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Research Article

Effectiveness of Artificial Intelligence-Enabled Teaching Learning Process on Academic Achievement of the Students

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Abstract

This paper will discuss how effective the teaching-learning processes based on artificial intelligence are on the academic performance of the students, and this research will centre on the interaction with the AI tools and the contribution of personalised learning through AI. The quantitative type of research was adopted based on a structured survey of 130 students chosen randomly. The researchers evaluated three hypotheses using regression and correlation analysis to capture the effects and connections of the main variables. The findings demonstrate that AI-based teaching-learning activities have significant and positive influences on academic performance and that the model can account for 71.2% percent of the variation, which means that AI-powered teaching and learning practices have a significant positive impact on the academic performance of students. The connection between the use of AI tools and the academic performance of students (r=.402, p=.001) was moderate but significant, proving that the frequent use of AI platforms can be associated with the improvement of learning outcomes. Further, AI- based personalized learning demonstrated a significant but small impact on academic results at various levels of performance (R^2 =.198), indicating that personalisation helped to achieve better results but works best with the traditional pedagogical methods. Altogether, the research finds that AI is one of the most effective educational resources that enhances student engagement, facilitate personalized learning, and increases academic performance. The results highlight the need to incorporate AI in a responsible and strategic way to ensure it reaps the maximum benefits in education.

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1. INTRODUCTION

Generative AI technologies, such as ChatGPT, have advanced quickly since 2022 and demonstrated substantial promise in a range of downstream tasks. AI in education is now a major study area as a result of these technological developments, which have sparked an increasing interest in incorporating earlier AI advances from domains like computer vision and natural language processing into educational contexts. (Tan *et al*., 2025) [11].

Through tools like chatbots, AI-assisted learning platforms, data-driven decision support systems, and learning behaviour analysis tools, among others, researchers have increasingly investigated how these AI technologies might improve the teaching and learning process. The education sector as a whole is aggressively investigating how AI might transform instruction. (Tan *et al*., 2025) [11].

Artificial intelligence's use in education is drastically changing both how teachers and students learn. Personalised learning experiences are made possible by AI-powered technologies that can modify the pace and content to suit the needs of each student. Virtual assistants, computerised grading, and intelligent tutoring technologies improve student engagement and teaching effectiveness. AI can also assist in the early identification of difficult pupils through the analysis of learning patterns, enabling prompt support and intervention. (West, 2025) [15], (Walter, 2024) [14], (Rao & Suhasini, 2025) [10].

The potential of AI to increase inclusivity and accessibility is a crucial component of its function in education. AI-powered platforms can offer students with impairments adaptive learning resources, speech-to-text capabilities, and real-time translations. AI also helps teachers by providing data-driven insights into student performance and the efficacy of curricula. AI has the ability to develop more effective and equitable learning environments globally as the technology advances. (West, 2025) [15], (Creely & Carabott, 2025) [1].

Significant advantages of artificial intelligence (AI) in education include improved accessibility, higher student engagement, continuous evaluation and real-time feedback, individualised learning, and increased teaching efficiency. Students can learn at their own speed and receive guidance based on their skills and shortcomings, thanks to AI's ability to customise instructional content. Additionally, AI frees up teachers' administrative time so they may concentrate more on mentoring and instruction.

Personalized Learning

AI increases student engagement and retention by tailoring classes and study materials to their unique learning preferences, pace, and style. Platforms have the ability to continuously evaluate student progress and adjust resources so that students grasp ideas before moving on. Additionally, by providing individualised learning experiences, this personalisation promotes inclusivity in education for individuals with special needs. (University, 2023) [12], (Kamra, 2025) [6].

Effectiveness and Administrative Assistance

AI frees up teachers' time for engaging and relevant instruction by automating repetitive administrative duties like scheduling, attendance monitoring, and grading. This improves resource allocation and lowers overhead expenses, increasing operational efficiency in educational institutions. The evaluation process is further streamlined by instant grading and feedback mechanisms. (Hurter, 2024) [4], (Online, 2025)

Constant Evaluation and Input

AI systems give students immediate feedback on their performance, assignments, and quizzes, allowing them to spot and fix errors fast. Students' confidence is increased, and improved learning outcomes are supported by this instant assessment. AI data analytics give teachers important insights to help them spot learning gaps and make better interventions. (University, 2023) [12], (Kamra, 2025) [6], (Online, 2025)

Engagement and Accessibility

AI promotes remote learning and global inclusion by expanding access to high-quality educational resources irrespective of financial or geographic limitations. Through gamified and interactive learning experiences catered to each student's interests and ability level, it can help boost motivation. AI also encourages the development of critical thinking and digital literacy, two essential future abilities. (Hurter, 2024) [4], (Online, 2025)

Thus, AI in education transforms conventional learning paradigms by improving accessibility, efficiency, personalisation, and engagement for both instructors and a wide range of learners.

2. OBJECTIVES

- To assess the impact of artificial-intelligence-enabled teaching–learning processes on the academic achievement of students.
- To examine the relationship between the level of students' engagement with AI tools and their academic performance.
- To analyse how AI-assisted personalised learning influences the academic outcomes of students across different performance levels.

Hypotheses

1. **H_1:** There is a significant impact of AI-enabled teaching–learning processes on the academic achievement of students.
2. **H_2:** There is a significant relationship between students' engagement with AI tools and their academic performance.
3. **H_3:** I-assisted personalised learning significantly improves the academic outcomes of students across different performance levels.

Research questions

- How effective is the AI-enabled teaching–learning process in improving the academic achievement of students?
- What is the relationship between students' engagement with AI tools and their academic performance?
- How does AI-assisted personalised learning influence academic outcomes among students with different performance levels?

3. LITERATURE REVIEW

(Dong *et al*., 2025) [2] Education has undergone a revolution thanks to recent advancements in artificial intelligence (AI), whose presence and advantages allow for the development of innovative teaching and learning strategies. As a result, numerous empirical studies have been carried out to assess how well AI uses affect students' academic performance. Examining how AI affects students' academic performance overall in connection to several moderator variables, such as educational level, the role of AI, the length of the intervention, sample size, learning strategy, subject area, and kind of AI, was the aim of this meta-analysis study. A total of 29 empirical papers were chosen from six databases (Scopus, Web of Science, APA PsycINFO, Education Full Text, Education Source, ERIC, and Social Sciences Full Text) in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) criteria. Before being coded, computed, and analysed, these studies—which included a sample of 2,657 people from various educational levels—met the inclusion criteria. With an impact size of 0.924, we discovered that AI significantly improved students' academic performance overall. This study confirms the effectiveness of AI and offers a crucial starting point for further investigation to pinpoint and capitalise on particular circumstances in which AI can best improve student learning.

(V *et al*., 2025) [13] In recent years, there has been an increase in the importance of artificial intelligence (AI) in the educational environment of the digital transformation period and its effect on student accomplishment. The proposed study will look at how students at higher education institutions use AI-based learning tools and how much of an impact these tools have on their overall academic performance, as well as their efficiency and involvement in the learning process. A structured questionnaire was utilised to collect data on 310 students located around the state of Karnataka, utilising a quantitative and empirical approach. The study examined the relationship between awareness, adoption, usefulness, ethical concerns, and institutional support using statistical software such as Pearson correlation, regression, and ANOVA. According to research, students' use and acquaintance with AI technology are favourably connected with their academic success. Learning involvement was shown to be significantly influenced by perceived usefulness, and problems and ethical considerations were found to be interconnected. AI must be introduced responsibly. Additionally, one of the main indicators of students' success as entrepreneurs in AI-driven businesses was their institutional support. According to the research, when accessibility, ethics, and institutional facilitation are properly managed, AI enhances not just learning experience and engagement but also innovation and academic success.

(Pertiwi *et al*., 2024) [9] The impact of artificial intelligence (AI) on student motivation, academic performance, and overall learning experiences is the main emphasis of this study, which investigates the transformative potential of AI in elementary education. This study clarifies the advantages and difficulties of integrating AI in educational settings through a thorough analysis of the body of existing literature, empirical data, and qualitative interviews with educators and administrators. The results show a favourable relationship between student motivation levels and AI-based teaching strategies, indicating that technology can meaningfully engage students by encouraging curiosity, independence, and intrinsic motivation throughout their educational journey. Furthermore, notable gains in students' academic performance after being exposed to AI- enhanced instruction highlight how effective these cutting-edge strategies are at promoting deeper conceptual comprehension and academic material mastery. Ongoing professional development, infrastructural expenditures, and the creation of ethical protections are all necessary components of a complex strategy to address issues including equity, inclusion, and ethical considerations. The complex dynamics of integrating AI in education, such as how it affects classroom dynamics, teacher-student interactions, and the larger sociocultural backdrop, require more investigation. All things considered, utilising AI's revolutionary potential to build more inclusive, egalitarian, and productive learning environments for every student requires interdisciplinary partnerships and a dedication to ethical innovation.

(Zheng *et al*., 2023) [16] The field of education has recently made extensive use of artificial intelligence (AI) technology, and artificial intelligence in education (AIEd) has drawn more and more attention. The total impact of AI on learning perception and achievement, however, has not been the subject of any quantitative meta-analysis. This study carried out a thorough meta-analysis of the effects of AI on learning accomplishment and learning perception in order to fill this research vacuum. A total of 2908 participants from 24 articles published between 2001 and 2020 were included in the current meta-analysis. The results show that while AI had a little impact on learning perception, it had a large impact on learning achievement. Thirteen moderator variables (sample levels, sample size, learning domains, learning methods, research design, research settings, intervention duration, and types of treatment organisations, role of AI, areas of AI application, AI software, AI hardware, and AI technologies) had their effect sizes examined. The effectiveness of AI was found to be significantly affected by hardware, learning domains, types of organisations, sample size, sample level, and AI roles. There is a thorough discussion of the findings and their significance for practitioners and educators.

(Pacheco-Mendoza *et al*., 2023) [8] This study assesses the application of artificial intelligence and how it affects the University of Guayaquil (UG) students' academic performance. The goal was to create and apply a predictive model that would forecast students' academic achievement. This study takes a quantitative, projective, non-experimental, and predictive method. Academic performance criteria were incorporated into a questionnaire, which was then validated using the expert judgment criterion. Data was gathered using the Google Forms platform and the questionnaire. A 92% response rate was achieved with the distribution of 1100 copies of the questionnaire and the receipt of 1012 responses. The prediction

model was created using the Gretl software, and the model fit was carried out taking into account the coefficient of determination of 0.9075, the mean square error of 0.26, and the mean absolute error of 0.16. The findings demonstrate a significant and direct impact on pupils' academic achievement, with p-values < 0.001 and positive coefficients around zero indicating the statistical relevance of age, hours, days, and AI-based tools or applications. In order to create an artificial intelligence-based model, it was determined that a predictive model with theoretical backing might be put into practice to modify the variables.

(Jiao *et al*., 2022) [5] Due to the lack of use of learning processes, summative data, and accurate predictions of quantitative relationships between factors and accomplishments, online education has been having trouble forecasting students' academic performance. Based on summative data and the learning process of the students, this study creates an artificial intelligence-enabled prediction model for academic achievement in order to overcome these two challenges. The learning data in an online engineering course is first described and transformed using established prediction criteria. Next, an evolutionary computing technique is employed to investigate the most effective prediction model for the academic achievement of the students. Using the same technology and pedagogy, another online course is used to validate the model. The course outcomes and the model prediction results show satisfactory agreement. The primary conclusions show that summative performance, classroom involvement, and knowledge acquisition are the three main factors influencing academic achievement. Academic performance usually does not depend significantly on the prerequisite knowledge. Pedagogical and analytical implications are presented based on the findings. Students' learning performance in online courses can be assessed with the help of the suggested evolutionary computation-enabled prediction approach. Comparing the reported genetic programming approach to other potent artificial intelligence techniques, it also offers a respectable prediction performance.

(Hamadneh *et al*., 2022) [3] Due to the COVID-19 pandemic, university electronic learning (e- learning) has grown dramatically, particularly in 2020. Because it guarantees that every student receives the necessary instruction, this kind of education is important. The statistical assessments' ability to accurately forecast the calibre of the university's e-learning is constrained. As a result, many colleges are being forced to adopt hybrid and online learning environments. In order to forecast students' performance in the blended learning environment at Saudi Electronic University (SEU), this article uses artificial neural networks (ANNs) in conjunction with statistical analysis to determine the most prevalent elements influencing students' performance. As a result, a dataset from SEU's Blackboard learning management system was created for this dissertation. The percentage of students who attend live lectures, their midterm exam scores, their percentage of completed evaluations, and their study habits—whether in-person or online—can all be used to evaluate a student's performance. The findings demonstrated that academic success is caused by the four elements. Then, based on the four factors, we suggested a new ANN model to forecast the students' performance. To train the ANNs, the Firefly Algorithm (FFA) was employed. Several statistical tests, including ANOVA tests, statistical hypothesis tests, and error functions, will be used to assess the performance of the suggested model.

4. RESEARCH METHODOLOGY

Research methodology refers to a structured pattern upon which an investigation is carried out in research. It outlines the guiding strategy, step-by-step methodology, and tools to be used in obtaining, analysing, and interpreting data, to answer research questions or to test hypotheses. Methodology describes the reason behind adopted methods and the way in which these decisions protect the accuracy, reliability, and validity of the findings. Normally, it refers to the research design, sampling methods, data-collection methods, data collection instruments and the methods of analysis. The clear expression of these elements helps research methodology to enhance transparency and allows other researchers to judge, criticise, or duplicate the research work. It also makes the process of investigation logical, arranged and consistent with the purpose of the study. In general, research methodology is used as a roadmap that can connect the purpose of the study to the methods used in the study to ensure that the results are acceptable, significant, and scientifically supported.

RESEARCH DESIGN

The current research assumes the primary approach of a quantitative study to objectively evaluate the efficiency of the artificial-intelligence-based teaching-learning processes on the academic performance of the students. A quantitative design suits the situation since it will allow measuring the important variables using numbers: AI utilisation, engagement levels, and academic performance. In addition, it allows testing relationships and their impact statistically, which in turn ensures the correctness, replicability, and expansion of the findings.

Research Approach

The deductive research method is used, which will start with conceived theories on AI in education and then test the hypotheses based on empirical information. The methodology is appropriate since the research aims to confirm the theoretical hypotheses on the impact of AI-mediated learning on student achievement. Measurable constructs, structured variables and statistical tools strengthen the deductive orientation of investigation.

Proposed Method

The research employs a quantitative approach based on a survey that enables the organisation of the responses of students concerning their use of AI tools, their perception of the effectiveness of AI-enabled learning, and the academic performance indicators. A closed-ended questionnaire,

consisting of structured questions to be measured on standard rating scales, is used. Surveys are chosen since they are effective in collecting data from a large group, consistency in feedback is inherent, and statistical coordination of the association between variables is easily attainable.

Sample Size and Sampling Design.

The sample that is considered in the study is 130 students. In the sampling design, we will use the randomised one, which ensures that every student receives the same probability of being chosen, therefore reducing sampling bias and increasing representativeness. Randomisation enhances the validity of the study because it makes sure that the sample size is representative of the general students involved in AI-based learning environments.

DATA COLLECTION METHOD

The survey-based questionnaire is used in collecting the data through a survey-based questionnaire; the questionnaire is in the form of a survey and is administered online or given as a paper-based questionnaire, as deemed appropriate. The survey will include demographic information, AI use frequency, and use of AI learning tools, AI usage perception, and academic performance indicators. This approach is selected as it is possible to obtain the data in an efficient way, using a relatively large sample and preserving its consistency and reliability.

DATA ANALYSIS

The data collected are examined in terms of proper statistical, descriptive, and inferential methods. Demographic variables are analysed using frequency and percentage analysis to give a clear sample profile. To achieve the aim of the research, the correlation analysis is used to comprehend the direction and strength of relationships between AI engagement and academic performance, and the regression analysis is used to understand how the AI-enabling teaching-learning processes can predict academic achievement. Objective testing of hypotheses, as well as the creation of significant information about the impact of AI-assisted learning, is possible with these statistical tools, thus guaranteeing strict data interpretation.

5. RESULT

Table 1: Age of the respondents.

Age (In years)		
	Frequency	**Percent**
18-20	24	18.5
21-25	51	39.2
26-30	27	20.8
31-35	28	21.5
Total	130	100.0

The above table discusses the frequency and percentage of the age of the respondents. In the 18–20-year age group, the frequency is 24, and the percentage is 18.5%. In the 21–25-year age group, the frequency is 51 and the percentage is 39.2%. In the 26–30-year age group, the frequency is 27, and the percentage is 20.8%. In the 31-35 years age group, the frequency is 28, and the percentage is 21.5%.

Graph 1: Graphical representation of the age of the respondents.

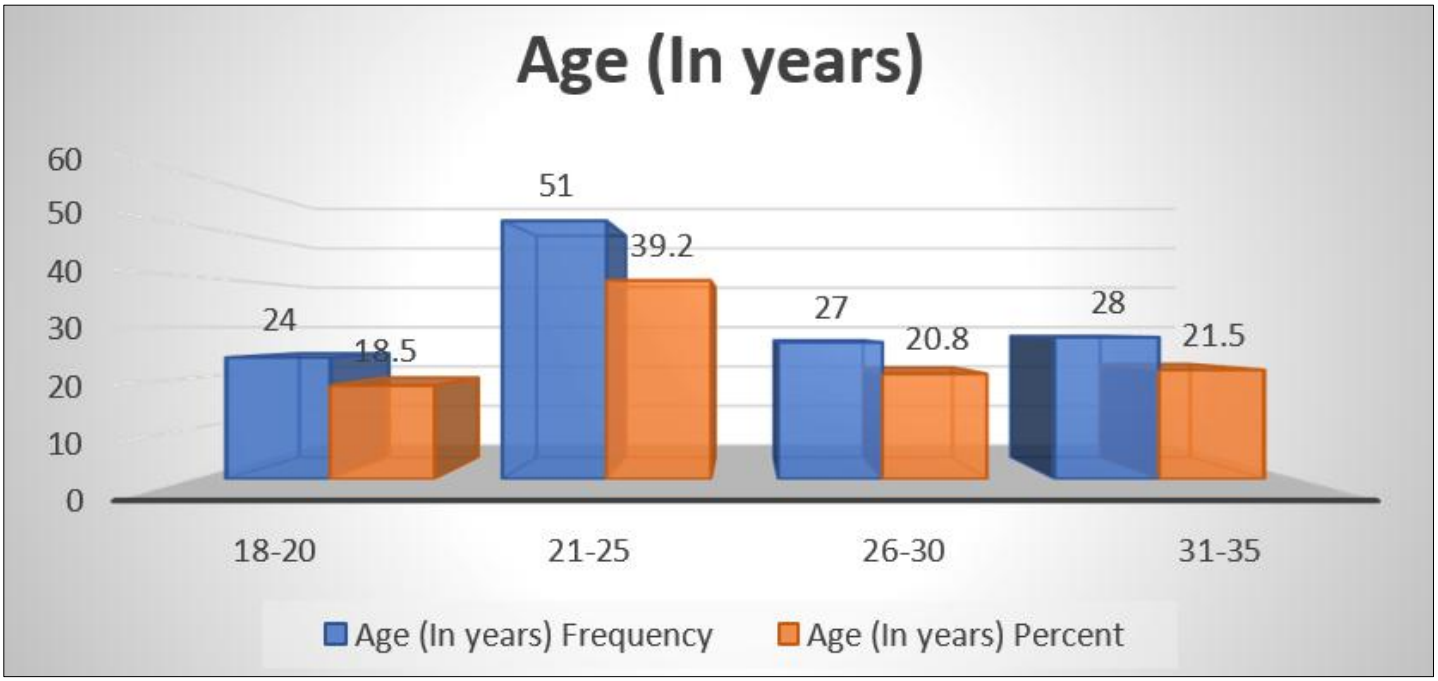

Table 2: Gender of the respondents.

Gender		
	Frequency	**Percent**
Male	89	68.5
Female	41	31.5
Total	130	100.0

The above table discusses the frequency and percentage of the gender of the respondent. In the male group, the frequency is 89, and the percentage is 68.5%. In the female group, the frequency is 41, and the percentage is 31.5%.

Graph 2: Graphical representation of the gender of the respondents.

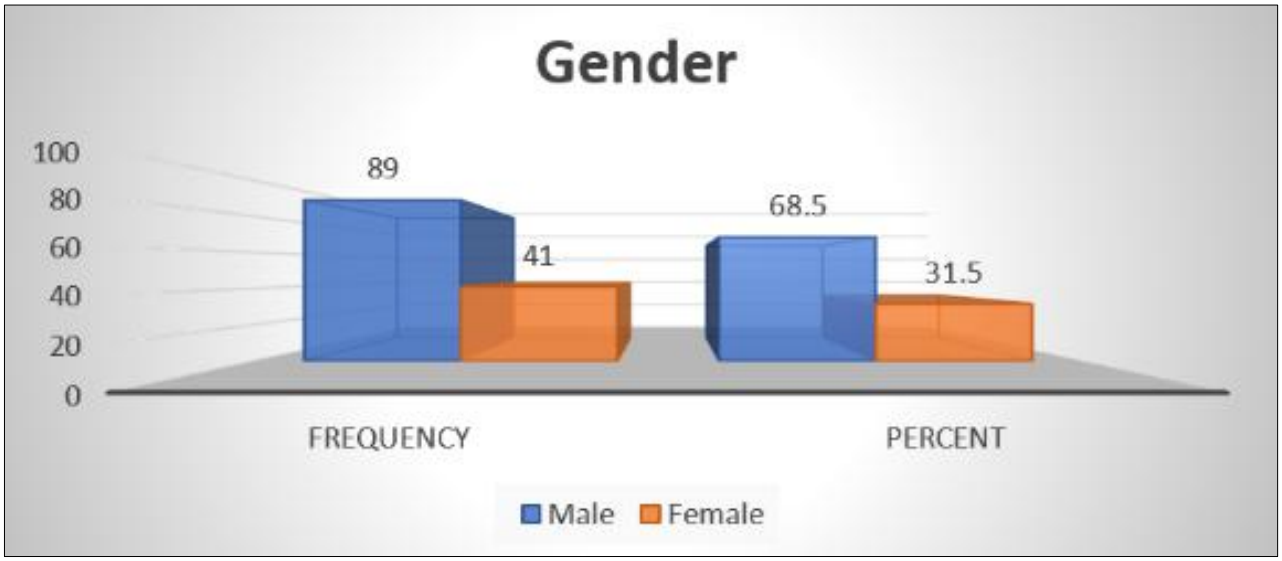

Table 3: Course/Program of Study of the respondents.

Course/Program of Study		
	Frequency	**Percent**
Higher secondary	47	36.2
Undergraduate	44	33.8
Post-graduate	19	14.6
Other	20	15.4
Total	130	100.0

The above table discusses the frequency and percentage of the Course/Program of Study of the respondents. In Higher Secondary, frequency is 47 and the percentage is 36.2%. In Undergraduate, Frequency is 44, and the percentage is 33.8%. In post-graduate, the frequency is 19, and the percentage is 14.6%. In other words, frequency is 20 and percentage is 15.4%.

Graph 3: Graphical representation of the Course/Program of Study of the respondents.

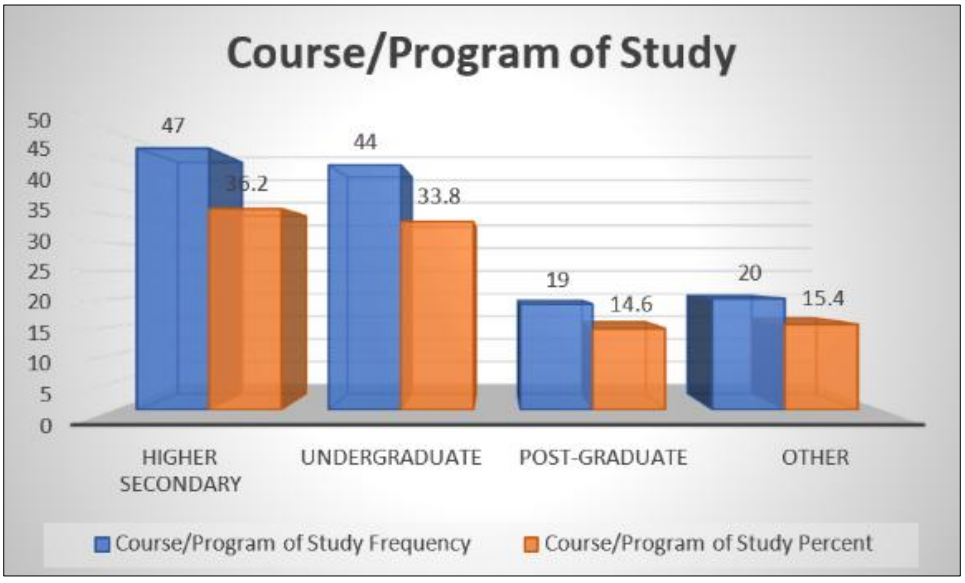

Table 4: Frequency of Using AI Tools for Learning of the respondents.

Frequency of Using AI Tools for Learning		
	Frequency	**Percent**
Daily	33	25.4
Several times a week	39	30.0
Once a week	21	16.2
Occasionally	22	16.9
Never	15	11.5
Total	130	100.0

The above table discusses the frequency and percentage of the Course/Program of Study of the respondents. The daily frequency is 33, and the percentage is 25.4%. Several times a week, the frequency is 39, and the percentage is 30.0%. Once a week, the frequency is 21, and the percentage is 16.2%. Occasionally, frequency is 22 and percentage is 16.9%. In Never, Frequency is 15, and the percentage is 11.5%.

Graph 4: Graphical representation of the frequency of using AI Tools for Learning of the respondents.

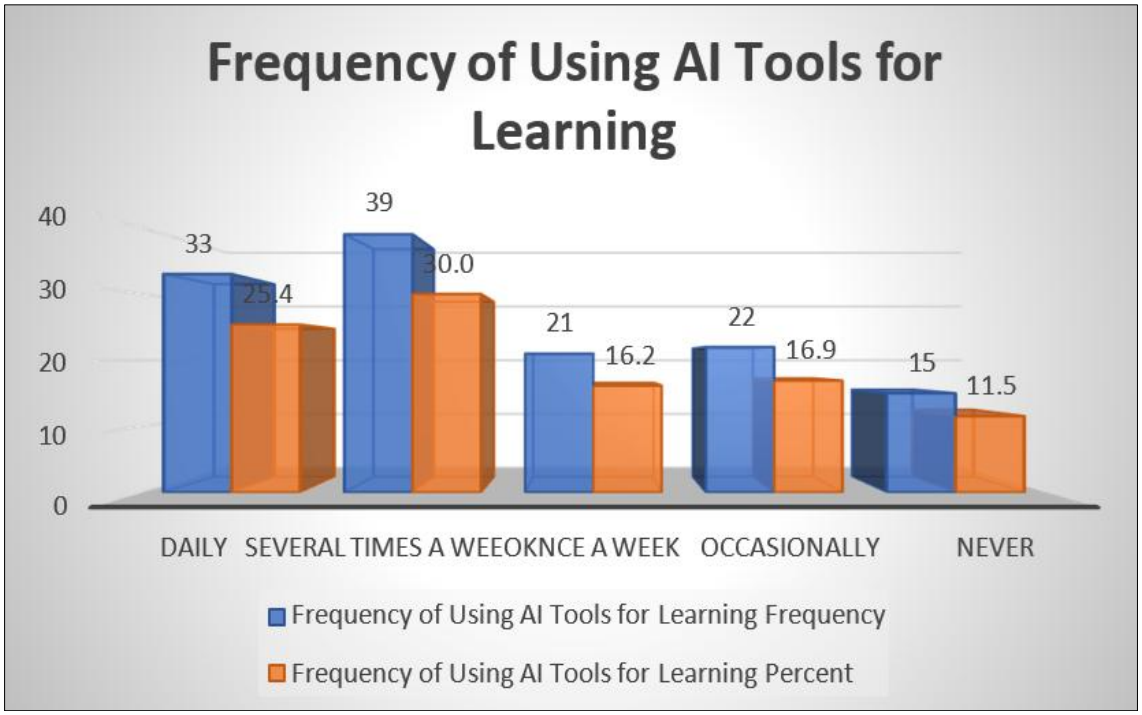

Table 5: Regression test on H_1 (There is a significant impact of AI-enabled teaching– learning processes on the academic achievement of students.)

Model Summary				
Model	**R**	**R Square**	**Adjusted R-Square**	**Std. Error of the Estimate**
1	.844[a]	.712	.710	.50397
a. Predictors: (Constant), AI-Enabled Teaching–Learning Processes				

ANOVA[a]						
Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	Regression	80.566	1	80.566	317.204	.000[b]
	Residual	32.511	128	.254		
	Total	113.077	129			
a. Dependent Variable: Academic Achievement						
b. Predictors: (Constant), AI-Enabled Teaching–Learning Processes						

Coefficients[a]						
Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**
		B	**Std. Error**	**Beta**		
1	(Constant)	.089	.211		.421	.675
	AI-Enabled Teaching–Learning Processes	.933	.052	.844	17.810	.000
a. Dependent Variable: Academic Achievement						

Academic achievement and AI-enabled teaching-learning processes have a robust and statistically significant association, according to the regression study. The R Square value of.712 indicates that roughly 71.2% of the variance in academic achievement is explained by AI-enabled teaching– learning approaches, while the model's high correlation coefficient (R =.844) indicates a strong positive link. The model is very significant, indicating that AI-enabled procedures meaningfully predict academic performance, according to the ANOVA results ($F = 317.204$, $p<.001$).

Additionally, the coefficient table indicates that the predictor variable has a significant positive influence (B =.933, β =.844, t = 17.810, $p<.001$), indicating that advancements in AI-driven teaching-learning strategies significantly boost academic attainment. The fact that the constant is not significant suggests that the predictor, not the baseline variables, has a greater influence on academic attainment. With a low standard error and high explanatory power, the model is generally resilient, demonstrating that AI-enabled teaching and learning procedures are a powerful and trustworthy indicator of students' academic success.

Table 6: Pearson correlation test on H_2 (There is a significant relationship between students' engagement with AI tools and their academic performance.)

Correlations			
		Academic Performance	**Students' Engagement with AI Tools**
Academic Performance	Pearson Correlation	1	.402**
	Sig. (2-tailed)		.000
	N	130	130
Students' Engagement with AI Tools	Pearson Correlation	.402**	1
	Sig. (2-tailed)	.000	
	N	130	130
**. Correlation is significant at the 0.01 level (2-tailed).			

Students' engagement with AI tools and academic performance has a modest, favourable, and statistically significant association, according to the correlation analysis. Higher student involvement with AI-based tools is linked to better academic performance, according to the Pearson correlation coefficient of r =.402 (p<.001). The association is significant and implies that greater engagement with AI educational tools can lead to improved learning results, despite its lack of strength. This association is unlikely to be the result of chance, as shown by the significance level of 0.01, underscoring the critical role AI tool engagement plays in promoting students' academic achievement.

Table 7: Regression test on H_3 (AI-assisted personalised learning significantly improves the academic outcomes of students across different performance levels.)

Model Summary				
Model	**R**	**R Square**	**Adjusted R-Square**	**Std. Error of the Estimate**
1	.445[a]	.198	.192	.78346
a. Predictors: (Constant), AI-Assisted Personalised Learning				

ANOVA[a]						
Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	Regression	19.432	1	19.432	31.658	.000[b]
	Residual	78.568	128	.614		
	Total	98.000	129			
a. Dependent Variable: Academic Outcomes Across Performance Levels						
b. Predictors: (Constant), AI-Assisted Personalised Learning						

Coefficients[a]						
Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**
		B	**Std. Error**	**Beta**		
1	(Constant)	2.089	.347		6.027	.000
	AI-Assisted Personalised Learning	.463	.082	.445	5.627	.000
a. Dependent Variable: Academic Outcomes Across Performance Levels						

AI-Assisted Personalised Learning has a statistically significant but small impact on Academic Outcomes across Performance Levels, according to the regression results. While the R Square is.198 suggests that AI-assisted tailored learning accounts for 19.8% of the variance in academic achievements, the model's R value of.445 indicates a moderately positive association. While this is a significant contribution, it also implies that the remaining variation can be explained by other causes. The model's significance is confirmed by the ANOVA table (F = 31.658, p<.001), indicating that AI-assisted tailored learning is a reliable indicator of academic performance. The coefficient analysis further supports this: the predictor has a substantial positive influence (B = .463, β = .445, t = 5.627, p< .001), implying that as the extent of AI-assisted personalised learning grows, academic performance improves. Even in the absence of the predictor, the constant is significant and shows a baseline level of academic performance. All things considered, the results indicate that although AI-assisted personalised learning improves academic results, its effect is only modest, suggesting the necessity of incorporating extra teaching techniques and learning aids to raise student achievement even more.

6. DISCUSSION

The results of the work are clear evidence that the teaching-learning process that is facilitated by artificial-intelligence has an impressive positive effect on the academic performance of students. The Hypothesis 1 regression model demonstrates that the predictive relationship is extremely strong, whereby AI-facilitated teaching-learning activities can explain more than 71 per cent of academic performance. This implies that AI tools, in personalised feedback, adaptive content delivery, automated evaluation, and learning support, play an important role in learning effectiveness. These findings align with the previous research, such as Dong *et al*. (2025) [2] and Pertiwi *et al*. (2024) [9], which highlight the transformational nature of AI in enhancing conceptual learning, motivation, and learning outcomes. The high standardised regression coefficient (β =.844) also supports the idea that AI integration is not a helpful tool, but an extremely powerful factor that can influence the performance of students.

The connection between the involvement of students with the tools of AI and their academic results, which is checked under Hypothesis 2, is statistically significant but of medium value (r=.402). This implies that the more one interacts with AI systems like learning chatbots, assessment systems, and intelligent tutoring systems, the better one's academic performance. Nevertheless, the average strength of the correlation suggests that the engagement is not the sole determinant of the performance since other factors, including the study habits, the quality of instruction, and the prior knowledge, have a significant contribution to the results. However, the results are also in support of the theoretical assumption of AI tool interaction with students to maximise efficiency, motivation, and timely feedback, which in turn improves academic progress.

The findings of Hypothesis 3 show that the statistically significant, yet relatively small effect of AI-assisted personalised learning on academic performance at various performance levels (R 2 =.198). Although the personalised AI tools, including adaptive learning pathways, differentiated tasks, and unique recommendations, alleviate the learning, the small effect size demonstrates that personalised learning is most efficient when it is used alongside the conventional teaching strategies, human-led facilitation, and peer interaction. Different students with different levels of performance can react

differently to personalisation, whereby the high-performing students gain more advantages of advanced support than students with low-level performance who need extra scaffold support. On the whole, the results imply that despite the valuable contribution that AI makes to academic development, it is necessary to incorporate it as a complementary component into the larger pedagogical frameworks.

7. CONCLUSION

It is concluded in the study that the use of artificial-intelligence-enabled teaching-learning processes can contribute to the academic gain of the students to a considerable extent and the favorable effect on the learning outcomes. The good outcomes of the initial regression model prove that the effect of AI-based instructional practices on the academic achievements of students is significant, which proves the importance of combining digital tools, automated tests, customised content, and interactive learning support. The interaction with AI tools also leads to the improvement of academic performance among students, and it is possible to propose that the more frequently and better the interaction with AI tools, the more effective learning is. Though the contribution of AI-assisted personalised learning is rather small, it is still a significant contribution to academic developments, especially when other learning strategies are involved. Altogether, the results prove the belief that AI is a revolutionary educational tool that can assist various students, enhance efficiency, and positively impact the entire process. Nevertheless, the research also suggests that AI must not be used instead of familiar teaching, human instructions, and interactive learning, but should be used as a supplement to help produce the best educational results. The research could examine the implications of AI in different contexts of learning, learners, and populations in future, to build a better insight into the long-term implications of AI on education.

REFERENCES

1. Creely E, Carabott K. Teaching and learning with AI: an integrated AI-oriented pedagogical model. The Australian Educational Researcher. 2025;52(6):4633–4654. doi:10.1007/s13384-025-00913-6.
2. Dong L, Tang X, Wang X. Examining the effect of artificial intelligence in relation to students' academic achievement: a meta-analysis. Computers and Education: Artificial Intelligence. 2025;8:100400. doi:10.1016/j.caeai.2025.100400.
3. Hamadneh NN, Atawneh S, Khan WA, Almejalli KA, Alhomoud A. Using artificial intelligence to predict students' academic performance in blended learning. Sustainability. 2022;14(18):11642. doi:10.3390/su141811642.
4. Hurter B. Top benefits of AI in education for teachers and students. Element451 Blog. 2024. Available from: https://element451.com/blog/benefits-of-ai-in-education
5. Jiao P, Ouyang F, Zhang Q, Alavi AH. Artificial intelligence-enabled prediction model of student academic performance in online engineering education. Artificial Intelligence Review. 2022;55(8):6321–6344. doi:10.1007/s10462-022-10155-y.
6. Kamra S. The impact of artificial intelligence on education in India. Lovely Professional University Blog. 2025. Available from: https://www.lpu.in/blog/the-impact-of-artificial-intelligence-on-education-in-india/
7. Faulkner University. The future of learning: positive applications of AI in education. 2025. Available from: https://www.faulkner.edu/news/the-future-of-learning-positive-applications-of-ai-in-education/
8. Pacheco-Mendoza S, Guevara C, Mayorga-Albán A, Fernández-Escobar J. Artificial intelligence in higher education: a predictive model for academic performance. Education Sciences. 2023;13(10):990. doi:10.3390/educsci13100990.
9. Pertiwi RWL, Kulsum LU, Hanifah IA. Evaluating the impact of artificial intelligence-based learning methods on students' motivation and academic achievement. International Journal of Post-Axial. 2024;2(1). doi:10.59944/postaxial.v2i1.279.
10. Rao GT, Suhasini N. Integrating artificial intelligence in higher education to enhance teaching and learning. Computer Applications in Engineering Education. 2025;33(6). doi:10.1002/cae.70085.
11. Tan X, Cheng G, Ling MH. Artificial intelligence in teaching and teacher professional development: a systematic review. Computers and Education: Artificial Intelligence. 2025;8:100355. doi:10.1016/j.caeai.2024.100355.
12. CIS International School. The benefits of AI in education. 2023. Available from: https://www.cis-spain.com/en/blog/the-benefits-of-ai-in-education/
13. V DG, KM S, NP L, HV P. Harnessing artificial intelligence for smart learning: an empirical study on student academic performance. Journal of Multidisciplinary Scientific Research. 2025. doi:10.61336/jmsr/25-09-01.
14. Walter Y. Embracing the future of artificial intelligence in the classroom: the relevance of AI literacy, prompt engineering, and critical thinking in modern education. International Journal of Educational Technology in Higher Education. 2024;21(1):15. doi:10.1186/s41239-024-00448-3.
15. University Canada West. Advantages and disadvantages of AI in education. 2025. Available from:

https://www.ucanwest.ca/blog/education-careers-tips/advantages-and-disadvantages-of-ai-in-education

16. Zheng L, Niu J, Zhong L, Gyasi JF. The effectiveness of artificial intelligence on learning achievement and learning perception: a meta-analysis. Interactive Learning Environments. 2023;31(9):5650–5664. doi:10.1080/10494820.2021.2015693.

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