

Role Of AI-Based Learning Tools in Improving Students' Academic Performance in The Nilgiris

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Abstract—Higher education serves as an important platform for students to acquire specialised knowledge, develop employability skills, and strengthen their intellectual abilities. AI technology enables computer systems to perform tasks that require human-like intelligence, such as learning, reasoning, problem-solving, and decision-making. AI-based learning tools support students through personalised learning, instant feedback, and easy access to academic resources. Their effective use can enhance learning efficiency, engagement, knowledge retention, and overall academic performance. AI-based learning tools are increasingly used by Arts and Science students to support learning, academic activities, and knowledge acquisition. However, their effectiveness in improving students' academic performance may vary depending on usage patterns, awareness, and learning needs. Therefore, this study aimed to examine the role of AI-based learning tools in improving the academic performance of Arts and Science students in The Nilgiris. The study adopted a descriptive research design and utilised both primary and secondary data. A sample of 213 Arts and Science students in The Nilgiris was selected using the simple random sampling technique. Primary data were collected through a structured questionnaire covering the students' demographic profile, usage of AI-based learning tools, and academic performance. The questionnaire included closed-ended questions and five-point Likert scale statements related to students' academic performance. The collected data were systematically coded and analysed using SPSS. Statistical tools such as percentage analysis, mean, standard deviation and Analysis of Variance (ANOVA) were employed to analyse the sample data. Null hypotheses were formulated to examine the significant differences in students' academic performance with respect to selected AI-based learning tool usage variables. This study noticed from the study that the highest level of students' academic performance is perceived by science students,

UG students, 2nd year students, students using Chatbots, students using AI tools for academic research and students using AI tools for 1–2 hours per day.

Index Terms—Artificial Intelligence, AI-Based Learning Tools, Academic Performance, Arts and Science Students, Higher Education, Student Engagement, Personalised Learning.

I. INTRODUCTION

Higher education performs a vital role in developing advanced knowledge, professional skills and critical thinking among students. It provides opportunities for intellectual growth, career development, and personal advancement. Colleges and universities increasingly adopt digital technologies and innovative learning methods to improve the quality and effectiveness of education. Artificial Intelligence technology refers to the use of computer systems to perform tasks that normally require human intelligence. It enables machines to analyse information, learn from data, solve problems, and provide intelligent responses. AI technology is increasingly used in education to support personalised learning, information retrieval, content creation, and academic assistance. Its integration into higher education has created new opportunities to improve teaching effectiveness, student engagement, and academic performance. AI-based learning tools are increasingly transforming the educational experience by providing students with personalised and technology-enabled learning support. These tools assist students in understanding complex concepts, accessing relevant information, preparing academic content, and receiving immediate feedback. AI-powered applications can adapt learning materials

according to individual abilities, learning pace, and academic requirements, thereby promoting more effective learning. Tools such as ChatGPT, intelligent tutoring systems, adaptive learning platforms, automated assessment applications, and AI-based educational assistants can support students in completing assignments, preparing for examinations, solving problems, and revising lessons. They also encourage self-directed learning by enabling students to learn beyond conventional classroom instruction and access academic assistance when required. Furthermore, AI-based learning tools can enhance student engagement, motivation, knowledge retention, and learning efficiency.

II. REVIEW OF LITERATURE

According to Anselmo et al. (2026) presented a study to assess the extent of AI-based learning tool utilization and its relationship with the academic performance of undergraduate students in Science, Technology, and Society (STS) courses in the Philippines. The analysis found that students reported high use of AI-based learning tools, although the duration, depth, and diversity of their usage were generally limited. Also, there is no significant relationship between the frequency of AI tool usage and academic performance. Similarly, there was no significant difference in academic performance between regular and non-regular AI users.

The researchers Mirza et al. (2026) focused that the students' perceptions of AI-based adaptive learning systems and their role in enhancing academic performance. It is inferred from the analysis that students had high awareness and perceived usefulness of AI-based adaptive learning systems, particularly due to personalized learning pathways, flexible pacing, and real-time feedback. Additionally, the systems positively influenced student engagement, self-directed learning, achievement of learning objectives, test preparation, and perceived academic performance. However, lack of internet connectivity, technical difficulties, and usability issues were identified as major barriers to effective implementation. In case of Chavalala (2025) measured that the impact of artificial intelligence on academic performance and learning strategies among university students in South Africa. The study confirmed that AI

integration significantly improved academic performance by providing personalised learning experiences, instant feedback, and adaptive study plans. Also, students reported improved motivation and efficiency through the use of AI for time management, problem-solving, and knowledge retention. In addition, excessive reliance on AI was identified as a concern, particularly because it may reduce students' critical thinking and independent cognitive skills.

In view of Lozano-Gomez and Libaque-Saenz (2025) aimed to examine the impact of ChatGPT usage on the academic performance of undergraduate students in Peru. The analysis observed that students' skills and stress levels were significant predictors of academic performance. Also, ChatGPT's idea-generation function had a positive influence on academic outcomes by encouraging creativity and supporting students' learning activities. However, the use of ChatGPT for research support showed a negative effect, possibly due to outdated or inaccurate information. The authors Phua et al. (2025) mentioned that students had a high level of engagement with AI tools such as ChatGPT, QuillBot, Grammarly, and Perplexity, mainly because they perceived these tools as useful for improving academic performance, efficiency, and personalised learning. Further, perceived usefulness, ease of use, security and privacy, and positive attitudes towards AI significantly influenced students' behavioural intention to use AI tools. In addition, behavioural intention was also found to be a strong predictor of actual AI tool adoption. Moreover, concerns regarding data security, privacy, and over-reliance on AI were identified as important issues that could negatively affect critical thinking and problem-solving skills.

The study of Tripathi (2024) analyzed that the impact of artificial intelligence-based learning tools on student engagement and academic performance in higher education institutions. The study noticed that AI-based learning tools significantly improved student engagement and academic performance through personalised learning and adaptive instructional support. Further, real-time feedback and continuous learning assistance also contributed to better academic outcomes. In addition, student engagement was found to play an important mediating role in the relationship between AI tool usage and academic achievement.

III. STATEMENT OF THE PROBLEM

The rapid development of Artificial Intelligence has transformed the educational environment by providing students with innovative tools for learning, information retrieval, content creation, personalised assistance, and academic support. AI-based learning tools such as ChatGPT, intelligent tutoring systems, automated assessment platforms, and AI-powered educational applications are increasingly used by students in Arts and Science Colleges.

However, the extent to which these tools contribute to improving students' academic performance remains uncertain. Differences in awareness, frequency of usage, purpose of use, digital skills, and students' ability to use AI responsibly may influence their academic outcomes. Excessive dependence on AI may also affect independent learning, critical thinking, and problem-solving abilities.

In The Nilgiris, limited empirical evidence is available regarding the role of AI-based learning tools in students' academic performance. Therefore, this study aimed to examine the role of AI-based learning tools in improving academic performance among students of Arts and Science Colleges in The Nilgiris.

IV. OBJECTIVES OF THE STUDY

- To explore the demographic profile of the selected college students in in the Nilgiris.
- To analyze the role of AI-based learning tools in improving students' academic performance in the Nilgiris.

V. HYPOTHESIS OF THE STUDY

- There is no significant mean difference in students' academic performance with regard to type of AI tools using.

- There is no significant mean difference in students' academic performance with regard to purpose of AI tool usage.
- There is no significant mean difference in students' academic performance with regard to duration of AI tool using.

VI. RESEARCH METHODS

This study adopted a descriptive research design. Both primary and secondary data were used for the study. The target population comprised students of Arts and Science Colleges in The Nilgiris who use AI-based learning tools for academic purposes.

The primary data were collected through a structured questionnaire designed to gather information on the students' demographic profile, usage of AI-based learning tools, and their academic performance. Secondary data were obtained from books, journals, published research articles, government reports, and online databases. A simple random sampling technique was employed to select 213 students from Arts and Science Colleges in The Nilgiris.

The collected data were coded, entered into MS Excel, and analysed using SPSS Version 26.0. The statistical tools used for the analysis included percentage analysis, mean, standard deviation, and ANOVA.

VII. RESULT AND DISCUSSION

7.1. Demographic Profile and Students' Academic Performance

The particulars of demographic profile and students' academic performance have been furnished in the following table.

Table 1: Demographic Profile and Students' Academic Performance

No.	Variables Name	Number of Respondents	%	Mean	SD
1	Stream of Study				
	• Arts	124	58.2	3.58	0.61
	• Science	89	41.8	3.61	0.60
	Total	213	100.0		
2	Degree of Study				
	• UG	135	63.4	3.70	0.73
	• PG	62	29.1	3.51	0.59

No.	Variables Name	Number of Respondents	%	Mean	SD
	• M.Phil. & Ph.D.	16	7.5	3.62	0.59
	Total	213	100.0		
3	Current Year of Study				
	• 1 st Year	81	38.0	3.50	0.67
	• 2 nd Year	97	45.6	3.63	0.58
	• 3 rd Year	30	14.1	3.57	0.54
	• Above 3 rd Year	5	2.3	3.58	0.64
	Total	213	100.0		
4	Type of AI Tools Using				
	• Chatbots	93	43.6	3.88	0.58
	• AI Writing Tools	67	31.5	3.64	0.62
	• AI Search Tools	34	16.0	3.35	0.56
	• AI Tutoring Tools	19	8.9	3.70	0.38
	Total	213	100.0		
5	Purpose of AI Tool Usage				
	• Academic Research	70	32.9	3.83	0.50
	• Assignment Preparation	49	23.0	3.68	0.56
	• Exam Preparation	62	29.1	3.50	0.67
	• Content Creation	32	15.0	3.51	0.58
	Total	213	100.0		
6	Duration of AI Tool Using				
	• Less than 30 Minutes	18	8.5	3.43	0.58
	• 30–60 Minutes	32	15.0	3.58	0.60
	• 1–2 Hours	74	34.7	3.94	0.56
	• Above 2 Hours	89	41.8	3.60	0.61
	Total	213	100.0		

- From the above table, it is mentioned that 58.2% of the students belong to the Arts stream and 41.8% belong to the Science stream.
- It is observed from the analysis that 63.4% of the students pursue UG programmes, 29.1% pursue PG programmes, and 7.5% pursue M.Phil. & Ph.D. programmes.
- From the analysis, it is displayed that 38.0% of the students are studying in the 1st year, 45.6% in the 2nd year, 14.1% in the 3rd year, and 2.3% are above the 3rd year.
- It is illustrated from the analysis that 43.6% of the students use Chatbots for improving their academic performance, 31.5% use AI Writing Tools, 16.0% use AI Search Tools, and 8.9% use AI Tutoring Tools for improving their academic performance.
- It is depicted from the analysis that 32.9% of the students use AI tools for academic research, 23.0% for assignment preparation, 29.1% for exam preparation, and 15.0% for content creation.

- From the analysis, it is evinced that 8.5% of the students use AI tools for less than 30 minutes per day, 15.0% for 30–60 minutes, 34.7% for 1–2 hours, and 41.8% for above 2 hours in a day.

7.2. Students' Academic Performance

AI-based learning tools are reflected in improved access to learning resources, enhanced understanding of academic concepts, efficient completion of assignments, and better examination preparation. Also, artificial intelligence enables students to learn new concepts, develop problem-solving skills, retain academic information, and improve their academic efficiency.

In this section, the study has developed eight statements to measure the level of students' academic performance among the selected students in Arts and Science colleges.

Table 2: Students' Academic Performance

S. No	Factors	Mean Score	SD
1	The use of AI-based learning tools has helped me achieve better marks in examinations	3.75	1.07
2	AI-based learning tools have improved my understanding of academic subjects	3.44	1.28
3	I am able to complete my academic assignments more effectively using AI-based learning tools	3.57	1.34
4	AI-based learning tools have improved my ability to learn new concepts	3.95	1.26
5	The use of AI-based learning tools has helped me retain academic information for a longer period	3.60	1.37
6	AI-based learning tools have improved my problem-solving skills in academic activities	3.70	1.29
7	The use of AI-based learning tools has increased my efficiency in completing academic tasks	3.18	1.31
8	AI-based learning tools have helped me prepare more effectively for examinations.	3.58	1.26

It is noticed from the analysis that the statements relating to students' academic performance indicate a positive level of agreement among the selected students. It is revealed that most of the students agree with the statement 'AI-based learning tools have improved my ability to learn new concepts', which records the highest mean score of 3.95 with a standard deviation of 1.26, followed by 'The use of AI-based learning tools has helped me achieve better marks in examinations' with a mean score of 3.75 and a standard deviation of 1.07. Conversely, the statement 'The use of AI-based learning tools has increased my efficiency in completing academic tasks' records the lowest mean score of 3.18 with a standard deviation of 1.31.

TESTING OF HYPOTHESIS (ANOVA)

7.3. Relationship between Demographic Profile of the women and Students' Academic Performance This section examines the relationship between the demographic profile and students' academic

performance. To analyse the relationship, hypotheses have been formulated, and the association between the selected independent variables and students' academic performance has been tested using Analysis of Variance.

Type of AI Tools Using and Students' Academic Performance

H₀: There is no significant mean difference in students' academic performance with regard to type of AI tools using.

Table 3: Type of AI Tools Using and Students' Academic Performance

	Sum of Squares	df	Mean Square	F	'p' value
Between Groups	7.130	3	2.377	7.136	0.000*
Within Groups	69.615	209	0.333		
Total	76.746	212			

Note: * – Significant at 1% level

It is displayed from the analysis that the 'p' value is lesser than 0.05 accordingly the null hypothesis is rejected. Hence, there is a significant mean difference in students' academic performance with regard to type of AI tools using.

Purpose of AI Tool Usage and Students' Academic Performance

H₀: There is no significant mean difference in students' academic performance with regard to purpose of AI tool usage.

Table 4: Purpose of AI Tool Usage and Students' Academic Performance

	Sum of Squares	df	Mean Square	F	'p' value
Between Groups	3.132	3	1.044	2.964	0.033**
Within Groups	73.614	209	0.352		
Total	76.746	212			

Note: ** – Significant at 5% level

It is revealed from the analysis that the 'p' value is lesser than 0.05 therefore the null hypothesis is rejected. So, there is a significant mean difference in students' academic performance with regard to purpose of AI tool usage.

Duration of AI Tool Using and Students' Academic Performance

H_0 : There is no significant mean difference in students' academic performance with regard to duration of AI tool using.

Table 5: Duration of AI Tool Using and Students' Academic Performance

	Sum of Squares	df	Mean Square	F	'p' value
Between Groups	3.060	3	1.020	2.893	0.036**
Within Groups	73.686	209	0.353		
Total	76.746	212			

Note: ** – Significant at 5% level

It is noticed from the analysis that the 'p' value is lesser than 0.05 consequently the null hypothesis is rejected. Therefore, there is a significant mean difference in students' academic performance with regard to duration of AI tool using.

VIII. FINDINGS

- It is indicated that most (58.2%) of the students belong to the Arts stream. Further, the highest level of students' academic performance is perceived by the Science students.
- It is assessed from the analysis that most (63.4%) of the students pursue UG programmes. Also, the highest level of students' academic performance is perceived by UG students.
- It is measured from the analysis that most (45.6%) of the students are in the 2nd year of study. Moreover, the highest level of students' academic performance is perceived by 2nd-year students.
- It is indicated that most (43.6%) of the students use Chatbots for improving their academic performance. Additionally, the highest level of students' academic performance is perceived by students using Chatbots.
- It is found that most (32.9%) of the students use AI tools for academic research. Furthermore, the highest level of students' academic performance is perceived by students using AI tools for academic research.
- It is indicated that most (41.8%) of the students use AI tools for above 2 hours daily. In addition, the highest level of students' academic performance is

perceived by students using AI tools for 1–2 hours in a day.

- It is asserted from the mean score analysis that most of the students agree with the statement 'AI-based learning tools have improved my ability to learn new concepts' and 'The use of AI-based learning tools has helped me achieve better marks in examinations' with a mean score of 3.95 and 3.75 respectively.
- The ANOVA indicated that there is a significant mean difference in students' academic performance with regard to type of AI tools using.
- From the 'F' test, it is mentioned that there is a significant mean difference in students' academic performance with regard to purpose of AI tool usage.
- It is confirmed from the ANOVA that there is a significant mean difference in students' academic performance with regard to duration of AI tool using.

IX. SUGGESTIONS

- It is displayed that science students perceive a higher level of academic performance through AI-based learning tools. Hence, Arts and Science colleges should provide AI-enabled learning resources and subject-specific guidance to support students across different streams.
- The findings mentioned that UG students perceive a higher level of academic performance through AI-based learning tools. So, institutions should provide structured AI-based learning support, training, and academic guidance particularly for undergraduate students.
- From the study, it is noticed that 2nd-year students perceive a higher level of academic performance through AI-based learning tools. Therefore, colleges should encourage students in the early stages of higher education to use AI tools effectively for academic learning and skill development.
- It is illustrated that students using Chatbots perceive a higher level of academic performance. Accordingly, educational institutions should encourage the responsible use of AI chatbots for academic discussions, concept clarification, and learning assistance.
- From the study, it is confirmed that students using AI tools for academic research perceive a higher

level of academic performance. Thus, colleges should provide training on using AI tools for research, information gathering, critical evaluation, and academic content development.

- The findings proved that students using AI tools for 1–2 hours per day perceive a higher level of academic performance. Consequently, students should be encouraged to use AI-based learning tools for a balanced duration of 1–2 hours daily, with proper academic guidance to ensure effective and responsible usage.

X. CONCLUSION

The study examines the role of AI-based learning tools in improving students' academic performance in The Nilgiris. AI-based learning tools enhance students' academic performance by improving learning efficiency, understanding, problem-solving skills, and examination preparation. The ANOVA results indicate that there is a significant mean difference in students' academic performance with regard to the type of AI tools used, purpose of AI tool usage, and duration of AI tool usage. It is suggested that colleges and educational institutions should provide appropriate guidance and training to students on the effective and responsible use of AI-based learning tools for academic purposes. Furthermore, AI literacy programmes, academic support, and structured usage guidelines should be strengthened to ensure that students derive maximum academic benefits from AI-based learning tools in The Nilgiris.

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