RESEARCH PAPER

From Chalk to Chat-bots: AI-Based Tools in Higher Educational Institutions of Jammu and Kashmir

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Received: 28th Feb, 2026; Revised: 6th March 2026; Accepted: 7th April, 2026; Available Online: 20th April, 2026

ABSTRACT
The purpose of the present study is to study the role of AI tools in teaching learning process. The investigator used 'Mixed Method Approach' where both qualitative and quantitative data were collected. Questionnaire and interview schedule were used to collect data from students and teachers. Validity and reliability of the tools are established by the investigators. The population includes the college teachers and students belong to different higher educational institutions. A sample of 300 students and teachers were selected randomly from 10 colleges. The investigators used thematic analysis and percentage analyses for qualitative data and ANOVA and correlation for quantitative data. Results revealed that AI has positive impacts on the academic achievement of the learners.
Keywords: AI-based tools, higher educational institutions (HEI's), mixed method research, academic achievement, Jammu province.
How to cite this article: Kumar R, Gupta R, Sharma A, Sharma D, Kumari, I, From Chalk to Chat-bots: AI-Based Tools in Higher Educational Institutions of Jammu and Kashmir. Int J Drug Deliv Technol. 2026;16(63s):119-124. DOI: 10.25258/ijddt.16.63s.15
Source of support: Nil.
Conflict of interest: None

INTRODUCTION

Artificial Intelligence (AI) has been used into education in the post-pandemic age, further evolving this rapid digitization. A paradigm change toward more individualized, flexible, and data-driven learning environments is reflected in the move from traditional "chalk-and-talk" methods to AI-driven teaching approaches. Artificial Intelligence (AI) represents a transformative technological advancement that has the potential to significantly simplify human life. As a rapidly expanding field, it is capable of reshaping various dimensions of social interaction (Bostrum, 2017). Within higher education, both educators and students are increasingly utilizing AI tools for a variety of purposes, including enhancing learning experiences, improving instructional efficiency, generating educational content, supporting writing tasks, providing feedback, and evaluating student performance (Banihashem et al., 2024;Chen et al., 2020; Guner et al., 2024; Noroozi et al., 2024). Artificial Intelligence is expected to enhance the quality of education and training significantly. There has been considerable debate suggesting that AI holds greater potential to transform higher education than any previous technological innovation.

Studies conducted by Bond et al. (2024),Ocen et al. (2025), Jaboob et al. (2025), and AlBlooshi (2026) indicate that AI is increasingly being utilized in teaching, learning, academic support, and administrative processes. Fuente and Farhadian (2025) and Xu and Thien (2026) demonstrate a substantial rise in global research focusing on AI applications in higher education.AI-powered technologies facilitate personalized and adaptive learning, improve academic achievement, strengthen student engagement, and support data-driven decision-making through intelligent tutoring systems and predictive analytics (Luo et al., 2025; Mosha et al., 2026). Rastogi (2025) reported that AI-enabled educational tools promote learner autonomy, improve conceptual understanding, and contribute to better academic performance. Similarly, a review of studies conducted between 2019 and 2024 (Artificial Intelligence-Driven, 2026) highlighted the positive role of learning analytics, personalized learning systems, intelligent tutoring platforms, and generative AI tools in enhancing instructional effectiveness and student engagement.Issues related to data privacy, algorithmic bias, academic integrity, insufficient infrastructure, and inadequate faculty preparedness continue to pose significant barriers (Jaboob et al., 2025; Mosha et al., 2026; AlBlooshi, 2026). Additional concerns include disparities in access to technology, limited AI literacy, and the continuing digital divide, particularly within developing nations (Phiri, 2025; Rastogi, 2025). Furthermore, existing research is predominantly concentrated in developed countries, resulting in limited representation of perspectives from the Global South (Xu

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& Thien, 2026). Suryavanshi et al. (2023) observed several implementation-related challenges remain unresolved. Liu et al. (2025) reported moderate improvements in students' academic achievement through ChatGPT-assisted learning, whereas Heung and Chiu (2025) found significant enhancements in behavioural, cognitive, and emotional engagement. AI-driven learning systems improve academic performance by providing personalized feedback and customized learning pathways (Yuensook et al., 2025). Similarly, Lo et al. (2024) reported consistent positive effects on behavioural engagement, although the impact on cognitive and emotional engagement varied across educational contexts. Nevertheless, the effectiveness of AI-based interventions depends on factors such as pedagogical design, learners' digital competencies, educational settings, and the extent of reliance on AI-generated content (Kumar et al., 2025).

Objectives of the Study

1. To study the significant difference between academic achievement and artificial intelligence among undergraduate college students.
2. To study the relationship between academic achievement and artificial intelligence among undergraduate college students.
3. To explore the different AI tools adopted by teachers in the teaching learning process.
4. To find out the difficulties being faced by teachers while using AI tools in the classroom

Research Questions of the Study

1. What are the different AI tools adopted by teachers in the teaching learning process?
2. What are the difficulties being faced by teachers while using AI tools in the classroom?

RESEARCH METHODOLOGY

'Mixed Method Approach' was used for the present investigation, where both qualitative and quantitative data were collected. College teachers and students of different higher educational institutions (HEI) of Jammu province was the population. Out of 10 districts (Jammu province), investigators selected 5 districts (50%) by using the 'lottery method,' namely Rajouri, Poonch, Jammu, Samba and Kathua. Jammu province covers very broad area, so that the investigators selected 5 districts. 2 Govt. degree colleges from each district were selected. A total 10 colleges were selected from 5 districts. 10 teachers from each college and 20 students from each college were selected by using 'fish bowl sampling technique' for the present study. A total 200 students (100 males and 100 females) and 100 teachers (50 males and 50 females) were the sample of the present investigation.Two research instruments i.e., questionnaire for students and interview schedule for teachers were used. The investigators found content and face validity of the questionnaire and interview schedule by giving it to five different subject experts and five different language experts. The Cronbach's alpha method of reliability of the questionnaire was found to be 0.79. Inter-rater reliability for the interview schedule was found by the investigators. The investigators used thematic analysis and percentage analyses for qualitative data and ANOVA and correlation for quantitative data.

ANALYSIS AND INTERPRETATION OF QUANTITATIVE DATA

In order to achieve the quantitative objectives of the study, data was gathered through the survey method. Prior to the analysis, the normality of the data was assessed, which revealed that the values of skewness and kurtosis lie within the limits of+1to-1 and the findings confirmed that the data followed a normal distribution. Consequently, parametric statistical procedures were deemed appropriate and were employed for further analysis. A three-way ANOVA was applied to determine significant differences among groups, whereas correlation analysis was used to examine the relationships between the variables under investigation.

Table 1 *Normality of Data*

	N	Skewness	Kurtosis
	Statistic	Statistic	Statistic
Artificial intelligence	200	.028	.866
Academic achievement	200	.284	-.139

Table 2 *Analysis of Variance (ANOVA)*

Tests of Between-Subjects Effects						
Dependent Variable: Academic achievement						
Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Artificial intelligence	42803.961	1	42803.961	33.572	.000	.149
Gender	1185.349	1	1185.349	.930	.336	.005
Locality	137.232	1	137.232	.108	.743	.001
Artificial intelligence * Gender	130.911	1	130.911	.103	.749	.001
Artificial intelligence * Locality	471.898	1	471.898	.370	.544	.002
Gender * Locality	7.921	1	7.921	.006	.937	.000

Artificial intelligence * Gender * Locality	77.900	1	77.900	.061	.805	.000

Interpretation

Above Tables 2 predicts that F-value for the main effect of artificial intelligence on academic achievement came out to be 33.572 which is significant at 0.01 level. This depicts that undergraduate college students having low and high artificial intelligence differ significantly on academic achievement. The partial eta squared i.e., .149 indicated a large effect size stated that 14.9% of the variance in the academic achievement is due to artificial intelligence usage. The results coincided with the findings of Asri, (2024) and Vieriu and Petrea, (2025) revealed that artificial intelligence usage significantly improved students' academic performance and also increased students' engagement in learning whereas locality and gender have no significant influence on the academic achievement of students. Further, it can also be found that there are no two-way interactions (artificial intelligence × gender, artificial intelligence× locality, gender × locality) and three-way (artificial intelligence × gender × locality) interactional effect on academic achievement of students.

Relationship of Academic Achievement with Artificial Intelligence

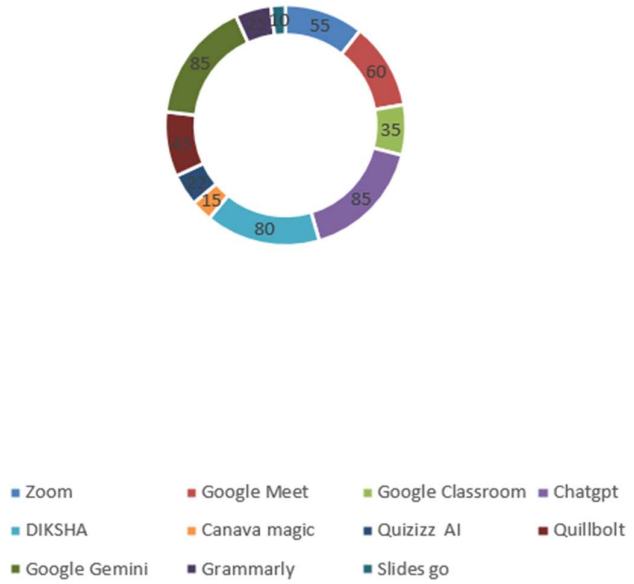
Table 3 Coefficients of Correlation of Academic Achievement with Artificial Intelligence (N=200) of Undergraduate College Students

Variable 1	Variable 2	Pearson correlation (r)	p-value
Artificial intelligence	Academic achievement	.425	.000

INTERPRETATION

Table 3 predicts that the coefficient of correlation between academic achievement and artificial intelligence is 0.425 which is significant as the p value is.000. This means that artificial intelligence and academic achievement are significantly and positively related with each other and the relationship is moderate positive. This shows that academic achievement of undergraduate college students increases with increase in the use of artificial intelligence. Similar results were reported by Dada (2026), Hassan (2026), and Gu and Yan (2025) indicated that usage of artificial intelligence positively influences learners' academic achievement.

Figure 1 *Responses of the teachers regarding the AI tools they used in teaching learning*



INTERPRETATION

The figure 1 depicts that out of 100 respondents, 55% respondents responded that they use Zoom in teaching learning, 60% respondents responded that they use Google meet, 35% respondents responded they use Google

classroom, DIKSHA platform was used by 80%respondents, ChatGPT was used by 85% respondents, Quizizz AI tool used by 22% for framing the questions, Quil bolt was used by 45%respondents, 15% respondents responded that they use Canava magic, 85% respondents responded they use Google Gemini, 25% respondents responded that they use Grammarly, 10 % respondents responded that they use slides go. From the above findings it can be concluded that commonly used AI tools and platforms by teachers in their teaching learning process are – Google Gemini, ChatGPT, Zoom, Google Meet and DIKSHA platform. Similar kind of results were revealed by Lee et al. (2024), Berg (2025), and Karimov et al. (2024).

Table 4 *Responses of the teachers regarding specific difficulties they faced while using AI tools in teaching*

No of respondents	Themes identified	Responses of the respondents recorded	Percentage
N=100	a. Technical challenges b. Lack of training c. Internet connectivity and accessibility d. Safety and security e. Availability of IT support staff f. Workload g. Assessment and evaluation	➢ Lack of skills to operate AI tools ➢ Regular software glitches ➢ Dependent on stable internet and proper digital infrastructure ➢ Insufficient training on AI tools ➢ Lack of institutional support ➢ Absence of regular professional development programmes ➢ Lack of high speed and stable internet ➢ Less wi-fi coverage in classrooms ➢ Lack of data privacy protection system ➢ Lack of quick troubleshooting system ➢ Difficult to manage both traditional and Ai based teaching ➢ Time required to learn and adapt AI tools ➢ Difficulty in verifying the information gained through AI tools ➢ Challenges in maintaining Impartiality in evaluation and - assessment	35 27 22 17 14 10 08

INTERPRETATION

It can be inferred from the Table 4 that a total of 07 themes were identified with descriptive phrases from the interview conducted with the teachers. Out of 100 respondents, 35% respondents responded that they faced difficulty due to the technical challenges like lack of skills to operate AI tools, regular software glitches, dependent on stable internet and proper digital infrastructure. 27% respondents responded that they face difficulty due to the lack of training like Insufficient training on AI tools, lack of institutional support and Absence of regular professional development programmes. 22% respondents have talked about internet connectivity and accessibility, 17%respondents have stressed upon safety and security, 14%respondents have talked about lack of availability of IT support staff, 10%respondents have talk about workload, and lastly, 08 % teachers have laid impetus on assessment and evaluation. Similar results were found by Mahaswari et al. (2026) regarding the challenges faced by private school teachers like lack of awareness, insufficient training, limited access to digital devices, poor internet connectivity and lack of technical support. Berg (2025) also found that challenges like lack of self-efficacy and ethical concerns hindered broader adoption of AI.

DISCUSSION AND CONCLUSIONS

Based on the findings of the present study, it is concluded that artificial intelligence improves the academic performances of the learners and there is a positive correlation between AI and academic achievement. Similar results were reported by Dada (2026), Hassan (2026), and Gu and Yan (2025). The present study also found that teachers commonly used Google Gemini, ChatGPT, Zoom, Google Meet and DIKSHA platform. Similar kind of results were revealed by Lee et al. (2024), Berg (2025), and Karimov et al. (2024). This study found that teachers faced many challenges like insufficient training on AI tools, lack of institutional support and absence of regular professional development programmes, lack of skills to operate AI tools, regular software glitches, dependent on stable internet and proper digital infrastructure. Similar results were given by Mahaswari et al. (2026) and Berg (2025). At last, we concluded that AI tools increase students' participations and their academic achievement.

PRACTICAL IMPLICATIONS FOR EDUCATIONAL POLICYMAKERS

The findings suggest two actionable strategies for policy makers and teachers. First, policy makers should develop guidelines for the integration of AI into higher education curriculum. This can help to increase student engagement

and personalized learning. Second, teachers should take part in different programmes related to AI. This will help teachers to become more AI literates.

LIMITATIONS AND SUGGESTIONS FOR FURTHER RESEARCH

There were several limitations of the study. First, a descriptive method was used in the present study, case studies and exploratory method can be taken in the future research. Second, only government degree colleges were selected for the study, private degree colleges can be taken up in the future research. Third, only Jammu province was chosen for the present study, Kashmir province can be taken up in the futuristic research.

FUNDING AND CONFLICT OF INTEREST

The authors declared that there is no funding received for the completion of this research work and there is no conflict of interest.

REFERENCESS

Aguado-García, J., Alonso-Muñoz, S., & De-Pablos-Heredero, C. (2025). Using artificial intelligence for higher education: An overview and future research avenues. *SAGE Open*, *15*(2). https://doi.org/10.1177/21582440251340352

AlBlooshi, S. (2026). Artificial intelligence in higher education, opportunities, and challenges: a review. *Frontiers in Education*, *10*, 1-11. https://doi.org/10.3389/feduc.2025.1683968

Asri. (2024). Utilization of artificial intelligence in improving student achievement. *PARADOKS JurnalIllumuEkonomi*, *7*(4), 451-465. https://doi.org/10.57178/paradoks.v7i4.990

Banihashem, S. K., Kerman, N. T., Noroozi, O., Moon, J., & Drachsler, H. (2024). Feedback sources in essay writing: Peer-generated or AI-generated feedback? *International Journal of Educational Technology in Higher Education*, 21(1), 1-15. https://doi.org/10.1186/s41239-024-00455-4

Bostrom, N. (2017). *Super intelligence: Paths, dangers, strategies*. Oxford University Press, Cop.

Chen, L., Chen, P., & Lin, Z. (2020). Artificial intelligence in education: A review. *Institute of Electrical and Electronics Engineers Access*, *8,* 75264–75278. https://doi.org/10.1109/ACCESS.2020.2988510

Crompton, H., & Burke, D. (2023). Artificial intelligence in higher education: the state of the field. *International Journal of Educational Technology in Higher Education*, *20*(22), 1-22. https://doi.org/10.1186/s41239-023-00392-8

Dada, K. S. J. (2026). Assessment of artificial intelligence on academic achievement among Nigerian university students: A meta- analysis. *Artificial Intelligence in Educational Decision Sciences*, *1*(1), 89-102. https://doi.org/10.66053/aieds.v1i1.277

De La Fuente, M. F., & Farhadian, G. (2025). Systematic review of the impact of artificial intelligence in higher education. *Journal of Teaching and Learning*, *19*(4), 72-96. https://doi.org/10.22329/jtl.v19i4.9849

Gu, J., & Yan, Zi. Effects of genAI interventions on student academic performance: A meta-analysis. *Journal of Educational Computing Research*, *63*(6), 1460-1492. https://doi.org/10.1177/07356331251349620

Guner, H., Er, E., Akçapinar, G., & Khalil, M. (2024). From chalkboards to AI-powered learning. *Educational Technology & Society*, *27*(2), 386–404. https://www.jstor.org/stable/48766180(open in a new window)

Hassan, A. (2026). Leveraging artificial intelligence (AI) to enhance student engagement and academic performance in higher education. *Education and Information Technologies*, 1-27. https://doi.org/10.1007/s10639-026-13946-w

Heung, Y. M. E., & Chiu, T. (2025). How ChatGPT impacts student engagement from a systematic review and meta-analysis study. *Computers and education: Artificial Intelligence*, *8*, 1-13.https://doi.org/10.1016/j.caeai.2025.100361

Jaboob, M., Al-Ansi, A. M., & Riyadh, H. A. (2025). Artificial intelligence in higher education: a PRISMA 2020 review. *International Journal of Educational Management*, *40*(1–2), 113–132. https://doi.org/10.1108/ijem-09-2024-0560

Khandakar, H., Fazal, S. A., Afnan, K. F., & Hasan, K. K. (2024). Implications of artificial intelligence chatbot models in higher education. *IAES International Journal of Artificial Intelligence*, *13*(4), 3808-3813. https://doi.org/10.11591/ijai.v13.i4.pp3808-3813

Kumar, P. R., Yusof, S. M., Aziz, R. C., & Mahmud, A. (2025). The Impact of generative AI tools on academic performance in higher education: A systematic review (2023–2025). *International Journal of Academic Research in Business and Social Sciences*, *15*(12), 2149-2160. https://doi.org/10.6007/ijarbss/v15-i12/270766

Lee, D., Arnold, M., Srivastava, A., Plastow, K., Strelan, P., Ploeckl, F., Lekkas, D. & Palmer, E. (2024). The impact of generative AI on higher education learning and teaching: A study of educators' perspective. *Computers and Education: Artificial Intelligence, 6,* 1-10. https://doi.org/10.1016/j.caeai.2024.100221

Liu, Z., Zuo, H., & Lu, Y. (2025). The Impact of CHATGPT on students' academic achievement: A meta-analysis. *Journal of Computer Assisted Learning*, *41*(4). https://doi.org/10.1111/jcal.700966

Lo, C.K., Hew, K.F., & Jong, M.S. (2024). The influence of ChatGPT on student engagement: A systematic review and future research agenda. *Computers and*

Education., *219*, 1-21. https://doi.org/10.1016/j.compedu.2024.1051000

Luo, J., Zhang, Y., & Li, X. (2025). AI-driven learning analytics and student performance prediction in higher education. Computers and Education, 198, 104789. https://doi.org/10.xxxx/compedu.2025.1047899

Mosha, N. F. V., Chigwada, J., Ketchiwou, G. F., & Ngulube, P. (2026). A systematic review of artificial intelligence in higher education institutions (HEIs): Functionalities, challenges, and best practices. *Education Sciences*, *16*(2), 1-32. https://doi.org/10.3390/educsci16020185

Noroozi, O., Soleimani, S., Farrokhnia, M., & Banihashem, S. K. (2024). Generative AI in education: Pedagogical, theoretical, and methodological perspectives. *International Journal of Technology in Education*, 7(3), 373–385. https://doi.org/10.46328/ijte.845

Ocen, S., Elasu, J., Aarakit, S. M., & Olupot, C. (2025). Artificial intelligence in higher education institutions: Review of innovations, opportunities and challenges. *Frontiers in Education*, *10*, 1-12. https://doi.org/10.3389/feduc.2025.15302477

Phiri, D.C. (2025). The double-edged sword: A systematic review of AI-powered tools for student engagement and personalized learning in zambian higher education. *International Journal of Research and Innovation in Social Science*, *9*(9), 283-291. https://dx.doi.org/10.47772/IJRISS.2025.9090000255

Rastogi, V. (2025). Artificial intelligence in Indian classrooms: Impact on secondary and higher education learners. *Journal of Emerging Technologies and Innovative Research*, *12*(6), 364-368. https://doi.org/10.56975/jetir.v12i6.565921

Shabana. (2026). Artificial intelligence-driven innovation in higher education system in India. *Journal of Informatics Education and Research*, *6*(1), 1507-1521. https://doi.org/10.52783/jier.v6i1.4418

Suryavanshi, D.P., Kaveri, P.R., &Kadlag, P. S. (2023). Advancing digital transformation in indian higher education institutions. *Intelligent Computing and Control for Engineering and Business Systems (ICCEBS)*, 1-6. https://doi.org/10.1109/ICCEBS58601.2023.10448947

Tomar, D., Chhillar, K., Trivedi, S., & Dev, Y. (2026). Future directions of artificial intelligence, machine learning and deep learning in higher education. *International Journal of Sciences and Innovation Engineering*, *3*(2), 355–368. https://doi.org/10.70849/ijsci03022601976

Ullrich, A., Vladova, G., Eigelshoven, F., & Renz, A. (2022). Data mining of scientific research on artificial intelligence in teaching and administration in higher education institutions: A bibliometrics analysis and recommendation for future research. *Discover Artificial Intelligence*, *2*(1), 1-18. https://doi.org/10.1007/s44163-022-00031-7

Vieriu, A. M., & Petrea, G. (2025). The impact of artificial intelligence (AI) on students' academic development. *Education Sciences*, *15*(3), 1-12. https://doi.org/10.3390/educsci150303433

Xu, X., & Thien, L.M. (2026). Artificial intelligence in higher education: Insights from a bibliometric analysis and systematic review of highly cited articles. *European Journal of Education*, *61*(1). https://doi.org/10.1111/ejed.70520

Yuensook, T., Jantakoon, T., & Limpinan, P. (2025). AI-Driven adaptive learning systems in higher education: A systematic review. *Journal of Education and Learning*, *15*(2), 117-132. https://doi.org/10.5539/jel.v15n2p1177

WEBLIOGRAPHY

https://www.researchgate.net/publication/357447234_Artificial_Intelligence_AI_In_Education_Using_AI_Tools_for_Teaching_and_Learning_Process

https://www.allstudyjournal.com/article/1429/7-4-19-595.pdf

https://doi.org/10.3390/educsci160202288

https://rjpn.org/ijcspub/papers/IJCSP26A1061.pdf