

The Impact Of Artificial Intelligence Tools Usage On Academic Research And Challenges Faced By Undergraduate Students.

Snigdha Deb ⁽¹⁾, Anushka Ghatak ⁽²⁾

Assistant Professor, M.Sc (N) 2nd year

Snigdhadeb885@gmail.com, anushkaghatak816@gmail.com⁽²⁾

Keywords : Artificial Intelligence in education, AI tool usage, Academic research performance, Student challenges with AI.

Abstract

This study examines the impact of Artificial Intelligence (AI) tool usage on academic research and examines the challenges faced by undergraduate students look for when using these tools. The purpose of the study is to (1) assess the frequency and percentage of AI tools used in basic research among undergraduate students, (2) assess the challenges students encounter when using AI tools, and (3) examine the relationship between AI tools use and academic research performance. A total of 150 undergraduate students were selected through a convenient sampling technique. Findings revealed that 36.66% of students were basic AI tool users, 34.67% moderate users and 28.67% advanced users. Regarding challenges, 61.33% of students reported facing moderate difficulties, while 38.67% experienced high challenges when using AI tools. A strong positive correlation was found between AI tool usage and academic research performance ($r = +0.85$, $p < 0.01$), indicating that greater use of AI tools is significantly associated with better research outcomes. These results highlight both the growing importance of AI in academic research and the need to address the obstacles students face to maximize their benefits.

1. Introduction

The rise of Artificial Intelligence (AI) has significantly changed many aspects of education, particularly academic research. From AI-based writing assistants to data analysis platforms, students now have access to powerful resources that can streamline the research process. However, despite these advantages, not all students are equally equipped to use AI tools effectively. Understanding the extent to which undergraduate students use AI in their research, the challenges they face, and the impact of AI usage on academic performance is essential for developing strategies to improve educational outcomes.

This study focuses on three key objectives :

Assessing the level of AI tool usage among undergraduate students, identifying the challenges faced during usage, and exploring the relationship between AI tool usage and academic research performance.

2. Objectives

1. To assess the frequency and percentage of AI tool usage among undergraduate students.
2. To assess the frequency and percentage of challenges faced by students in using AI tools.
3. To explore the correlation between AI tool usage and academic research performance.

3. Methodology

A descriptive, correlational research design was adopted for this study. The sample consisted of 150 undergraduate students, selected using a convenient sampling technique. A structured questionnaire was used to collect data on the extent of AI tool usage, challenges encountered, and students' academic research performance. Responses were categorized and analyzed using descriptive statistics (frequency and percentage) and Pearson correlation for assessing the relationship between variables.

4. Results

TABLE-1 : Frequency and percentage distribution according to usage of AI tools in academic research

N=150

AI tools usage level	Score Range	Frequency (f)	Percentage (%)
Basic AI tool user	1-3	55	36.66
Moderate AI tool user	4-6	52	34.67
Advanced AI tool user	7-9+	43	28.67

Above table shows that 36.67% undergraduate students are basic AI tool users, 34.67% are moderate and 28.67% are advanced AI tool users.

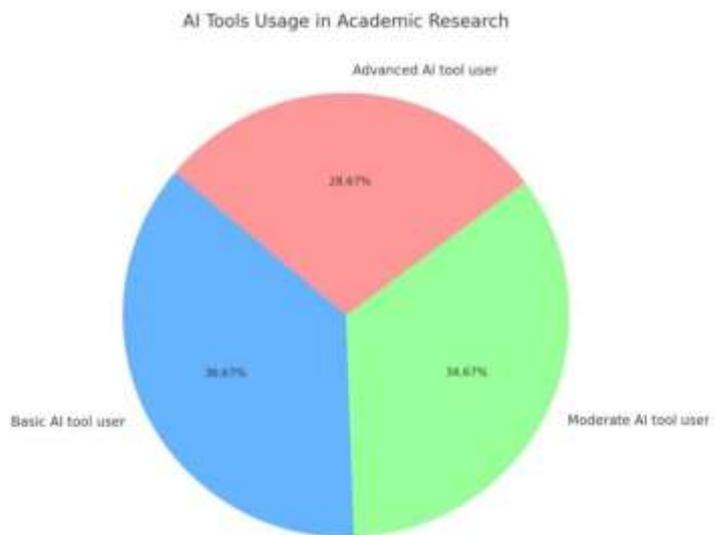


TABLE-2 : : Frequency and percentage distribution according to challenges faced while using of AI tools in academic research

N=150

	Score Range	Frequency (f)	Percentage (%)
very low challenges	10 - 19	----	----
Low challenges	20 - 29	---	---
Moderate challenges	30 - 39	92	61.33
High challenges	40 - 45	58	38.67
Very high challenges	46 - 50	---	---

Above table shows that 61.33% undergraduate students faced moderate challenges while using AI tools in academic research and 38.67% undergraduate students faced high challenges while using AI tools in academic research.

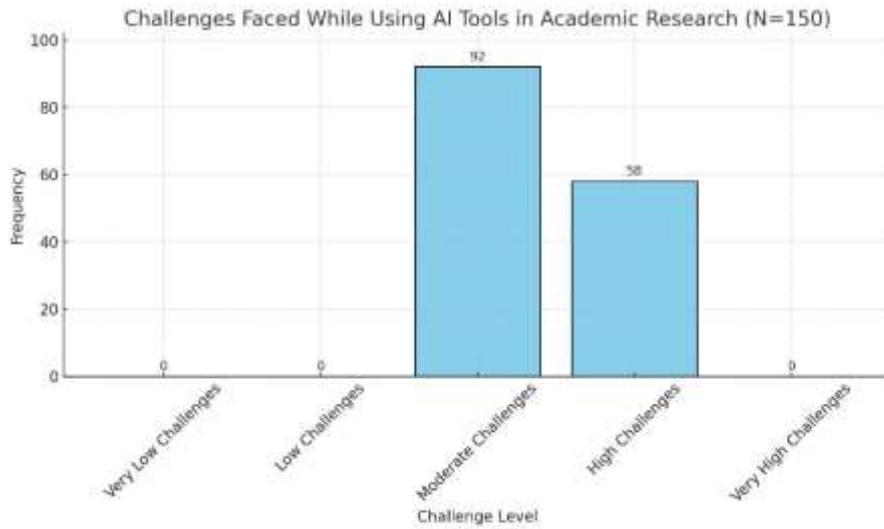


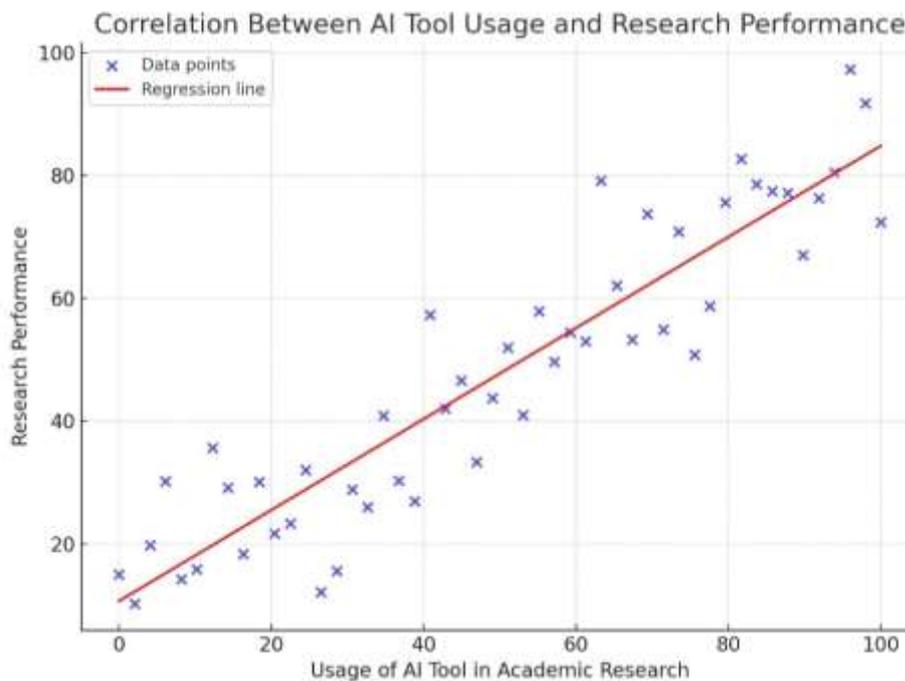
TABLE - 3 : Correlation between AI tool usage and students’ academic research performance.

	r Value	p value
Usage of AI tool in academic research	+0.85	<0.01
Research performance		

Above table indicates a strong positive correlation between the usage of AI tools and research performance. As the use of AI tools increases, research performance tends to increase as well. p-value <0.01 means the result is statistically significant at the 1% level.

From this correlation, hypothesis is formulated.

H1 : There is a significant correlation between the usage of AI tools in academic research and research performance.



5. Discussion

The results of this study highlight several important trends in the academic use of AI. First, a majority of students are engaging with AI tools at least at a basic or moderate level. This shows an increasing acceptance of technology in academic research. However, the proportion of advanced users is still relatively low, indicating room for growth in digital proficiency.

Second, the challenges faced by students -- with over 60% experiencing moderate difficulty and nearly 40% high difficulty -- suggest that accessibility, training, and digital literacy may be limited factors. These challenges may include lack of familiarity with AI platforms, ethical concerns, or limited institutional support.

Most notably, the strong positive correlation between AI tool usage and research performance underscores the potential value of these tools in enhancing the quality and efficiency of student work. This aligns with existing literature, which has emphasized the role of AI in improving research speed, data handling, and academic writing support.

6. Conclusion

This study reveals that AI tools play a significant role in shaping academic research outcomes for undergraduate students. While many students are beginning to use these tools, a substantial number still face barriers that limit their effective use. The strong positive correlation between AI usage and research performance suggests that better access to and training in AI tools could meaningfully enhance student success in academic research.

7. Recommendations

1. Institutions should offer workshops or modules to teach students how to effectively use AI tools for academic purposes.
2. Universities should provide technical support and resources to help students overcome challenges in using AI tools.
3. Future studies could examine how different types of AI tools (e.g., writing, data analysis, citation management) specifically affect research performance.

8. Limitations

- The study used a convenient sampling method, which may affect the generalizability of the results.
- The research relied on self-reported data, which may include subjective bias.

9. References

- Luckin, R., Holmes, W., Griffiths, M., & Forcier, L. B. (2016). *Intelligence unleashed: An argument for AI in education*. Pearson Education. <https://www.pearson.com/>
- Holmes, W., Bialik, M., & Fadel, C. (2019). *Artificial intelligence in education: Promises and implications for teaching and learning*. Center for Curriculum Redesign.
- UNESCO. (2021). *AI and education: Guidance for policy-makers*. <https://unesdoc.unesco.org/ark:/48223/pf0000376709>
- Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education – Where are the educators? *International Journal of Educational Technology in Higher Education*, 16(1), 1–27. <https://doi.org/10.1186/s41239-019-0171-0>

- Chassignol, M., Khoroshavin, A., Klimova, A., & Bilyatdinova, A. (2018). Artificial Intelligence trends in education: A narrative overview. *Procedia Computer Science*, 136, 16–24. <https://doi.org/10.1016/j.procs.2018.08.233>
- Dwivedi, Y. K., Hughes, D. L., Ismagilova, E., Aarts, G., Coombs, C., Crick, T., ... & Williams, M. D. (2021). Artificial Intelligence (AI): Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy. *International Journal of Information Management*, 57, 101994. <https://doi.org/10.1016/j.ijinfomgt.2019.08.002>
- Roll, I., & Wylie, R. (2016). Evolution and revolution in artificial intelligence in education. *International Journal of Artificial Intelligence in Education*, 26(2), 582–599. <https://doi.org/10.1007/s40593-016-0110-3>
- Baker, R. S., & Inventado, P. S. (2014). Educational data mining and learning analytics. In J. A. Larusson & B. White (Eds.), *Learning analytics* (pp. 61–75). Springer. https://doi.org/10.1007/978-1-4614-3305-7_4
- Tsai, Y.-S., Poquet, O., Gašević, D., Dawson, S., & Pardo, A. (2019). Complexity leadership in learning analytics: Drivers, challenges, and opportunities. *British Journal of Educational Technology*, 50(6), 2839–2854. <https://doi.org/10.1111/bjet.12846>
- Williamson, B., & Eynon, R. (2020). Historical threads, missing links, and future directions in AI in education. *Learning, Media and Technology*, 45(3), 223–235. <https://doi.org/10.1080/17439884.2020.1798995>

