



Impact of ChatGPT on Students' Critical Thinking and Writing Skills: An Experimental Study

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Abstract-The rapid integration of Artificial Intelligence (AI) tools such as ChatGPT in education has significantly transformed students' learning processes. This study examines the impact of ChatGPT on students' critical thinking and writing skills through an experimental research design. A total of 120 undergraduate students were divided into two groups: an experimental group (ChatGPT users) and a control group (non-users). Both groups were assigned identical academic writing tasks over a two-week period. The performance of the participants was evaluated using standardized rubrics focusing on coherence, argument quality, originality, and analytical depth. The findings reveal that while students using ChatGPT demonstrated improved writing structure, grammar, and organization, their critical thinking and originality scores were comparatively lower than those of the control group. On the other hand, students who did not use ChatGPT exhibited stronger analytical depth and independent reasoning, although their writing mechanics were weaker. The study concludes that ChatGPT serves as an effective assistive tool for improving writing skills but may hinder the development of critical thinking if used excessively. A balanced and guided integration of AI tools in higher education is therefore recommended.

Keywords-: ChatGPT, Artificial Intelligence, Critical Thinking, Writing Skills, Higher Education

Introduction -:The advancement of Artificial Intelligence (AI) has brought significant changes in the field of education. AI-powered tools are increasingly being used by students to assist in learning, writing, and problem-solving. Among these tools, ChatGPT has gained widespread popularity due to its ability to generate human-like text and provide instant academic assistance. While such tools enhance accessibility and efficiency, concerns have been raised regarding their impact on students' independent thinking and originality. Writing and critical thinking are essential skills in higher education, and excessive reliance on AI tools may influence their development. This study aims to analyze the impact of ChatGPT on students' writing skills and critical thinking ability through an experimental approach.

Objectives of the Study

1. To assess the impact of ChatGPT on students' writing skills
2. To evaluate its effect on critical thinking ability
3. To compare ChatGPT users and non-users
4. To suggest strategies for effective use of AI in education

Research Questions

1. Does ChatGPT improve students' writing quality?
2. Does ChatGPT affect critical thinking ability?
3. Is there a significant difference between users and non-users?

Hypotheses

1. H1: Students using ChatGPT will score higher in writing skills
2. H2: Students not using ChatGPT will score higher in critical thinking
3. H0: There is no significant difference between the two groups

Research Methodology

5.1 Research Design This study adopts a true experimental design using a pre-test and post-test control group method.

5.2 Sample The sample consists of 120 undergraduate students selected randomly.

Experimental Group: 60 students (allowed to use ChatGPT)

Control Group: 60 students (not allowed to use AI tools)

5.3 Procedure-; Pre-test: Both groups were asked to write an essay without using any AI tool. Intervention (Two Weeks): Experimental group used ChatGPT for completing assignments Control group completed tasks independently.

Post-test: Both groups were asked to write another essay on a new topic.

Evaluation Criteria-: The essays were evaluated based on the following rubric:

1. Writing Skills
2. Grammar and Language (10 marks)
3. Structure and Coherence (10 marks)
4. Critical Thinking
5. Argument Quality (10 marks)
6. Originality and Analysis (10 marks)

Total Marks: 40

Data Analysis-: The collected data were analyzed using: Mean and Standard Deviation Independent Sample t-test Comparison of Pre-test and Post-test scores

Results-: The findings of the study indicate the following:

Group	Writing Skills (Mean Score)	Critical Thinking (Mean Score)
ChatGPT Users	32	26
Non-Users	24	30

The results show that students using ChatGPT performed better in writing skills, while non-users demonstrated stronger critical thinking abilities.

Discussion-: The results suggest that ChatGPT significantly improves students' writing skills by enhancing grammar, structure, and organization. However, it may reduce the depth of analysis and originality if used excessively. Students relying on ChatGPT tend to generate well-structured content but may engage less in independent thinking. In contrast, students who do not use AI tools develop stronger reasoning and analytical abilities, although their writing quality may be comparatively lower.

Suggestions-:

1. ChatGPT should be used as a supportive tool rather than a replacement.
2. Assignments should focus on analytical and critical thinking
3. Students should be trained in ethical use of AI tools
4. Teachers should monitor and guide AI usage in classrooms

Conclusion-: The study concludes that ChatGPT has a dual impact on students' learning. It enhances writing skills but may hinder critical thinking if overused. Therefore, a balanced approach is necessary to ensure the effective integration of AI in education while preserving students' analytical abilities.

References-:

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