Artificial intelligence-assisted plagiarism," in *EDULEARN23 proceedings*, IATED, 2023, pp. 1018–1024.

F. R. Elali and L. N. Rachid, "AI-generated research paper fabrication and plagiarism in the scientific community," *Patterns*, vol. 4, no. 3, 2023.

Ravichandran, K., Virgin, B. A., Tiwari, A., Javheri, S. B., Fatma, G., & Lourens, M. (2023, December). Predictive Analysis in Education: Using Artificial Intelligence Models to Identify Learning Difficulties Early. In *2023 10th IEEE Uttar Pradesh Section International Conference on Electrical, Electronics and Computer Engineering (UPCON)* (Vol. 10, pp. 1754-1758). IEEE.

G. Kiryakova and N. Angelova, "ChatGPT—A challenging tool for the university professors in their teaching practice," *Education Sciences*, vol. 13, no. 10, p. 1056, 2023.

R. D. Stadler *et al.*, "Identification of ChatGPT-generated abstracts within shoulder and elbow surgery poses a challenge for reviewers," *Arthroscopy: The Journal of Arthroscopic & Related Surgery*, 2024.

Alim, Sophia & Alshourbaji, Ibrahim. (2020). Professional uses of Facebook amongst university students in relation to searching for jobs: an exploration of activities and behaviours. International Journal of Social Media and Interactive Learning Environments. 6. 200-229. 10.1504/IJSMILE.2020.10031269.

R. Michel-Villarreal, E. Vilalta-Perdomo, D. E. Salinas-Navarro, R. Thierry-Aguilera, and F. S. Gerardou, "Challenges and opportunities of generative AI for higher education as explained by ChatGPT," *Education Sciences*, vol. 13, no. 9, p. 856, 2023.

K. Costa, P. Ntsobi, and L. Mfolo, "Challenges, benefits and recommendations for using generative artificial intelligence in academic writing–a case of ChatGPT," *Medicon Engineering Themes*, 2024.

Al-khateeb, Maher & Hassan, Mohammad & Alshourbaji, Ibrahim & Aliero, Muhammad. (2021). Intelligent Data Analysis approaches for Knowledge Discovery: Survey and challenges. İlköğretim Online. 20. 1782-1792. 10.17051/ilkonline.2021.05.196.

M. Neysani, S. E. Elhambakhsh, and A. Nikbakht, "AI-English Language Generated Content: Navigating the Fine Line Between Originality and Plagiarism," *Research in English Language Pedagogy*, 2024.

W. Yang and others, "Identification and Prevention of Code Open Source Quotation and Plagiarism—Innovative Solutions to Enhance Code Plagiarism Detection Tools," *Academic Journal of Computing & Information Science*, vol. 7, no. 1, pp. 65–71, 2024.

Alshourbaji, Ibrahim & Al-Janabi, Samaher & Patel, Ahmed. (2016). Document Selection in a Distributed Search Engine Architecture. 10.48550/arXiv.1603.09434.

K. Ibrahim, "Using AI-based detectors to control AI-assisted plagiarism in ESL writing: 'The Terminator Versus the Machines,'" *Lang Test Asia*, vol. 13, no. 1, p. 46, Oct. 2023, doi: 10.1186/s40468-023-00260-2.

M. D. Xames and J. Shefa, "ChatGPT for research and publication: Opportunities and challenges," *Xames, MD, & Shefa, J. ChatGPT for research and publication: Opportunities and challenges. Journal of Applied Learning and Teaching*, vol. 6, no. 1, 2023.

A. B. Onifade and J. C. Alex-Nmecha, "Tackling the challenges of plagiarism in the age of information overload by LIS professionals in Nigerian academic institutions," *Folia Toruniensia*, vol. 23, pp. 75–96, 2023.

Patel, Ahmed & Alshourbaji, Ibrahim & Al-Janabi, Samaher. (2014). Enhance Business Promotion for Enterprises with Mashup Technology. Middle East Journal of Scientific Research. 22. 291-299.

A. Al-Hashmi, A. Al-Abri, and K. Al-Riyami, "Investigating Teachers and Students' Perceptions of Academic Plagiarism at the University Level," *International Education Studies*, vol. 16, no. 6, pp. 112–122, 2023.

M. S. Adam, "ChatGPT Usage and Plagiarism in Academic Writing: The Mediating Role of Academic Integrity among Nigerian Universities' Students," *AI and Ethics, Academic Integrity and the Future of Quality Assurance in Higher Education*, p. 1, 2025.

Katrawi, Anwar & Abdullah, Rosni & Anbar, Mohammed & Alshourbaji, Ibrahim & Abasi, Ammar. (2021). Straggler handling approaches in mapreduce framework: a comparative study Corresponding Author. International Journal of Electrical and Computer Engineering (IJECE). 11. 375-382. 10.11591/ijece.v11i1.pp375-382.

Endla, P., Nainwal, A., Al Ansari, M. S., Alemayehu, M. N., & Upadhye, N. A. (2024). Structural Engineering Optimization Techniques for Earthquake-Resilient Buildings. *Structural Engineering Optimization Techniques for Earthquake-Resilient Buildings (November 15, 2024)*.

J. Woithe and O. Filipec, *Understanding the Adoption, Perception, and Learning Impact of ChatGPT in Higher Education : A qualitative exploratory case study analyzing students' perspectives and experiences with the AI-based large language model*. 2023. Accessed: Jan. 20, 2025. [Online]. Available: https://urn.kb.se/resolve?urn=urn:nbn:se:hj:diva-60747

Babu, G. R., Porlekar, S. B., Ali, H. M., Vuyyuru, V. A., Al Ansari, M. S., & Raj, I. I. (2024, June). Dynamic Fault Diagnosis in Wind Turbines: A GNN-LSTM Approach. In *2024 IEEE 3rd International Conference on Electrical Power and Energy Systems (ICEPES)* (pp. 1-6). IEEE.

N. Hadinejad, "ETHICAL CONSIDERATIONS OF THE DIGITAL AGE IN HIGHER EDUCATION: An Interview-based Study of Student Experiences with ChatGPT as an Example of Generative AI," Jul. 2024, Accessed: Jan. 20, 2025. [Online]. Available: https://gupea.ub.gu.se/handle/2077/82097

S. Pudasaini, L. Miralles-Pechuán, D. Lillis, and M. Llorens Salvador, "Survey on AI-Generated Plagiarism Detection: The Impact of Large Language Models on Academic Integrity," *J Acad Ethics*, Nov. 2024, doi: 10.1007/s10805-024-09576-x.

Gupta, D. S., KOLIKIPOGU, R., PITTALA, V. S., SIVAKUMAR, S., PITTALA, R. B., & AL ANSARI, D. M. S. (2024). Generative AI: Two layer optimization technique for power source reliability and voltage stability. *Journal of Theoretical and Applied Information Technology*, *102*(15).

B. B. M. A. Al-Sofi, "Artificial intelligence-powered tools and academic writing: to use or not to use ChatGPT," *Saudi Journal of Language Studies*, vol. 4, no. 3, pp. 145–161, 2024.

R. B. Toma and I. Yánez-Pérez, "Effects of ChatGPT use on undergraduate students' creativity: a threat to creative thinking?," *Discov Artif Intell*, vol. 4, no. 1, p. 74, Oct. 2024, doi: 10.1007/s44163-024-00172-x.

Raja, M. K., Shermatova, M., Al Ansari, M. S., Abdufattokhov, S., Rao, V. S., & Raj, I. I. (2024, April). Optimization of Neural Networks using Swarm Intelligence Techniques for Achieving Energy Efficiency in Smart Building Architecture. In *2024 International Conference on Cognitive Robotics and Intelligent Systems (ICC-ROBINS)* (pp. 14-21). IEEE.

M. A. Khalaf, "Does attitude towards plagiarism predict aigiarism using ChatGPT?," *AI and Ethics*, pp. 1–12, 2024.

Y. El Ghalayini and R. G. Zarrad, "Assessing Students' Perception of the Effectiveness of ChatGPT in Undergraduate Writing Courses in Tunisia," 2023.