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ARTIFICIAL INTELLIGENCE IN EDUCATION: A DOUBLE-EDGED SWORD FOR ACADEMIC SUCCESS AND DATA PRIVACY

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Abstract
This study examines how artificial intelligence (AI) affects students' academic achievement, highlighting the advantages and disadvantages of ethical use, data protection, and self-regulated learning. There are now worries about academic integrity and cognitive engagement as a result of the increasing use of AI technologies like ChatGPT, Grammarly, and AI-based platforms. Using a standardized questionnaire, 300 university students provided primary data. The dependent variable was academic success as determined by CGPA, whereas the independent variables were AI dependence, ethical behavior, privacy issues, and cognitive aspects. Significant determinants of academic achievement were identified by descriptive statistics, correlation and non-parametric tests providing educators and policymakers with important information on how to responsibly integrate AI in education.

INTRODUCTION

The rapidly developing science of artificial intelligence (AI) aims to create machines and systems that can carry out tasks that have historically required human intelligence, including learning, reasoning, problem-solving, language understanding, and visual perception. AI has become a disruptive force in education in recent years, changing how teachers teach, how students learn, and how educational content is distributed and customized. AI solutions have the potential to improve overall educational performance and boost student engagement by making learning more interactive and adaptive (Guo & Wang, 2025). Understanding how students and AI interact in today's digital world is essential to ensure responsible use and upholding a balanced approach to education (Morales-García et al., 2024).

1.1 Integration of AI Tools and Academic Performance

There are now more chances to enhance learning effectiveness and academic achievement thanks to the incorporation of AI tools like ChatGPT, Grammarly, and intelligent teaching systems. Artificial intelligence (AI)-powered platforms clarify difficult ideas, offer

instant feedback, and design personalized learning paths (Holmes et al., 2019). Numerous studies have connected the use of AI with better academic results, such as higher GPAs, more effective learning, and improved comprehension (Ward et al., 2024).

But for implementation to be successful, obstacles pertaining to ethics, teaching responsibilities, and access must be addressed (Saleem et al., 2025). Academic performance is impacted by cognitive ability as well as psychological, behavioral, social, and technical elements. It is frequently measured by GPA, standardized test scores, course completions, and overall standing. By assessing how much students rely on AI and how that affects their academic performance, teachers can comprehend both the possible advantages like higher productivity and the risks like over-reliance and decreased cognitive engagement (Crompton & Burke, 2023).

1.2 Cognitive Development and AI Dependency

Despite the advantages, there are serious issues with critical thinking and cognitive growth when AI is used more and more. An over-reliance on AI tools may result in superficial learning by impairing students' capacity for problem-solving and limiting their prospects for deep cognitive engagement (Luckin et al., 2016; Basha, 2024). While academic self-efficacy and AI dependency are not directly related, research has shown that academic stress and performance expectations act as mediators in this relationship. Increased indolence, the dissemination of false information, a decline in creativity, and a diminished capacity for independent thought are all detrimental effects of over-reliance (Zhang et al., 2024).

Students who strategically integrate self-regulated learning skills with AI-assisted learning, on the other hand, attain superior academic results. The combination of autonomous cognitive effort and tailored AI assistance improves learning outcomes and quality (Zawacki-Richter et al., 2019).

1.3 Ethical Issues and Academic Integrity

The use of AI in education has brought up difficult moral questions, such as those pertaining to safety, social order, and human rights. Governments and international organizations are creating rules and ethical frameworks for the use of AI in an effort to strike a balance between ethical concerns and technological growth (Chen, 2024). A significant obstacle is upholding academic honesty. Though plagiarism is discouraged by programs like Turnitin and Grammarly, generative AI applications can also be abused for academic dishonesty if they are not well managed (Yang & Beil, 2024).

Misuse of AI could lead to inflated marks that don't fairly represent real learning. AI's ability to maintain academic standards is mostly dependent on institutional regulations, moral norms, and user education (Dwivedi et al., 2023). Thus, proper integration is necessary to guarantee that AI promotes academic achievement without sacrificing ethics, integrity, or student autonomy.

1.4 Data Privacy, Security and Cultural Considerations

Large volumes of student data must frequently be gathered and analyzed in order to exploit AI's personalization features, which raise serious issues about surveillance, data misuse, and confidentiality violations (Zawacki-Richter et al., 2019). Transparent data regulations not only guarantee adherence to legal requirements but also foster confidence and encourage academic participation, making data privacy in education a crucial problem (Jones, 2019). Students' perceptions and usage of AI tools are also influenced by cultural variables, which has an impact on their academic achievement and involvement (Viberg et al., 2023).

Educational institutions must give privacy education, open data practices, and cultural sensitivity top priority when designing AI policies in order to protect students' rights (Marín et al., 2022). While AI has the potential to enhance data security, ethical issues must be handled with caution (Devineni, 2024). Building trust and encouraging responsible AI use are two benefits of institutional emphasis on ethical data handling (Huang, 2023; Yang & Beil, 2024). Moreover, organized AI auditing procedures are necessary to guarantee that AI systems continue to be ethical, transparent, and safe throughout time (Mokander, 2023). According to the literature, AI has a great deal of promise to improve academic performance through individualized support, increased learning effectiveness, and enhanced assessment integrity. However, the risks associated with over-reliance, cognitive stagnation, ethical

quandaries, data privacy, and cultural differences outweigh these advantages.

METHODOLOGY

The target population of this study consists of 6,175 students of university of Gujrat (UOG) studying in BS, MPHILL and PHD programs. Based on Cochran's formula a sample of 300 students is selected for the study. Stratified random sampling was applied to ensure fair and proportional representation of students from each department and gender group. This approach ensures that the sample accurately reflects the diversity of the total population in terms of both departmental affiliation and gender. Survey method technique is used for Data collection. A well-structured questionnaire is used as an instrument of data collection.

First part consists of the demographic characteristics of university students like Name, age, semester, department, gender, academic discipline, GPA, CGPA, frequency of AI use in daily life (in hours), familiarity with AI tools used in education, perception of academic success, perceived improvement in academic performance due to AI tools, and privacy concern related to AI educational tools. The next part is designed to gather information on various quantitative factors related to university student academic performance and privacy concerns. There are used to collect information using a 5-point Likert-Scale.

These items are designed to obtain the data of 8 factor in which one is Dependent and other 7 are Independent.

Reliability indicates the extent to which an instrument yields consistent results over repeated applications under similar conditions. Common methods for assessing reliability include internal consistency measures like Cronbach's Alpha, test-retest reliability, and inter-rater reliability. Among these, Cronbach's Alpha is widely used for Likert-scale surveys and questionnaires to evaluate the internal consistency of multiple-item scales. In this study, reliability statistics were calculated to verify the consistency of the survey instrument, thereby ensuring that the data collected would be dependable for further analysis.

Descriptive statistics are used to understand the main features of a dataset. Each descriptive statistic condenses a large amount of data into an easier-to-read summary. Correlation is measured between dependent and independent variables to check the relationship between these variables. The Mann-

Whitney U test is used to assess the differences between two groups of an independent variable when the dependent variable is not normally distributed rather is either ordinal or continuous. The Mann-Whitney U test does not need normality or equal variances, in contrast to the t-test. When the assumption of normality is not fulfilled the we can use non parametric test. It evaluates whether there is significant variation between the two groups' distributions.

RESULTS AND DISCUSSION

Reliability Statistics

The reliability analysis of the scale consisting of 8 items shows a Cronbach's Alpha of 0.890, which indicates excellent internal consistency among the items. This high value suggests that the items are reliably measuring the same underlying concept, providing confidence in the consistency of responses. Additionally, the Cronbach's Alpha based on standardized items is 0.893, which is very close to the raw alpha, implying that the item variances are relatively uniform and the scale is well-balanced.

2.1 Descriptive Statistics

The descriptive statistics for the demographic variables Age, GPA, and CGPA provide insights into the characteristics of the participants in the study. The age of the respondents ranged from a minimum of 17 years, with a mean age of 20.62 years and a standard deviation of 3.495. Regarding academic performance, the GPA score has an average of 3.29 and a standard deviation of 0.50492, suggesting that the majority of students maintained above-average academic standing. Similarly, the CGPA has an average of 3.24 and a standard deviation of 0.44469, indicating a consistent academic performance across semesters.

The analysis of responses concerning AI reliance and its impact on student performance shows a moderate level of agreement with AI's academic benefits, but also reveals concerns about overdependence. On average, 35.55% of students agreed and 17.25% strongly agreed that AI tools like ChatGPT, Grammarly, and Turnitin contribute positively to

academic tasks indicates a generally favorable perception, though not extremely strong.

Students especially acknowledged AI's role in increasing task efficiency and improving assignment quality, with the highest agreement levels (46% and 48.3% respectively) and relatively high mean values of 2.80 and 2.74. However, when asked whether they prefer AI tools over traditional academic sources, or if their academic performance would suffer without AI, agreement was weaker, with mean scores of 2.37 and 2.29, indicating mixed views and potential reliance rather than preference.

Additionally, concerns about AI reducing intrinsic motivation for deep learning and critical thinking were evident, as 40% agreed and 17% strongly agreed with this negative impact (mean = 2.43, SD = 1.176).

The responses regarding AI dependence and its influence on students' cognitive growth reveal a mix of both concern and appreciation for the role AI plays in learning. The overall mean score of 2.60 suggests a slightly positive inclination toward the benefits of AI, but not without some reservations. With a standard deviation of 1.08, the variability in responses indicates that students have diverse experiences and perceptions regarding AI's cognitive impact. A significant number of students agreed (43.66%) and strongly agreed (19.8%) that AI tools have enhanced their learning experience by making learning easier, especially by providing quick answers (34% strongly agreed) and customized learning (22.7% strongly agreed).

On the other hand, concerns about reduced analytical thinking and memory retention were also evident. A substantial proportion of students agreed (43.7%) and strongly agreed (10.7%) that their ability to analyze and interpret academic content has declined due to dependence on AI tools (mean = 2.33). Similarly, about 50.3% agreed that AI usage has reduced their engagement in problem-solving, though this concern is slightly moderated by a mean score of 2.56, reflecting a moderate view. Interestingly, the use of AI to understand complex topics more efficiently than through traditional methods received more positive feedback (mean = 2.77, with 42% agreement and 27.7% strong agreement), indicating that students see clear advantages in using AI for difficult academic material.

The results concerning AI's impact on academic integrity show mixed student perspectives, with a general tendency toward cautious agreement that AI influences honesty and plagiarism detection in academic work. A significant portion of respondents agreed (34.88%) and strongly agreed (14.54%) overall that AI tools contribute to academic integrity. Specifically, many students recognize the role of AI-based tools like Turnitin and Grammarly, with 34.7% agreeing and 16% strongly agreeing that such tools make academic work more honest (mean = 2.44).

The analysis of student responses regarding AI and learning outcomes reveals a moderate level of agreement about the positive role of AI in enhancing educational experiences, but also highlights uncertainties and reservations, particularly regarding AI's ability to replace traditional human interaction in education. A significant number of students agree (40.74%) or strongly agree (14.72%) that AI contributes positively to learning outcomes.

When it comes to replacing human teachers, students show the most resistance. Only 35% agreed and 15% strongly agreed with the statement that AI tutoring systems could replace human teachers, while 26.6% disagreed or strongly disagreed. This is reflected in the low mean score of 2.29, indicating that although students acknowledge the usefulness of AI, they still value human interaction in learning, particularly for complex or sensitive subjects where personalized instruction is needed.

The responses indicate moderate awareness among students about how AI tools in education collect and use personal data. The overall mean score of 2.41 suggests that while students have some understanding, many still lack clarity or have not fully engaged with data privacy issues. A significant portion (26.8%) remains neutral, and only 16.1% strongly agree with the statements. Most students agree that more institutional guidance and training is needed. For instance, 62.3% supported receiving AI security training, and 57.7% agreed that institutions should provide more information about AI data practices.

A significant portion of respondents expressed worry about the misuse of personal and academic data (e.g., unauthorized sharing, hacking, or unfair decisions), but many remained neutral (27%) or somewhauncertain. While some students (around 34.6% agree) believe these risks are real, fewer strongly

agree (14%), and about 24.3% (SD + D) disagree with the concerns, suggesting mixed perceptions. This reflects a general awareness of potential threats but also a lack of strong conviction or detailed understanding.

A substantial percentage of students (nearly 60% combined) agree or strongly agree that strict regulations, transparency, and student rights to access, modify, or delete data are necessary. However, students show low confidence in current laws ensuring fairness and protection, with over 30% disagreeing that existing rules are sufficient. These results point to a strong demand for improved legal frameworks and ethical accountability from AI providers and educational institutions

2.2 Normality Test

Normality of the variables is tested results are shown in table A-1. The Tests of Normality using both the Kolmogorov-Smirnov and Shapiro-Wilk methods reveal that the data collected from all sections do not follow a normal distribution. This finding implies that the assumption of normality is violated for each dataset collected. Consequently, the use of parametric statistical techniques that assume normality may not be appropriate for

analyzing these data. Instead, non-parametric methods that do not rely on the assumption of normally distributed data for valid and reliable analysis outcome are used.

Table A-1: Normality Tests

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
AI Reliance and Student Performance	.155	297	.000	.942	297	.000
AI Dependence and Cognitive Growth	.151	297	.000	.912	297	.000
AI's Impact on Academic Integrity	.093	297	.000	.973	297	.000
Understanding AI Data Practices	.104	297	.000	.977	297	.000
AI Risks in Privacy and Data Protection	.116	297	.000	.971	297	.000
Data Control and Consent	.065	297	.004	.988	297	.016
AI in Education: Ethics and Law	.095	297	.000	.980	297	.000
	.121	297	.000	.953	297	.000

a. Lilliefors Significance Correction

2.3 Correlation Analysis

Table A-2 provides the correlation between independent variables and a dependent variable. The Spearman's correlation analysis reveals significant positive relationships between AI and Learning Outcomes and several other factors studied in this research. Specifically, there is a moderate positive correlation in AI Reliance and Student Performance, with a correlation coefficient of 0.504 and a significance value of 0.000, indicating that increased reliance on AI tools is associated with better perceived learning outcomes among students. Similarly, AI Dependence and Cognitive Growth show a positive correlation. AI's Impact on Academic Integrity demonstrates a stronger positive correlation of 0.570 ($p = 0.000$), implying that students who perceive AI as playing a significant role in maintaining academic integrity also tend to report better learning outcomes. The strongest correlation is observed in Understanding AI Data Practices, which has a coefficient of 0.613 ($p = 0.000$). This indicates that students' awareness and understanding of how AI processes their academic data is strongly associated with enhanced learning outcomes.

All correlations are statistically significant at the 0.01 level, confirming that these relationships are unlikely due to chance. Overall, these findings suggest that various dimensions of AI use, understanding, and

governance are positively connected with students' perceptions of their learning outcomes, underscoring the multifaceted impact of AI integration in educational settings.

Table A-2: Correlation Tests

Factors	Correlation Coefficient (Spearman's rho)	Sig. (2-tailed)
AI Reliance and Student Performance	0.504	0.000
AI Dependence and Cognitive Growth	0.429	0.000
AI's Impact on Academic Integrity	0.570	0.000
Understanding AI Data Practices	0.613	0.000
AI Risks in Privacy and Data Protection	0.383	0.000
Data Control and Consent	0.484	0.000
AI in Education: Ethics and Law	0.450	0.000

2.4 Mann-Whiteny U test:

The Table A-3 shows the Mann-Whitney U test conducted to explore whether students' perceptions and experiences regarding various aspects of artificial intelligence (AI) in education differ significantly based on their CGPA, categorized into two groups: Group 1 (CGPA between 1.0 and 3.0) and Group 2 (CGPA between 3.1 and 4.0). The results indicate significant differences in several key areas. AI Reliance and Student Performance, the test yielded a U value of 7103 with a Z-score of -2.386 and a p-value of 0.017, which is statistically significant at the 0.05 level. This implies that students with higher CGPAs (Group 2) have notably different perceptions regarding their reliance on AI tools for academic tasks compared to those with lower CGPAs (Group 1). Specifically, it suggests that academically stronger students may rely differently on AI or view its role in performance distinctively.

For AI Dependence and Cognitive Growth, the U value was 8458 with a Z-score of -0.108 and a p-value of 0.914, which is not statistically significant. This indicates no meaningful difference between the two CGPA groups in how they perceive AI's impact on their cognitive growth, such as critical thinking or understanding complex topics. Similarly, AI's Impact on Academic Integrity resulted in a U of 7955, Z of -1.05, and p-value of 0.294, also showing no significant difference between CGPA groups. This suggests that students, regardless of academic achievement, share similar views on AI's role in maintaining academic honesty and integrity.

In AI and Learning Outcomes, the U value was 7203.5 with a Z-score of -2.091 and a p-value of 0.037, indicating a significant difference. This means that students with higher CGPAs perceive AI's influence on learning outcomes differently, possibly valuing AI's benefits on critical thinking, engagement, and motivation more than their lower CGPA peers.

In Understanding AI Data Practices, the test showed a U of 7322, Z of -2.042, and a significant p-value of 0.041. This result suggests that higher-achieving students tend to be more aware of, or have different perceptions about, how AI tools collect and use personal and academic data compared to lower-achieving students.

For AI Risks in Privacy and Data Protection, the U value was 7416.5 with a Z-score of -1.893 and a p-value of 0.058, which is just above the conventional significance threshold of 0.05. This marginal result indicates a slight trend where students with higher CGPA might be somewhat more concerned about risks related to privacy and data protection, though the difference is not strong enough to be conclusive.

Data Control and Consent, the test yielded a U of 6948.5, Z of -2.625, and a highly significant p-value of

0.009. This strongly indicates that students with higher CGPA have notably different, perhaps more critical, views regarding their control over personal data collected by AI systems and the importance of consent mechanisms in educational platforms. Lastly, for AI in Education: Ethics and Law, the U value was 7701.5, Z-score of -1.386, and a p-value of 0.166, showing no significant difference. This suggests that views on legal and ethical regulations concerning AI in education are fairly consistent among students regardless of their CGPA.

Overall, the analysis shows that students' perceptions of AI reliance, learning results, data control and permission, and understanding data practices are all greatly influenced by their academic success. On the other hand, students with different academic backgrounds seem to have similar opinions on the cognitive effects of AI, academic integrity, privacy threats, and ethical and legal issues. This demonstrates how basic ethical and cognitive concerns about AI are widespread across the academic spectrum and may or may not have a significant differential impact on university students' academic performance, even though higher-performing students may be more discriminating about specific practical and data-related aspects of AI.

Table A-3: Mann-Whiteny U test

Factors	Mann-Whitney U	Z	Asymp. Sig. (2-tailed)
AI Reliance and Student Performance	7103	-2.386	0.017
AI Dependence and Cognitive Growth	8458	-0.108	0.914
AI's Impact on Academic Integrity	7955	-1.05	0.294
AI and Learning Outcomes	7203.5	-2.091	0.037
Understanding AI Data Practices	7322	-2.042	0.041
AI Risks in Privacy and Data Protection	7416.5	-1.893	0.058
Data Control and Consent	6948.5	-2.625	0.009
AI in Education: Ethics and Law	7701.5	-1.386	0.166

Conclusion

The results of this study demonstrate how artificial intelligence (AI) significantly and favorably influences students' learning outcomes and experiences. The results of the correlation analysis showed that enhanced learning outcomes are substantially correlated with a number of aspects of AI, including dependence on AI tools, opinions on how it affects academic integrity, and particularly knowledge of AI data practices. These noteworthy correlations highlight the growing significance of AI literacy and awareness in higher education by showing that students who are more knowledgeable about and involved with AI technology typically report better academic experiences.

The Mann-Whitney U test also demonstrated that students' opinions of AI are influenced by their academic achievement in a number of important domains. Comparing higher-achieving students to their lower-achieving friends, the former showed markedly different opinions on issues of control and permission, perceived learning outcomes, data practices, and AI reliance. Nonetheless, opinions about the cognitive effects of AI, academic honesty, privacy threats, and ethical and legal issues were similar across groups, indicating a shared foundation of worries. Overall, these findings highlight how students' academic standing influences how they interact with and assess AI, even while AI integration enhances learning. Therefore, to guarantee that all students can gain something significant from AI-enhanced learning environments, educational institutions should encourage equitable AI literacy and ethical use.

Recommendations and Suggestions

It is advised that educational institutions create thorough ethical rules to regulate the use of AI in academic contexts in light of the study's findings. These rules ought to guarantee the openness and integrity of the handling of students' academic and personal information. To protect sensitive data and stop illegal access or exploitation, institutions must also give top priority to adhering to national and international data protection rules.

Additionally, it is crucial to educate instructors and students on the advantages, disadvantages, and workings of artificial intelligence through frequent training sessions, seminars, and workshops on digital literacy. It's also critical that AI systems be designed and implemented transparently; students should know how their data is being used and how AI technologies are determining their learning objectives. Last but not least, more responsible and balanced use of AI tools in educational settings can result from incorporating all relevant stakeholder's students, teachers, IT specialists, and legislators in the development and implementation of these technologies.

It is recommended that longitudinal studies be carried out in the future to evaluate the long-term impacts of AI on students' psychological health, privacy issues, and academic achievement. The results' generalizability might be enhanced by broadening the study's scope to encompass a more varied population from various fields, geographical locations, and educational levels. To learn more about how AI affects instructional strategies and institutional policies, it would also be beneficial to collect viewpoints from technical personnel, administrators, and educators. Last but not least, examining the effects of certain AI tools like ChatGPT, intelligent tutoring programs, or learning management system analytics would offer more thorough understandings of their useful advantages and possible disadvantages in the teaching and learning process.

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