



Relationship Between Usage of Artificial Intelligence Learning Tools And Academic Achievement Among Undergraduate Students At Salesian College (Autonomous), Sonada And Siliguri

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Abstract:

The rapid evolution of Artificial Intelligence (AI) has significantly reshaped the educational landscape, and it has become imperative to critically analyze its impact on learning and academic achievement among students. This study, "Relationship between Usage of Artificial Intelligence Learning Tools and Academic Achievement among Undergraduate Students," was conducted at Salesian College (Autonomous) Sonada and Siliguri. The study aimed at analyzing the relationship between the degree to which undergraduate students utilize AI-powered learning tools and their academic achievement, and the possible gender differences in usage and performance. Using a descriptive survey research approach and a sample of 130 undergraduate students, data were collected through a standardized self-report questionnaire and analyzed using statistical methods such as frequency analysis, t-tests, and correlation analysis. The findings showed that while there was no statistically significant relationship between the usage of AI learning tools and academic achievement, there was a significant difference in academic achievement with respect to gender, where female students reported higher achievement. The study also found that female students had a slightly higher mean score in their usage of AI tools compared to their male counterparts. These results suggest a need for educational institutions to focus not just on the adoption of AI learning tools, but on their strategic and ethical use to ensure that they actually make a difference to learning outcomes and promote a balanced, inclusive learning environment for all students. The study concludes with educational implications, highlighting the importance of gender-inclusive digital literacy programs and the critical evaluation of AI tools' pedagogical value.

Keywords: Artificial Intelligence (AI), AI Learning Tools, Academic Achievement, Undergraduate Students, Gender Differences, Educational Technology, Digital Literacy.

Introduction:

The onset of the 21st century has been marked by a phase of remarkable technological evolution, often termed the Fourth Industrial Revolution (4IR or Industry 4.0). This age of rapid change has dramatically transformed nearly all aspects of contemporary life, from the manner in which we communicate and process information to the manner in which we work and, most importantly, the manner in which we learn. The key

driver of this transformative change has been Artificial Intelligence (AI), a technology that has brought about profound changes in many fields, including education being a prime example. AI, which is defined as the ability of machines to simulate human cognitive functions such as data processing, understanding information, and making decisions, holds immense potential to revolutionize traditional teaching and learning models.

We are living in an era where everything continues to change and evolve, and so do strategies and new approaches in learning and teaching. Learning in the 21st century has also greatly evolved, with new sophisticated methods and tools redefining the way learning occurs (Reaves, 2019). Among the most prominent aspects of this revolution is the arrival of Artificial Intelligence (AI) in learning. AI is the capability of machines to do work that replicates human thinking, including analysis of data, understanding information, learning from experience, and decision-making. It can revolutionize the manner in which we learn and teach, where learning becomes more personalized, interactive, and efficient (Harry & Sayudin, 2023). With new technologies, AI-based tools have become readily available and widespread in learning, making learning more personalized and efficient.

In the age of contemporary education, the rise of AI-powered learning tools has become a central feature. These tools, which include platforms like ChatGPT, Gemini, QuillBot, etc., have become increasingly accessible and are now part of the learning process of most students. AI promises to provide personalized learning experiences that cater to the unique needs and abilities of students, very different from the time when the same teaching method was used for everyone. By providing instant feedback, adapting course content, and performing routine administrative tasks, AI learning tools are designed to enhance student engagement and improve the productivity of learning. The current study acknowledges this transformative landscape and tries to examine the specific impact of these tools in more depth. It is set against a backdrop of increasing reliance on digital technology in education, where students are not just adapting to these tools but are actively incorporating them into their study habits and assignment completion processes.

The primary objective of this research is to bridge a notable gap in the existing literature by exploring the relationship between the usage of AI learning tools and academic achievement of undergraduate students (Alkinani, 2025; Youssef et al., 2024). It aims to move beyond a general understanding of AI's role in education by offering a detailed study based on facts and figures about how it affects student performance. Furthermore, the study recognizes that the adoption and outcomes of technology are often influenced by demographic factors. Therefore, the study specifically aims to establish whether gender influences the usage of AI learning tools and, consequently, academic achievement. By focusing on a specific cohort of undergraduate students, the study adds helpful information from a local perspective to the global discussion on AI in education, which can help improve institutional policies, curriculum development, and teaching methods.

The significance of the research is reinforced by the ethical and educational implications of AI. While AI has a lot of benefits, issues related to over-reliance, bias in algorithms, data privacy, and their ability to hinder the growth of critical thinking skills are no less significant (Tanvir et al., 2024). This research, hence, is not just an adoption assessment of technology; it is a critical review of how AI can be incorporated responsibly and effectively to prepare learners for a future where AI is a part of the academic and professional ecosystem. By elucidating the relationship between AI usage, academic performance, and gender, the study lays the groundwork for strategies that ensure AI functions as a complement to, rather than a replacement for, traditional learning methods.

Reviews of Related Literature:

Several recent studies have explored the relationship between AI tool usage and academic achievement, offering valuable insights into its benefits and challenges. Alkinani (2025) and Youssef et al. (2024), cited in the paper, reported a positive relationship between academic performance and the application of AI tools, stating that such tools assist students in grasping complex ideas and improving writing assignments, thereby positively influencing their performance. In a quasi-experimental study on Nigerian university undergraduates, Abubakar, Aliyu, and Nurchalis (2024) examined the impact of ChatGPT and Google Gemini on creative writing skills. Although their research was limited in scope to one specific skill, it suggested that AI can serve as an effective facilitator for skill development, even though the nature of its impact on overall academic performance was not addressed. Tanvir et al. (2024), in their study among Bangladeshi undergraduates, found a strong relationship between originality and plagiarism, hypothesizing that excessive reliance on AI-generated material may reduce originality, thereby highlighting a significant ethical concern associated with AI tools. In the Indian context, Lohitha and Sumathi (2024) reported that ChatGPT enhances learning, supports assignments, and benefits students' mental health, though they also noted challenges in its effective implementation. Similarly, Oyeyemi et al. (2024) investigated public universities in Nigeria using a descriptive survey design to examine the perceived effect of AI tools on academic performance, contributing, like the present study, to the growing body of literature on the topic. Furthermore, Micabalo et al. (2024), whose work forms the basis for the operational definition of AI adoption in the present study, explored ChatGPT adoption and found that enjoyment, performance expectations, and habit were the most significant drivers of students' intention to adopt the tool, indicating that perception and usage are critical factors in AI tool adoption.

Objectives of the Study:

The following objectives were laid down for the present study:

1. To study the nature of distribution of scores on the Usage of Artificial Intelligence Learning Tools among undergraduate students.
2. To study the nature of distribution of scores of Academic Achievement among undergraduate students.
3. To study the difference in the Usage of Artificial Intelligence Learning Tools among male and female undergraduate students.
4. To study the difference in Academic Achievement among male and female undergraduate students.
5. To study the relationship between the Usage of Artificial Intelligence Learning Tools and Academic Achievement among undergraduate students.

Hypotheses of the Study:

The following hypotheses were formulated which will be tested in the present study:

H₀₁: Usage of Artificial Intelligence Learning Tools is not the same in magnitude for all undergraduate students with respect to gender.

H₀₂: Academic Achievement is not the same in magnitude for all undergraduate students with respect to gender.

H₀₃: There is no significant difference in the Usage of Artificial Intelligence Learning Tools with respect to gender.

H₀₄: There is no significant difference in the Academic Achievement with respect to gender.

H₀₅: There is no significant relationship between Usage of Artificial Intelligence Learning Tools and Academic Achievement among undergraduate students.

Delimitations of the Study:

The present study was delimited to the Darjeeling and Jalpaiguri districts of North Bengal. Due to limited time and resources, only two colleges were selected. The research focused solely on students from the Arts and Commerce streams, as they had a higher number of students compared to the Science stream. This helped maintain a balanced sample size. Only 4th semester (2nd year) students were considered, as their academic performance from the 3rd semester was readily available and could be easily verified.

Methodology:

The present investigation aimed to explore the relationship between the Usage of Artificial Intelligence Learning Tools and Academic Achievement among undergraduate students at Salesian College (Autonomous), Sonada and Siliguri. In view of the objectives and nature of the problem, the 'Descriptive Survey Method' was adopted. This method was considered suitable for gathering quantitative data to examine patterns, correlations, and group differences in artificial intelligence tool usage and academic performance among students from diverse academic and demographic backgrounds.

Sample:

The study sample consisted of 130 undergraduate students enrolled in the 4th semester of Arts and Commerce streams at Salesian College (Autonomous), Sonada and Siliguri, located in the Darjeeling and Jalpaiguri districts of North Bengal. A Stratified Sampling technique was employed to ensure balanced representation based on gender (male and female). The decision to focus on 4th semester students was due to the accessibility of their 3rd semester academic records and their familiarity with AI tools integrated into higher education platforms.

Tools Used:

To achieve the objectives of the present study the investigator had used the following tools for undergraduate students:

1. Artificial Intelligence Learning Tools usage was measured using Artificial Intelligence Learning Tools Scale, which was developed by researchers from by the research team of Micabalo, Ofianga, Ormita, Orola, and Ong from Xavier University – Ateneo de Cagayan. This tool was designed to measure the usage and perception of AI-based learning tools among undergraduate students. It comprised 40 items, all positively worded, focusing on salient features such as usage frequency, tool variety, ease of use, and perceived usefulness of AI tools in academic settings. These tools were validated through expert feedback, and the instrument's reliability was confirmed via a pilot test, resulting in a Cronbach's Alpha of 0.98, indicating excellent internal consistency.
2. Academic Achievement was measured based on the marks secured by the students in their 3rd semester end term examination. The 3rd semester results were chosen because they reflected the students' performance after full completion of the syllabus and standard academic evaluation. The marks were used as a valid, unbiased and error-free representation of students' academic achievement.

Results and Discussion:

The following findings were obtained after conducting the study:

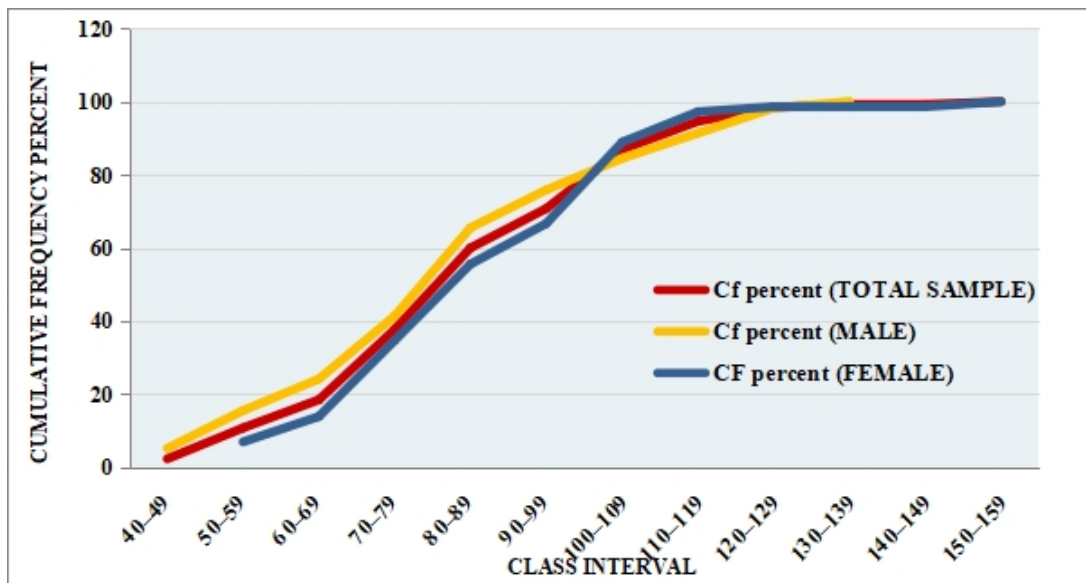


Figure 1: Ogive highlighting the scores in Usage of Artificial Intelligence Learning Tools with regard to the total sample and sub samples

The ogive in Figure 1 illustrates the cumulative frequency distribution of AI tool usage scores. The distribution was slightly positively skewed (Skewness = 0.23) and platykurtic (Kurtosis = -0.14), indicating a flatter curve than normal and a slight concentration of scores toward the lower end. The mean score was 86.65 (SD = 21.08), with female students scoring marginally higher ($M = 88.53$) than males ($M = 84.33$). However, the t-test result ($t = -1.24$, $p > 0.05$) showed that this difference was not statistically significant. This supports Hypotheses H_{01} and H_{03} , suggesting that gender does not substantially influence the magnitude or pattern of AI tool usage. The lack of significance may be attributed to overlapping standard deviations and similar medians (Male = 83.07, Female = 86.83), indicating comparable engagement levels across genders.

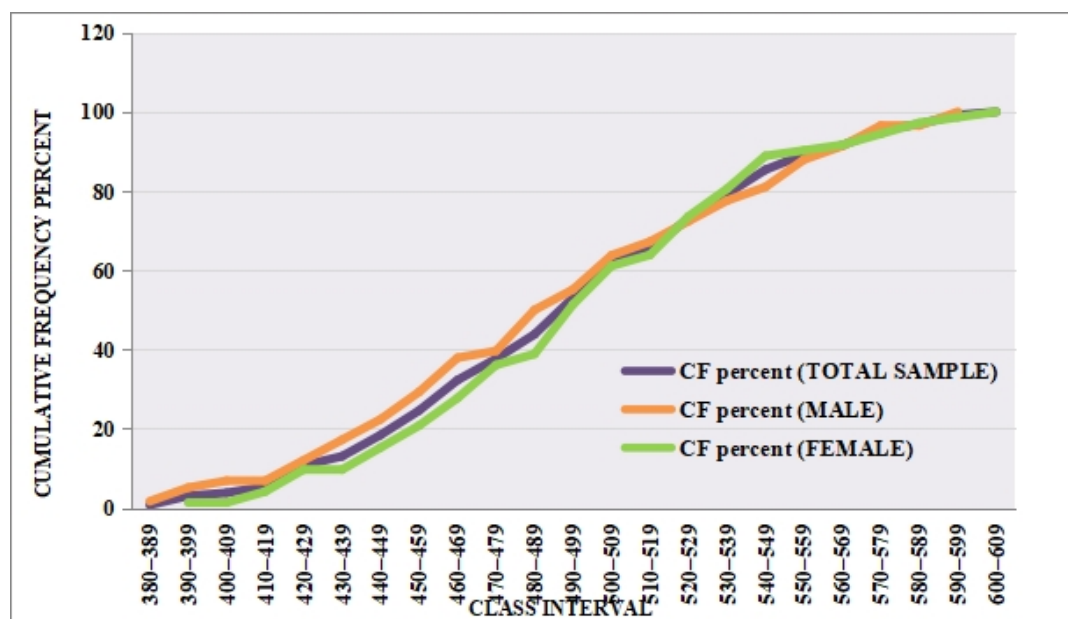


Figure 2: Ogive highlighting the scores in Academic Achievement with regard to the total sample and sub samples

Figure 2 presents the cumulative frequency distribution of academic achievement scores. The distribution was nearly symmetrical (Skewness = -0.0025) and platykurtic (Kurtosis = 2.40), suggesting a broad spread of scores with no extreme outliers. The overall mean was 496.04 (SD = 49.48), but female students had a notably higher mean (M = 552.82) than males (M = 509.8). The t-test result ($t = -5.72$, $p < 0.05$) confirmed a statistically significant difference in academic achievement between genders. This led to the rejection of Hypotheses H₀₂ and H₀₄. The significance is supported by the narrower standard deviation among females (SD = 39.14), indicating more consistent performance, and a higher mode (Female = 497.28 vs. Male = 483.25), reflecting a stronger central tendency in female scores.

Table 1: t-value for male and female undergraduate students in respect of the variable of Usage of Artificial Intelligence Learning Tools

Variable	Gender	N	Mean	Standard Deviation	df	t-value
Usage of Artificial Intelligence Learning Tools	Male	58	84.33	19.61	128	-1.24 N.S.
	Female	72	88.53	18.61		

N.S. – Not Significant

Table 1 shows that the t-value for gender difference in AI tool usage was -1.24, which is not significant at the 0.05 level. Although female students had a slightly higher mean score, the overlapping standard deviations and similar distribution patterns suggest that the observed difference could be due to random variation rather than a true gender effect. Thus, Hypothesis H₀₃ was accepted. This outcome may reflect equal access to AI tools and similar levels of digital literacy among both genders in the sampled population.

Table 2: t-value for male and female undergraduate students in respect of the variable of Academic Achievement

Variable	Gender	N	Mean	Standard Deviation	df	t-value
Academic Achievement	Male	58	509.8	45.26	128	-5.72 N.S.
	Female	72	552.82	39.14		

N.S. – Not Significant

Table 2 reports a t-value of -5.72 for gender differences in academic achievement, which is statistically significant at the 0.05 level. This indicates a meaningful difference in academic achievement between male and female students. The higher mean and lower standard deviation among females suggest not only better performance but also greater consistency. The rejection of Hypothesis H₀₄ is justified by the substantial gap in mean scores and the clustering of female scores around higher values, possibly reflecting stronger study habits, higher motivation, or more effective use of academic resources.

Table 3: The variable of Product Moment Correlation between Usage of Artificial Intelligence Learning Tools and Academic Achievement among total Undergraduate Students

The Group	Coefficient of Correlation
Total Sample	-0.0034 N.S.

N.S. – Not Significant

Table 3 presents a Pearson correlation coefficient of -0.0034, indicating an almost negligible relationship between AI tool usage and academic achievement. This supports Hypothesis H₀₅. The lack of correlation suggests that mere frequency or intensity of AI tool usage does not translate into improved academic outcomes. This could be due to varied purposes of AI usage (e.g., paraphrasing, grammar checks, or content generation) that may not directly enhance conceptual understanding or critical thinking, which are essential for academic success.

Implications:

The findings of the study have some important implications for educational practices:

1. **Focus on Effective Integration of Artificial Intelligence Learning Tools:** Since the Usage of Artificial Intelligence Learning Tools did not significantly impact Academic Achievement, there is a need for institutions to not just adopt but strategically integrate these tools into the curriculum, accompanied by proper training and pedagogical support.
2. **Gender-Inclusive Digital Literacy Programs:** With female students demonstrating slightly higher Usage of Artificial Intelligence Learning Tools and significantly better Academic Achievement, institutions may benefit from implementing gender-sensitive digital skill enhancement programs to support male students as well.
3. **Need for Evaluation of Artificial Intelligence Learning Tools' Pedagogical Value:** Educational stakeholders should critically assess the instructional value of Artificial Intelligence Learning Tools rather than merely focusing on their technological appeal.
4. **Encouraging Balanced Learning Approaches:** Given the weak correlation between Usage of Artificial Intelligence Learning Tools and Academic Achievement, educators should encourage a blended learning approach, combining traditional methods with digital tools for more holistic learning outcomes.
5. **Research-Informed Policy Making:** Policymakers should support ongoing research to examine the evolving effectiveness of Artificial Intelligence Learning Tools in various academic disciplines and contexts.

Conclusion:

On the basis of the analysis, the investigator of the present study arrived at the following findings which have been presented below:

1. Male, female, and total sample of undergraduate students differed in their level of Usage of Artificial Intelligence Learning Tools and Academic Achievement.
2. There was no statistically significant difference in the level of Usage of Artificial Intelligence Tools among students with respect to gender. Since the mean score on Usage of Artificial Intelligence Tools was slightly higher for the female students compared to the male students, it may be inferred that female students exhibit higher engagement with Artificial Intelligence Learning Tools.
3. There was a statistically significant difference in the level of Academic Achievement with respect to gender. Since female students scored higher on average, it may be inferred that female students demonstrate higher academic performance than male students.
4. There was no significant relationship between Usage of Artificial Intelligence Learning Tools and Academic Achievement among undergraduate students. Therefore, increased use of Artificial

Intelligence Learning Tools did not necessarily correlate with improved academic performance among undergraduate students.

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