

Educational AI and Ethical Growth: Exploring the effects of ChatGPT on student learning strategies, critical thinking, and academic ethics from a Bangladeshi academic perspective

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Abstract—As the pace of technological progress quickens, artificial intelligence (AI) is rising to the forefront as a potentially game-changing breakthrough. The proliferation of AI tools like ChatGPT has significantly helped local communities everywhere. ChatGPT is one of the most widely used AI technologies, and its widespread adoption across a wide range of applications has given it a major impact on people's everyday lives. However, there are both good and bad outcomes associated with how often students use ChatGPT. The aim of this paper is to examine how using ChatGPT can affect students while they are learning. An assessment is carried out by administering a survey to the students and conducting interviews with the instructors, both of which help to pinpoint areas in which the students could use additional help. The findings of this study provide new insight into the effects of using ChatGPT in classrooms and provide a blueprint for initiatives to improve learning outcomes for students.

Index Terms—artificial intelligence, chatbot, chatgpt, open-ai, gpt-4

I. INTRODUCTION

The replication of human thought processes by computers, in particular, is referred to as artificial intelligence. Learning, thinking, problem-solving, vision, and understanding languages are examples of these processes [1]. Artificial intelligence began to mature in the 1950s, with pioneers like Alan Turing making crucial efforts. Early efforts involved developing systems capable of playing chess and proving mathematical theorems [2]. Since its inception, AI has progressed through three stages: the early stages, the industrialization phase, and the explosion period. Artificial intelligence made its third and most significant leap from 1993 until the present [3]. The rise of virtual assistants powered by artificial intelligence

and chatbots in recent years has resulted in significant improvements, proving their ability to learn and construct human language with incredible precision. However, early attempts to imitate the first human conversational chatbot ELIZA were made by Joseph Weizenbaum at the Massachusetts Institute of Technology (MIT) in the mid-1960s [4].

ELIZA produced significant contributions to the fields of artificial intelligence, human-computer interaction, and language. It illustrated how simple language processing techniques may be used to produce discussions people find unexpectedly compelling. Even though they were conscious of the fact that they were conversing with an automated device, people were frequently captured to address their thoughts and emotions with ELIZA. Conversational AI was nurtured to acquire greater resemblance to human interactions, resulting in the development of human-like virtual assistants and the introduction of AI-powered chatbots into a range of sectors. Currently, there are plenty of chatbots with multiple uses and capabilities, like Google Bard, Microsoft Azure Bot Service, Bing Chat, and many more.

Generative Pre-Trained Transformer (GPT) utilizes artificial neural networks for natural language processing, which delivers an explanation based on the given context of the input message [6]. ChatGPT, which was developed by Open-AI on November 30th, 2022, and is based on the GPT-3 architecture, has received widespread attention for its capability of handling complex language understanding and generating tasks in the way of dialogue [5]. The GPT-3.5 model was introduced in 2020. GPT-3.5 algorithms are able to comprehend and generate natural language or code. The most recent iteration of this

series, GPT-4¹, accepts image and text inputs simultaneously and produces human-like text. ChatGPT is a versatile tool that can easily be used to improve content, generate ideas, assist programmers by providing programming examples, debug, translate languages, conduct market research, and much more [7]. In contrast, as its abilities evolve, so do the intellectual concerns that come with it. The danger of fraudulent use and plagiarism is a significant academic risk associated with ChatGPT. Because of its ability to produce meaningful and contextually appropriate language, there is fear that students are using it to make unique-looking essays and projects without an adequate understanding of what they are studying. This brings up moral questions of integrity in the classroom and pedagogical honesty. This advancement may result in the end of online exams' educational credibility [8]. As a result, it is essential to think about the future possibilities of this AI client.

The purpose of this article is to evaluate the current ChatGPT use case scenario from the academic standpoint of Bangladeshi students. Investigate the influence of ChatGPT manipulation on students' academic integrity, learning outcomes, and critical thinking skills. Examine particular instances of ChatGPT misuse in academics, such as plagiarism, and the presentation of generated content as genuine work.

II. BACKGROUND

ChatGPT is currently one of the most essential tools available. The introduction of ChatGPT has significantly altered various socioeconomic regions around the world. Through the use of this AI bot, people frequently use ChatGPT to highlight their knowledge. With a consistent area of research and analysis in the fields of engineering and medicine, ChatGPT is widely used in academia [9]. ChatGPT has significantly altered technology because it assists in gathering up-to-date information about any incident, including what happened when it did, and in providing data with the highest degree of accuracy [7]. ChatGPT has a plethora of applications. As it advances the conversation using dialogues and searches for the most accurate response to provide to the users, this AI bot helps researchers and students from all over the world come up with new ideas. This tool offers academic support, which benefits teachers as well as students by assisting them with their studies. Without having to take any courses, a student can learn a new language or get to know another culture thanks to ChatGPT, which can interact with users in over 95 different languages. This AI bot offers students the chance to develop their writing skills by providing edited and drafted versions of their academic papers, reports, assignments, etc. by improvising grammatical errors and sentence structures [10]. In Figure 1, an example of how ChatGPT solves problems asked by users through conversation is shown.

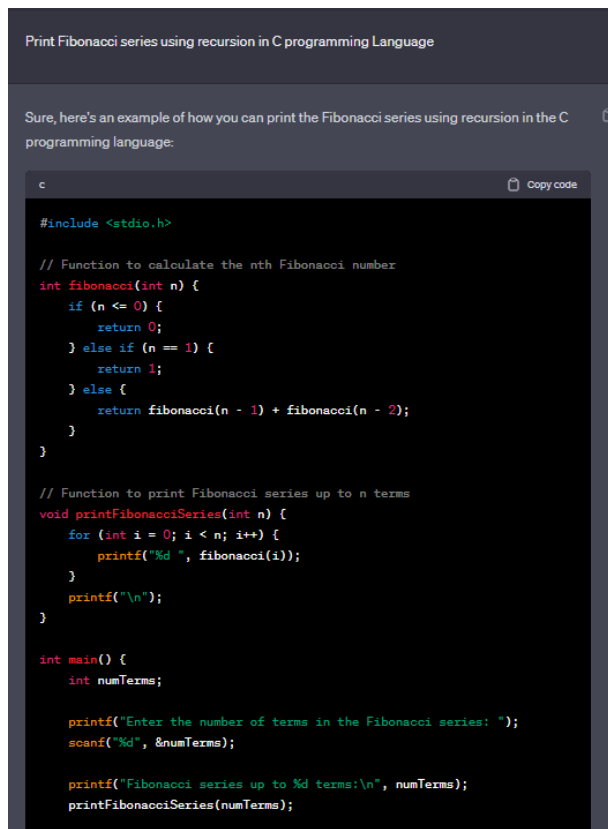
In the field of engineering, comprehensive knowledge and competence in the fields of math and sciences are necessary for the successful handling and resolution of compli-

cated problems where ChatGPT is an invaluable resource for handling complex and difficult problems [11]. Moreover, the incorporation of ChatGPT into the automated grading system facilitates the publicizing of course-related material and commonly asked questions. In the context of university education, it is customary for students engaged in the study and analysis of training and testing data to conduct preliminary simulations as a necessary step prior to executing the primary code [12]. However, it is often observed that students do not receive constructive feedback aimed at enhancing the quality and efficacy of their projects. ChatGPT is designed to provide students with the opportunity to simulate their code and receive a performance critique of their work from an artificial intelligence bot.

Despite its useful features, ChatGPT has been abused by many to achieve its goals. This kind of misconduct is especially common in the academic community. The following are some of the issues associated with the ChatGPT that have been noted in reviews by other researchers:

- **Plagiarism:** A specific group of students utilizes ChatGPT as a tool to fulfill their academic obligations, such as homework completion, essay writing, and other assorted activities. These actions violate the academic code of conduct and are unethical [13]. The act of duplicating assignments by students is a source of frustration for instructors, as it undermines the intended purpose of assessing learners for the purpose of assigning grades.
- **Deficiency in Human Interaction:** Students now have access to Frequently Asked Questions (FAQs) within the ChatGPT platform. Consequently, students infrequently ask for clarification from their instructors regarding the content of the course [14]. The aforementioned phenomenon leads to a decline in student engagement when it comes to participating in peer review of research studies and collaborative group assignments. The utilization of such an advanced tool is negatively impacting the creativity and originality of learners in the fields of writing and idea generation, which has given rise to an immediate problem worldwide.
- **Lack of Authenticity of information:** Due to the extensive dependency of students on ChatGPT, it is frequently seen that academic students experience a deficiency in the originality and authenticity of the material they provide. A lack of data is the likely cause of ChatGPT, an AI bot, occasionally providing inaccurate and incorrect information [15] [16]. The constant paraphrasing of commonly used material by individuals leads to a decline in the general standard of writing.
- **Conceptual Lackings:** The students are not afforded the opportunity to comprehend sophisticated issues, and there is a dearth of clear intellectual ideas being nurtured among them [17]. Consequently, upon entering the professional job market, many students might face difficulties solving complex problems.

¹<https://openai.com/research/gpt-4>



The screenshot shows a chat window with a dark theme. At the top, a title bar reads "Print Fibonacci series using recursion in C programming Language". Below it, a text input area contains the prompt: "Sure, here's an example of how you can print the Fibonacci series using recursion in the C programming language:". The response is a C program code block. The code defines a recursive function `fibonacci` to calculate the n th Fibonacci number and a function `printFibonacciSeries` to print the series up to n terms. The `main` function prompts the user for the number of terms and then prints the series.

```
#include <stdio.h>

// Function to calculate the nth Fibonacci number
int fibonacci(int n) {
    if (n <= 0) {
        return 0;
    } else if (n == 1) {
        return 1;
    } else {
        return fibonacci(n - 1) + fibonacci(n - 2);
    }
}

// Function to print Fibonacci series up to n terms
void printFibonacciSeries(int n) {
    for (int i = 0; i < n; i++) {
        printf("%d ", fibonacci(i));
    }
    printf("\n");
}

int main() {
    int numTerms;

    printf("Enter the number of terms in the Fibonacci series: ");
    scanf("%d", &numTerms);

    printf("Fibonacci series up to %d terms:\n", numTerms);
    printFibonacciSeries(numTerms);
}
```

Fig. 1: Example of ChatGPT providing Answer to a Programming Question

III. METHODOLOGY

This study uses a systematic approach to collecting and analyzing data to better understand how ChatGPT affects learning. The methodology section serves as a comprehensive guide that delineates the methodical approach utilized in this research undertaking. This section provides an in-depth look at the investigation's methodology by detailing the research's approach to data collecting, participant selection, and assessment.

A. Data Collection Methods

The process of collecting information is an essential component of the execution of any research study. There are several data collection processes, such as interviews, surveys, questionnaires, focus groups, case studies, and observation. This study used a mixed-methods approach to research, integrating quantitative data collected through a survey and qualitative responses acquired through interviews. The researchers opted for a survey methodology in order to gather data from a diverse group of students representing a wide range of academic fields. The questionnaire features closed-ended questions designed to collect demographic information. One of the key advantages of utilizing interview sessions is the ability to question individuals regarding topics relevant to the study objectives. This enables researchers to efficiently evaluate and elaborate on their research findings.

B. Participants

201 people who are recent graduates or students from a range of academic fields and representing various universities will participate in this survey. The study includes people aged 18 to 25, with the aim of achieving a gender-balanced sample. During the interview process, a panel consisting of five faculty members will be convened to make a selection. These individuals will possess a range of teaching experience and competence in various disciplines.

C. Data Analysis

The quantitative data obtained from the survey will be subjected to analysis using statistical methods, specifically percentages, and frequencies, in order to provide a concise summary of the demographic features of the participants. The evaluation of qualitative data obtained through interviews will be conducted using thematic analyses. The written records will go through an analysis known as coding in order to find common themes and patterns that are associated with the lessons learned by faculty members.

D. Research Ethics

All participants are required to provide informed consent in order to ensure confidentiality and voluntary involvement in the study. The participants were provided with a consent document and requested to provide their signature after carefully reviewing it prior to commencing the interview sessions.

IV. RESULTS

A. Interview Outcome

The participants were interviewed to understand their perspectives on the diverse advantages and disadvantages associated with the application of ChatGPT within a learning environment. The questions we posed to the participants were:

- Whether having access to ChatGPT increases students' motivation to learn from effective course materials and whether this tool helps explain challenging concepts
- The student's ability to think critically, or, to put it another way, whether they are still trying to solve problems in the most effective way, was the next question we sought to answer.
- Depending on whether or not teaching strategies need to change, the prevalence of AI may have contributed to an increase in plagiarism in tests and assignments.
- In light of the pervasiveness of AI, We questioned participants about how they were modifying traditional teaching techniques to better serve students

A brief and translated summary based on the participant's response is provided below:

- **Participant 1:** Students are not properly utilizing ChatGPT. Instead of learning challenging concepts, they are using this AI tool to solve assignments and complete assessments, which has decreased their desire to retain the course material. Their capacity for original thought has somewhat decreased, so this habit may prove problematic

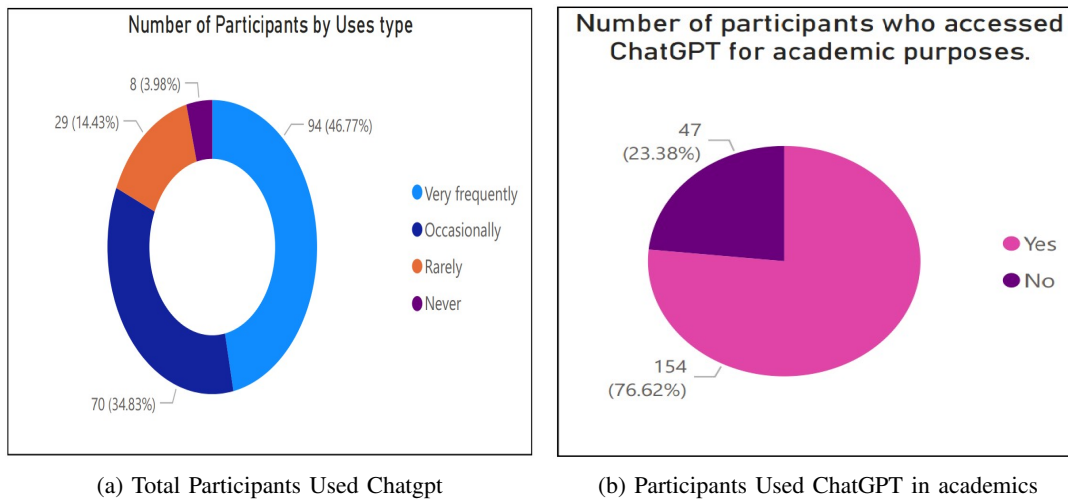


Fig. 2: ChatGPT Use Case Scenario

for them in the future. We cannot dispute the fact that AI is evolving into a powerful tool for academic purposes, but proper application under supervision is required. From the standpoint of teaching methods, we must also improvise the assessment so that, if they rely on AI, they must first comprehend the concept.

- **Participant 2:** Currently, students are utilizing ChatGPT haphazardly and relying on the knowledge it offers. Most of the time, they do not verify the data provided by this tool. Students, who ought to be interested in learning from the course materials, are being negatively affected, in my opinion. Before using ChatGPT for evaluation, they do not conduct research analyses in that relevant field or come up with potential discussion topics. Personally, I think that sophisticated methods could be deployed when students are performing tests so that even if they choose to rely on the AI tool, they would still benefit academically. This is something that I believe could be done.
- **Participant 3:** The majority of the time, students have both beneficial and detrimental effects. Today, ChatGPT is a daily source of resources for students. Although they are making an effort to learn more, the information they are learning is unfortunately causing them to become biased. In most cases, the conceptual understanding of students is impacted negatively. The most crucial fact is that they blindly trust these AI tools, so they do not even attempt to validate the solutions they have received or analyze the process in accordance with the solution. They use ChatGPT for simple solutions and Quillbot for paraphrasing. AI has an accuracy rate of up to 80% because it is based on machine learning, and students mistakenly think the results of this tool's generated problems are entirely accurate. I believe that in order for people to understand every topic clearly, even when using AI tools, we need to adapt to technology but in a more intelligent way.
- **Participant 4:** Students' desire to learn has decreased,

and the amount of effort they used to put into their studies is dwindling daily. They are no longer paying attention to the lessons or learning new things. Their efforts to write essays and content have drastically decreased as they have received their information with a click. This is hampering the creativity and individuality of the students. I have found some students who are utilizing this tool and developing their academic skills.

- **Participant 5:** I do not believe that students have lost interest in effective learning as a result of the use of ChatGPT. People who are committed to learning are now more driven to analyze difficult subjects and work through complex problems. However, since ChatGPT is intelligent enough to solve any problem based on the question asked, the instructors should be more flexible when introducing assessment-based evaluation. As a result, the questions could be made challenging so that the students will ponder the subject before finding the answers.

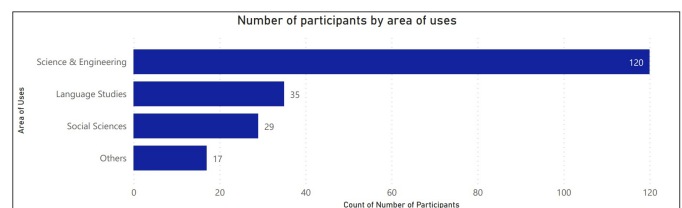


Fig. 3: Participants Use Area

B. Survey Results

A survey was circulated to a population of students who browse ChatGPT for academic pursuits concurrently. The survey instrument was developed with the aim of determining the influential elements of ChatGPT utilization on the day-to-day assessments conducted by students. The quantitative information gathered was examined following a survey of 201

students. The subsequent results are derived from the survey conducted.

The pie chart in (Figure 2a) illustrates the distribution of users based on their frequency of accessing ChatGPT, providing insight into the frequency at which students make use of the platform. The data reveals that a significant proportion of 46.77 percent is attributed to frequent users, whilst around 34.83 percent is attributed to occasional users. The data that is shown in (Figure 2b) illustrates the number of individuals who have utilized ChatGPT specifically for educational intentions. Based on the findings of the survey, it was observed that a significant majority of respondents, specifically 76.62%, have already employed ChatGPT for the purpose of academic assessments and assignments. Approximately 23.38% of students either do not utilize ChatGPT for academic purposes or are not users of ChatGPT.

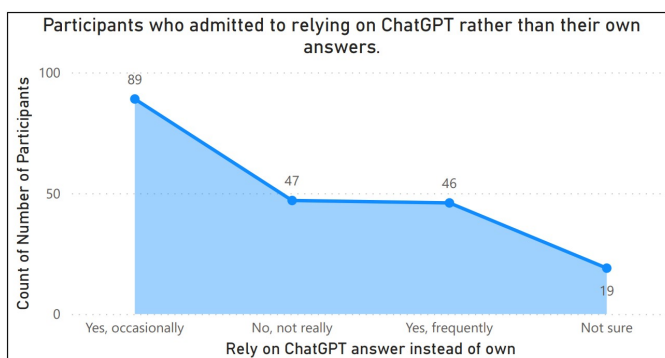


Fig. 4: Participants Rely on ChatGPT instead of own

Figure 3, illustrates the categorization of student utilization areas inside the ChatGPT system. Out of a total of 201 respondents that were surveyed, 120 individuals reported utilizing ChatGPT specifically for the purpose of studying Science and Engineering. A total of 35 students used ChatGPT for language studies, with 29 of them indicating their usage for Social Science. The remaining students either employed ChatGPT for other subjects or were not users of the platform.

Figure 4, illustrates a growing trend among university students wherein they are increasingly dependent on ChatGPT as a substitute for engaging in independent critical thinking. Out of the total of 201 respondents, 89 individuals reported occasional reliance on ChatGPT, whereas 46 participants indicated frequent reliance on ChatGPT. In spite of the fact that the development of critical thinking skills is essential for finishing of higher-level coursework, this is increasingly being seen negatively by students.

Figure 5 illustrates the examination of students' perceptions of the influence of ChatGPT on their critical thinking skills and productivity. It has been discovered that 44.78 percent of students believe that ChatGPT significantly reduces their productivity, while 29.85 percent of students believe that it affects their production in certain circumstances. However, there was a group of roughly 20% of students who did not believe that ChatGPT had a major impact on their productivity.

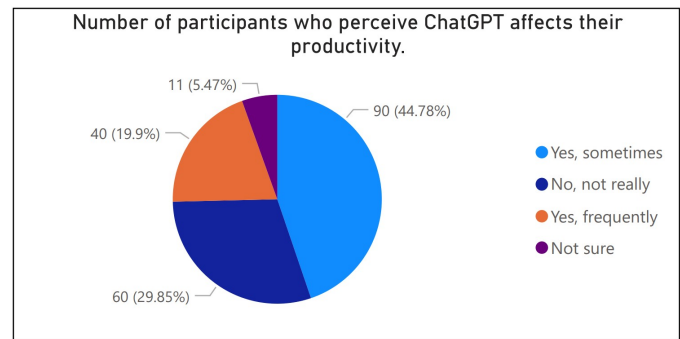


Fig. 5: Participants Believe They are Being Unproductive

These students also did not think ChatGPT made them more efficient.

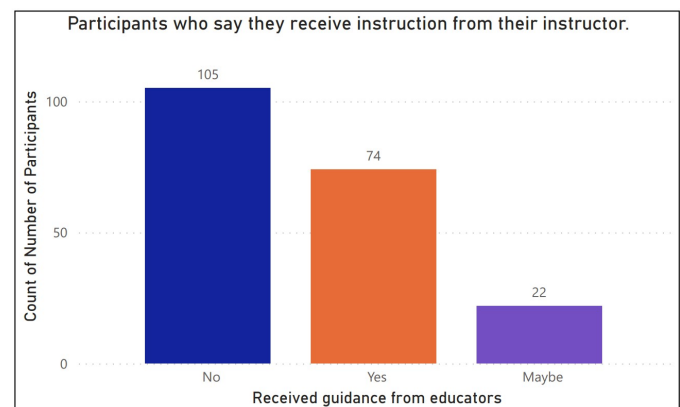


Fig. 6: Participants About Receiving Instruction

The students were questioned about whether they received any teaching regarding the safe usage of AI bots such as ChatGPT within the classroom setting. Figure 6 illustrates the perspectives of the participants about this issue. Out of a total of 201 students, a significant proportion (105 students) lack direction from their teachers regarding the proper use of ChatGPT for research analysis and academic pursuits.

According to the participants' responses, both effects are possible for ChatGPT usage in academic settings, but at first glance, biasing on AI Information is hindering students because crucial concepts of relevant topics are not always understandable. Moreover, the abundance of information and solutions might lead to a deficiency in critical thinking abilities and a decrease in the practice of brainstorming among students. When used effectively, this AI technology can change the knowledge base of the next generation and improve research assessment. Students must be adaptable and utilize this AI tool for their own benefit, as AI tools will continue to evolve, and we must be progressive and intelligent enough to be able to learn through ChatGPT.

V. DISCUSSION AND LIMITATION

Based on our interviews, we have determined that all instructors agree that students now extensively rely on ChatGPT

and do not attempt to validate the solutions it provides. Because of ChatGPT, students can easily access the provided evaluations or tasks without attempting to find optimal answers to these difficulties, despite the fact that success in any area necessitates critical thinking and a mastery of complex concepts, especially in engineering. This is going to be a problem for the next generation. Still, some teachers think that AI might bring in a new era of technological advances and help us learn more about complex topics. The interviewees agreed that, in order to alter the teaching strategies, the study procedures must be expanded to include challenging problem-solving phases that encourage students to think critically prior to using ChatGPT. According to the results of the survey, most students use ChatGPT for schoolwork or research. Students are increasingly relying on ChatGPT; they do not seek to deconstruct or understand the solutions offered by AI technologies; instead, they put these solutions in their assignments without validating them. The educational establishments in Bangladesh are getting worse because of this. Because the students use ChatGPT too much, the quality of their work is going down, and they are slowly losing their ability to be creative and do computational analysis. The survey, however, showed that students are not taught how to use ChatGPT for academic reasons.

However, it's important to remember that this sampling of this research might be biased because most of the people in it belong to a particular demographic. Considerable thought should be given to the potential disparity between the characteristics and outcomes of this group and the research results. It's possible that the participants haven't used ChatGPT in scenarios where it would be useful, which limits their understanding of what it can do. Also, the individuals' attitudes toward ChatGPT could be affected by their own interests, which could create a bias in favor of themselves. It's important to realize that cultural stereotypes may have affected how people see things and what they say.

VI. CONCLUSION

This study has provided useful insights into the current use of ChatGPT among Bangladeshi students in the academic sector. The results provide a glimpse into how interfering with ChatGPT can affect students in a wide range of ways. Students' increasing reliance on ChatGPT for academic activities has emerged as a notable trend. This reliance, however, has had disturbing effects on academic honesty, since plagiarism has become a widespread problem. Students' dedication to creative thought and extensive research is weakened by the appeal of easily generated information. Furthermore, the negative influence on learning outcomes was visible through decreased productivity and a loss in critical thinking skills. Students' ability to think critically and solve problems has been hampered by ChatGPT because they are more likely to rely on the tool's instantaneous outcomes. Students think lacking direction from teachers, whereas instructors attributed this disparity to the instant accessibility of information via ChatGPT, which led to a weak understanding of concepts and

a lack of in-depth comprehension.

This study highlights the necessity for a complete approach to manage the shifting educational landscape in the presence of AI technologies like ChatGPT. Academic institutions and teachers need to think about ways to foster uniqueness in students, develop critical thinking, and increase guidance in this age of technology. Collaborative efforts are needed to find a middle ground between the advantages of technology and the maintenance of core academic ideals as AI integration continues to transform educational paradigms. Creating an atmosphere for learning that encourages self-determination, ethical behavior, and deep understanding is key to addressing AI's problems and prospects in education.

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