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Impact of ChatGPT on Academic Performance among Bangladeshi Undergraduate Students

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Abstract: Purpose: Chat GPT, an advanced AI chatbot, ushers in a new era of intelligent technology. While it benefits academia, its use has led to have some negative impacts as well. This study explores the impact of ChatGPT on academic performance of Bangladeshi undergraduate students in light of plagiarism, creativity and motivation.
Methodology: Data from 100 undergraduate students who had access to the ChatGPT in its infancy in early 2023 were gathered using a quantitative research design. The sample had been chosen utilizing a purposive sampling technique through conducting a 15-item structured online survey.
Result: The finding highlights that there is relation between plagiarism and creativity; creativity and motivation; creativity, plagiarism, motivation and academic performance.
Conclusion: The research shows that ChatGPT is impacting creativity which is impacted by plagiarism and motivation is impacted by creativity and all the factors have an impact on academic performance. Institutions should encourage a proper way to help the students get off this dependency on ChatGPT and promote innovation and unique ideas among the students.

Keywords: ChatGPT, Plagiarism, Creativity, Motivation, Academic Performance.

1. INTRODUCTION

The present world is dominated mainly by artificial intelligence and Machine Learning. One of the most impactful inventions made possible using Artificial Intelligence is AI powered chatbots or to be more specific ChatGPT. ChatGPT, developed by OpenAI, is an acronym for Chat Generative Pretrained Transformer, representing its full name. [1]. ChatGPT

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participates in dialogue which allows ChatGPT to respond to follow-up inquiries, acknowledge mistakes, refute unfounded assumptions, and reject improper requests [1]. After the introduction on 30th November,2022, ChatGPT gained around 100 million users and 1.8 billion visitors per month up to 16th May,2023[1], [2]. ChatGPT demonstrates its impact on various sectors and one of them is the Academic or educational sector. Intelligent tutoring systems (ITS), which may be utilized to resemble one-on-one private tuition, are one good example. According to the results of a meta-analysis, ITS typically had a fairly advantageous influence on undergraduate students' academic achievement [3].

ChatGPT's success enables AI-assisted cheating, raising concerns about academic integrity and devaluing genuine learning experiences in education [4]. Due to the concerns surrounding AI-assisted cheating and the potential for ChatGPT to be used for completing assignments and exams on behalf of students, some schools have taken the step of forbidding the use of ChatGPT on their campuses [5]. College students are likely to obtain significantly from ChatGPT's aid with duties like essay writing, assignment assistance, script coding, and evaluation support [6]. This assistance has its upsides and downsides. Frequent use of ChatGPT may hamper the ability of students to think and brainstorm new and unique ideas. ChatGPT could streamline the process of finding solutions or information, which may interfere with the desire of students for conducting their own research [7].

Related Work

AI Powered Chatbots

AI-driven chatbots are sophisticated computer programs designed to replicate human conversation and provide consumers with automated support. These chatbots use artificial intelligence techniques like machine learning and natural language processing (NLP) to comprehend user inquiries and reply to their requests in a manner that is conversational [8]. By providing round-the-clock assistance, they minimize the requirement for human involvement and enhance the speed of responses. Online business platforms utilize chatbots to aid customers in areas such as suggesting products, tracking orders, and delivering personalized shopping experiences [9]. Chatbots have the potential to greatly streamline the learning journey by offering learners access to customized resources that align with their individual learning traits. Integrating chatbots into eLearning systems can provide tailored responses that meet the specific needs of each learner, filling the void of real-time consultation often absent in offline courses [10].

ChatGPT

ChatGPT, created by OpenAI, is an AI-driven language model based on the GPT-3.5 framework, enabling interactive conversations with users by leveraging extensive text training data to generate meaningful and contextually appropriate replies [11]. ChatGPT finds utility in a wide array of domains, demonstrating its versatility and ability to cater to various applications across different industries, sectors, and fields of expertise [12]. Within the realm of education, ChatGPT can enhance individualized learning encounters by addressing student inquiries and delivering educational materials, while also being harnessed in content generation tasks, assisting users in generating written content like articles, narratives, and

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code segments [13], [14]. A notable application of ChatGPT is in the realm of language learning, where ChatGPT serves as a valuable resource by offering language practice opportunities and aiding in the comprehension of grammar concepts, enabling users to enhance their linguistic abilities through natural and interactive conversations [15], [16].

Plagiarism and Creativity

Plagiarism is presenting others' work as your own, without giving credit which is unethical and violates intellectual property rights [17]. One possible misuse of ChatGPT for plagiarism is when it produces text resembling existing works without proper attribution, enabling users to present others' work as their own, undermining principles of originality and intellectual property [18]. The convenience of generating coherent and contextually appropriate responses through ChatGPT can entice users to depend on the model for generating entire written pieces, impeding the growth of their own creative abilities and individuality as they become reliant on the model's suggestions, potentially overshadowing their unique voice and perspective [18],[19]. Furthermore, the misuse of ChatGPT for plagiarism poses significant risks to academia, journalism, and creative sectors, as it undermines academic integrity by allowing students to generate papers without proper citations, while overshadowing original reporting by journalists and potentially harming credibility and the overall quality of journalism [18], [20], [21]. The influence of ChatGPT on creativity is complex, as it can provide inspiration and generate ideas, but users must recognize it as a tool rather than a replacement for their own creative process, utilizing it as a launching pad for their own thoughts while incorporating their unique perspectives and experiences [22].

Students Motivation

The inappropriate usage of ChatGPT for plagiarism might have a significant negative impact on the motivation of learners [23]. The excessive dependence of students on AI-generated content for completing their assignments or projects undermines their feelings of achievement and hampers their personal development [24]. The presence of AI-generated content offers immediate gratification, enabling students to swiftly produce essays or research papers without exerting the required effort and reflection, potentially resulting in reduced motivation to independently research, study, and engage in critical thinking, leading to a loss of intrinsic motivation for exploring novel concepts, pushing boundaries, and cultivating their distinct viewpoints [25].

Conceptual Framework and Hypothesis

This paper explores the impact of ChatGPT in academic performance of undergraduate students of Bangladesh in context of Plagiarism, Creativity and Motivation. The proposed model shows the interconnection between Plagiarism, Creativity, Motivation and Academic Performance.

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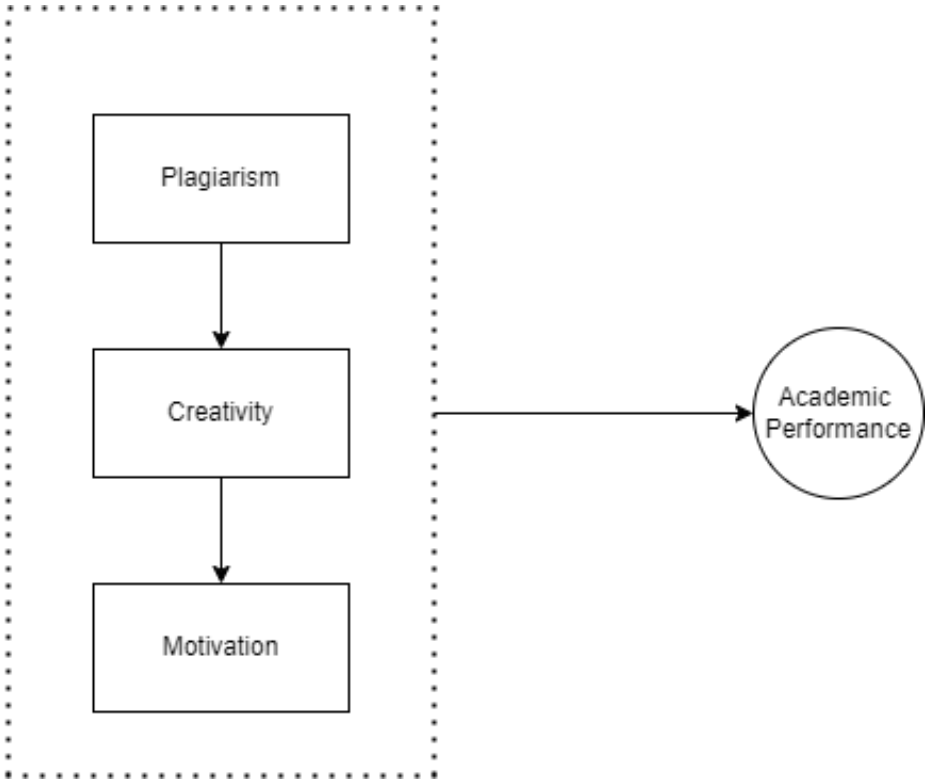


Fig. 1 Conceptual Framework (self-created by author)

Hypothesis

H1: Plagiarism facilitated by ChatGPT does have an impact on the creativity of students.
H2: There is indeed a relationship between creativity and motivation of students.
H3: Academic performance is related to Plagiarism, Creativity and Motivation.

2. METHODOLOGY

This study was carried out by conducting an online survey on Microsoft forms utilizing the purposive sampling method and a quantitative strategy. A non-probability sampling technique called "purposeful sampling" determines the sample's components based on the researcher's best judgment. Additionally, researchers will be convinced that employing purposeful sampling techniques can result in significant time and cost savings [26]. For this study, the target population was undergraduate students of public and private universities of Bangladesh. Data from 100 students were collected by using Microsoft forms where there were 15 structured questions and 6 demographic questions. The 15 structured questions included a 5-point Likert Scale where 1=Strongly Disagree, 2=Disagree, 3= Neutral, 4= Agree and 5= Strongly Agree.

The questionnaire was distributed among 200 undergraduate students of different public and private students of Bangladesh. 137 out of 200 participants responded to the survey in the time of three days. 17 individuals have been eliminated because of their unjust or unreliable

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answers. The average age of undergraduate students is around 24 years[27]. That is why 20 respondents were rolled out as they were above the age of 24. The response rate for this study was 68.5%, which complies with the requirement stated by W. Black & Babin, who stated that the minimum response rate for a survey should be 50% [28].

3. RESULTS AND FINDINGS

Total 102 respondents were involved in this study. Respondent's demographic descriptive statistics of frequency and valid percentages were summarized in the following table 1.

Table 1: Demographic Information

	Age	Division	Residence	University Type	Degree Program	Year
count	102.000000	102.000000	102.000000	102.000000	102.000000	102.000000
mean	3.186275	2.254902	1.931373	1.382353	4.196078	2.137255
std	2.480540	1.983528	1.196197	0.488362	4.061505	1.126101
min	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000
25%	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000
50%	2.000000	1.000000	1.000000	1.000000	2.000000	2.000000
75%	4.750000	3.000000	3.000000	2.000000	8.000000	3.000000
max	10.000000	8.000000	4.000000	2.000000	14.000000	4.000000

In this study, we aim to investigate the impact of ChatGPT on students' academic performance, using a Partial Least Squares Structural Equation Modelling (PLS-SEM) approach [29]. We use SmartPLS 3.2.8 [30] software to measure the factors that affect the Academic Performance, such as Motivation, Creativity and Plagiarism.

According to the discussed conceptual framework above in Figure 1, we have created a model in SmartPLS software we constructed the model.

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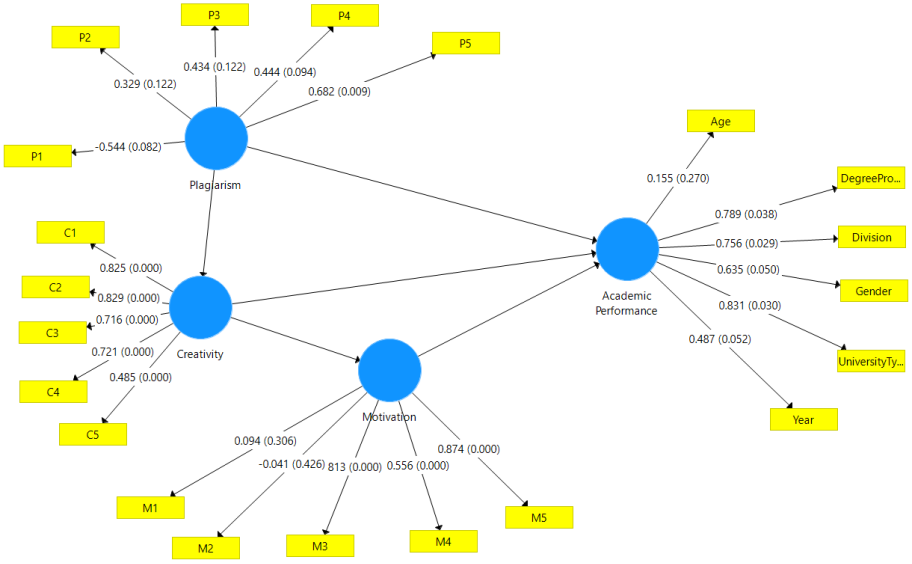


Fig. 2 Conceptual Model generated in SmartPLS including inner and outer model

Convergent Validity Test

Convergent validity is a type of construct validity that measures how well a test correlates with other tests that measure the same construct [31]. For this research, we used convergent validity to assess the reliability and validity of our survey instrument. We compared the scores of our survey with the scores of other established measures of student motivation, plagiarism, and creativity.

Table 2: Reliability and Validity

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Academic Performance	0.703	0.794	0.794	0.425
Creativity	0.768	0.809	0.844	0.527
Motivation	0.391	0.700	0.618	0.349
Plagiarism	0.122	0.178	0.326	0.251

These measures are essential for evaluating the quality of the measurement model in PLS-SEM. We have aimed for high reliability (Cronbach's Alpha and CR) and convergent validity (AVE) for each latent construct[28], [30-31]. Additionally, ensuring discriminant validity between constructs is crucial to confirm that each construct is measuring a unique aspect of the underlying theoretical concept. By assessing reliability and validity, we can ensure the robustness and accuracy of the measurement model, leading to more reliable and valid findings in PLS-SEM analyses.

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Table 3: Fornell-Larcker Criterion

	Academic Performance	**Creativity**	**Motivation**	**Plagiarism**
Academic Performance	0.652			
Creativity	-0.010	0.726		
Motivation	-0.159	0.492	0.591	
Plagiarism	-0.262	0.275	0.110	0.501

Table 2 helps determine whether the constructs in the model are distinct and not highly correlated with each other. The table displays the interrelationships among constructs, along with the square root of the Average Variance Extracted (AVE) for each of them.

Hypothesis Testing

Internal consistency reliability: composite reliability should be higher than 0.70 (in exploratory research, 0.60 to 0.70 is considered acceptable) [34]. Consider Cronbach's alpha as the lower bound and composite reliability as the upper limit of internal consistency reliability. Indicator reliability necessitates that the outer loadings of the indicator should exceed 0.70 [34]. Indicators with outer loadings ranging from 0.40 to 0.70 may be considered for removal, but only if their elimination leads to an improvement in composite reliability and AVE beyond the threshold of 0.5. The t-statistic test in the partial least squares (PLS) analysis model is conducted using SmartPLS 3.2.8 software with the assistance of the direct effect test.

Table 4: Hypothesis Testing: Statistical Calculations

Hypothesis	**Connection**	**Original Sample (O)**	**Standard Deviation (STDEV)**	**T Statistics (|O/STDEV|)**	**P Values**	**Decision**
H1	**Plagiarism -> Creativity**	0.275	0.154	1.784	**0.037**	Supported
H2	**Creativity -> Motivation**	0.492	0.082	5.992	**0.000**	Supported
H3	**Creativity -> Academic Performance**	0.173	0.094	1.840	**0.034**	Supported
	Motivation -> Academic Performance	-0.213	0.126	1.698	**0.046**	
	Plagiarism -> Academic Performance	-0.287	0.146	1.970	**0.026**	

Based on the statistical calculations summarized in Table 3 above, it is concluded that all variables by plagiarism, creativity, motivation and academic performance are positive and

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significant. Evidenced by the p-value is smaller than 0.05. meaning that all hypotheses are accepted.

4. CONCLUSION

This research aimed to explore the impact of ChatGPT on the academic performance of undergraduate students in Bangladesh, focusing on the factors of plagiarism, creativity, motivation, and their interconnections. The research outcomes have offered valuable perspectives on the connections among the different variables. The findings have validated the presence of noteworthy associations between plagiarism, creativity, motivation, and academic achievement. The study highlights that plagiarism enabled by ChatGPT can considerably influence students' creativity, as the ease of using AI-generated content may lead them to overly depend on the tool for producing complete written works, thereby impeding the growth of their creative skills and uniqueness; this underscores the necessity of promoting ethical AI tool usage and nurturing individual creative thinking among students. A clear positive correlation exists between creativity and motivation in students, where those with greater creative abilities also display higher academic motivation, emphasizing the value of promoting creative thinking to enhance intrinsic motivation and individual growth. There is a positive correlation between academic performance and creativity, as the former is enhanced by creativity while the misuse of ChatGPT for plagiarism negatively affects academic integrity, genuine learning experiences, motivation, and achievement. The research highlights the possible advantages and obstacles of incorporating AI-driven aids such as ChatGPT in education, as they can provide valuable support to students, yet the risk of unethical use, such as plagiarism, poses concerns over maintaining academic integrity and authentic learning encounters.

In conclusion, educational institutions must establish guidelines and educational initiatives that encourage responsible and ethical utilization of AI tools. It is crucial to inspire students to perceive ChatGPT as a valuable resource for learning and problem-solving, rather than a mere shortcut for completing tasks. This approach fosters a balance between leveraging AI technology and nurturing critical thinking and creativity.

Additionally, educators should stress the significance of originality and offer opportunities for students to express their distinct perspectives and ideas. By cultivating a culture of creativity and intellectual integrity, academic institutions can effectively mitigate the adverse effects of AI-enabled cheating and ensure students are equipped with the necessary skills and mindset for success in an AI-driven world.

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