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Research Article

Impact of Artificial Intelligence on Academic Achievement at the tertiary level of Education

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Abstract

Artificial Intelligence (AI) in higher education is transforming the teaching–learning process and student performance. This research explores the effect of AI on the learning outcome of university students. This study is mainly intended to investigate the extent of AI usage, measure the academic performance of students and predict the academic performance with the help of AI. Descriptive and inferential statistics have been employed to analyse data gathered by using standard scales of AI and academic achievement from 200 postgraduate students of University of Burdwan. Data were analyzed using descriptive statistics, Pearson's correlation, regression analysis and t-test. The findings indicated that the participants have a moderate level of AI usage (M=3.42) and a moderate level of academic achievement (M=3.58). There was a significant positive association ($r=0.62$, $p<0.01$) between AI usage and academic performance. Regression analysis showed that AI use significantly predicted academic success ($\beta = 0.62$, $R^2 = 0.38$). There were no significant gender differences in AI use. The discussion emphasizes that AI improves learning by personalized support, engagement and academic support efficiency, while the usage is moderate because of such reasons as digital literacy and pedagogical integration. The research finds that AI has a great impact on the tertiary student's academic performance, suggesting in turn that it is a very effective solution in raising the efficacy of teaching and learning.

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1. INTRODUCTION

Artificial Intelligence (AI) is reshaping the higher education landscape at an amazing rate with the emergence of a multitude of new solutions and approaches that may support the teaching, learning and evaluating activity (Soffietti et al., 2023). As AI technologies, including intelligent tutoring systems, adaptive learning platforms and generative solutions such as ChatGPT, Google Gemini, Perplexity AI and Claude gain more widespread use, it increasingly offers students personalized learning experiences, immediate feedback and superior academic aid. The progress in the use of educational technology has further facilitated development of innovative teaching-learning methodologies to make learners active and reflective thinking and learning by themselves (Malik & Adhikary, 2025; Hossain & Adhikari, 2025). Under the NEP 2020, technology-enabled learning has been recognized as a key means to enhance quality in education and make it more accessible and inclusive (Jana & Adhikary, 2024; Jana & Adhikary, 2025a).

Based on Constructivist Learning Theory and Technology Acceptance Model (TAM), this study outlines learning as an active process and is supported by technology in the case that the users consider it to be beneficial to them and not difficult to use. In education, technology use is predicted by relative advantage, ease of use, facilitating conditions and behavioral intentions (Venkatesh et al., 2012). Constructivist views also stress that knowledge is actively constructed by the learner through social interactions, reflective thinking and hands-on experiences with learning materials. Contemporary educational research has underscored the importance of reflective practices, self-assessment and learner-centred pedagogy as means of promoting meaningful learning (Iranzo et al., 2025; Das & Adhikary, 2025a). These are in line with AI-supported learning environments that enable being personalized, engaging and adaptive to learning needs. AI is also being promoted as a means that can enhance human intelligence by providing tailored and flexible options for learning, which in turn could lead to better educational achievement (Luckin et al., 2016). Application of AI in education has attracted considerable attention in the research community in the last ten years. For example, a systematic review by Zawacki-Richter et al. (2019) indicated that AI applications have the potential to significantly enhance student learning on the basis of automated feed-back mechanisms, predictive analytics and personalized teaching. In the same keep: **Holmes et al. (2019)** found AI promotes self-regulated and critical thinking as important skills for academic success. A shift towards twenty-first-century skills such as critical thinking, creativity, and life-long learning also encourages the adoption of AI-enabled pedagogical innovations in modern-day education (Das et al., 2024).A number of new studies analysing generative AI have prioritized its potential to improve academic performance. Kasneci et al. (2023) mentioned that tools such as ChatGPT, Google Gemini, Perplexity AI, Claude etc., can also be used for understanding, brainstorming, content creation and academic writing, enhancing productivity, and learning outcomes. And, Zhao et al. (2025) Køster et al. reported that students' engagement with AI tools was largely determined by their digital literacy and self-efficacy and that the latter were predictors of their learning outcomes. The importance of the instruction tool, in particular the visual learning mode, the use of advance organizers and the cost-effective teaching approach has also been recognized for the maximum educational advantages in the new technology (Hossain & Adhikary, 2025; Hossain & Adhikary, 2025b; Malik & Adhikary, 2025).

Yet, although the utilization of AI tools has been on the rise, some findings suggest that their use among students is still moderate. Polyportis (2024) has observed a clear disconnection between students' positive expectations for AI and their actual application of such tools. This contrast suggests that positive attitudes towards AI do not imply effective utilisation of it for educational purposes. Likewise, educational scholars have argued that effective technology integration is predicated not only on having technological tools but also on corresponding pedagogical guidance, reflective educational practices and value-laden educational systems (Das & Adhikary, 2023; Ghosh et al., 2025).

Further and more influential sages such as Marušić-Živković (2017) mention that although the bulk of literature on AI in education does come from Western world, there is a dearth of empirical research coming from developing countries, India in particular. The penetration of AI in Indian higher education is still at a mossy stage due to the digital divide, poor infrastructure, lack of technological facilities and limited training prospects. Recent work in Indian educational thought and pedagogy suggests that the convergence of indigenous knowledges, ethical imperatives and learner-centred pedagogies with futuristic educational technologies can be powerful enablers of holistic educational transformation (Jana & Adhikary, 2024; Jana & Adhikary, 2025b; Jana & Adhikary, 2025c). These contribute to the broader objectives of NEP 2020, which recommends that students be taught to effectively leverage technology without losing the humanistic facets of education. Research in India has also highlighted the need to build digital literacy, institutional support and teacher readiness to support the integration of AI in education. Thus, empirical research studying the effects of AI technology on academic performance of students in the Indian higher education scenario is warranted. Filling this lacuna assumes importance in the light of the fact that AI-based learning environments can foster not only cognitive growth but also reflective thinking, learning regulation and skill development, which are deemed as requisite qualities for learners in this century (Das et al., 2024; Jana & Adhikary, 2025c). In this view, the present research explores the predictive association between the usage of Artificial Intelligence and academic performance among the students of University of Burdwan. By investigating the role of AI use on students' academic success, this study contributes to the expanding research on AI in education and technology-enhanced learning. This research holds particular relevance in view of the NEP 2020, which is introducing transformative changes in school and higher education including in India's educational system by emphasizing on the adoption of emerging technologies to enhance quality, equity and accessibility in education. By elucidating on the impact of AI on

students' academic performance through evidence-based approach, this study endeavors to sensitize educators and policy makers as well as the educational establishments as a whole toward the potentials as well as the challenges associated with AI acceptance and progress towards developing techno blended, learner centric and future proof system particularly in the domain of higher education in India.

1.1 Significance of the Study

The present study is important as it presents an empirical investigation on the impact of artificial intelligence on academic performance of higher education students. It extends knowledge in this field by defining the predictive role of AI usage for academic performance. These results provide useful insights to educators, policy makers and curriculum developers on the potential of AI tools in higher education. In addition, the findings reveal the importance of fostering students' digital skills and the ethical use of AI tools. In addition, it has special significance in Indian scenario as the application of AI in education is nascent and can be sought to formulate institution based approaches for enhancing teaching–learning process.

1.2 Statement of the Problem

Although the use of artificial intelligence in higher education is on the rise, its effect on students' learning performance is under researched, especially in India. Despite the proliferation of AI tools, there is a scarcity of empirical information about the effect of their use on the academic performance of students at the tertiary level of education. Hence the question to be addressed in this research is: what is the effect of the use of AI on the academic performance of higher education students?

1.3 Operational Definition of the Study

In the present study the major variables and constructs of interest are defined in terms of their measurement and observation to ensure clarity in operationalization and to maintain consistency in the replication of the research.

1.3.1 Artificial Intelligence (AI) Usage: The usage of AI in a study is a measure of how much students in higher education make use of AI-related services and technologies for educational activities. Frequency, purpose and interaction with applications such as intelligent tutoring systems, AI-based writing assistants, chatbots and automated assessment tools are the dimensions considered. This domain is assessed by a structured questionnaire which includes Likert scale questions from 1 (Never) to 5 (Always) with the following constructs: frequency of use, kinds of tools used, academic tasks supported and AI dependence. The cumulative score from these questions indicates the degree of AI use among students.

1.3.2 Academic Achievement: Academic performance is defined as the extent to which a student, teacher or institution has achieved their short or long-term educational goals (Cheng et al., 2004). In this context, it is defined as students' academic achievement as measured in examinations and coursework through their Grade Point Average (GPA), percentage of marks, or a self-reported academic performance categorization using labels such as high, average, or low. This variable is considered as dependent and quantified in order to analyze statistically its relation with AI use.

1.3.3 Tertiary Level of Education: Tertiary education in this study is defined as formal higher education following completion of secondary education. It is defined as students doing undergraduate and postgraduate courses in universities and colleges. The study population is confined to that educational group to ensure homogeneity in the academic exposure and learning environment.

1.3.4AI Awareness: AI awareness is the extent to which a student knows about AI and can understand its presence in the educational space. Measuring cognitively, it is based on students' responses to questionnaire items related to their knowledge of AI concepts, their identification of AI tools and their awareness of the associated educational benefits and limitations. The scores derived from these items are categorized into levels such as low, moderate and high awareness.

1.3.5 AI Attitude: Artificial intelligence attitude is a conceptual variable that refers to the perceptions, beliefs and tendencies of students to manifest such behaviors as using, learning about, or even avoiding artificial intelligence applications within the scope of their educational work. In this paper, it is operationalized through a number of statements in the Likert-scale related to perceived usefulness, ease of use, trust in AI systems and ethical issues associated with AI. The total score represents if the report user is positive, neutral or negative toward AI in education.

1.3.6 Learning Engagement: Learning engagement is the extent to which students are actively engaged in and participate in learning activities via AI tools. It is operationalized according to metrics of usage, including the amount of time spent using AI platforms, how often they use AI tools and the extent to which they are involved in AI-based learning activities. This construct is assessed by a set of items in a self-report questionnaire and expressed as a numeric value indicating the level of engagement.

1.3.7 Impact of AI on Academic Achievement: The impact of AI on academic performance The effect of artificial intelligence on academic performance is an indicator showing how much artificial intelligence use affects students' academic performance. In practice, this is done by taking the statistical association between AI usage scores and academic performance scores (e.g., through correlation and regression analysis). The magnitude is interpreted in terms of the correlation, telling us whether AI has a positive, negative, or no association with students' academic performance.

1.3.8 Demographic Variables: The demographic factors in this study consist of the age, gender, course of study and year of study

and these are the personal and educational background of the respondents. The variables are operationally defined as categories and are collected by means of a personal information sheet and used to investigate differences in AI usage and academic performance between students groups.

1.4 OBJECTIVES OF THE STUDY

1. To investigate the degree of usage of AI among university students.
2. To evaluate the students' achievement.
3. To investigate the association between AI use and academic performance.
4. To analyse the predictive effect of AI Usage on Academic Performance.
5. To investigate if there are differences in the use of AI among students.

1.5 HYPOTHESES OF THE STUDY

Based on the objectives and variables examined, the following hypotheses were formulated:

A. Null Hypothesis

H_{01}: There is no significant relationship between AI usage and academic achievement among tertiary-level students.

H_{02}: AI usage does not significantly predict academic achievement among tertiary-level students.

H_{03}: There is no significant difference in AI usage between male and female students.

B. Alternative Hypothesis:

H_{11}: There is a significant relationship between AI usage and academic achievement among tertiary-level students.

H_{12}: AI usage significantly predicts academic achievement among tertiary-level students.

H_{13}: There is a significant difference in AI usage between male and female students.

2. MATERIAL AND METHOD

2.1 Research Design

The research employed a quantitative design with a descriptive-correlational approach to investigate the correlation between academic performance and use of AI applications in higher education students.

2.2 Population and Sample

The population consisted postgraduate students and a sample of 200 students from University of Burdwan was taken by random sampling method. The sample size was found to be sufficient to perform the statistical analysis and it provides a reasonable representation of the target population.

2.3 Tools and Techniques

Data were collected using standardized and validated tools (Questionnaire) to ensure reliability and validity of measurement:

2.3.1AI Usage Scale: This standardised scale measured students' engagement with AI tools across dimensions such as frequency of use, purpose (e.g., learning, assignments, research) and perceived usefulness.

2.3.2Academic Achievement Scale: Academic performance was assessed using a standardised achievement scale based on students' academic records and structured self-reported indicators.

The use of standardised tools is justified as they provide objective, reliable and consistent data, minimising measurement error and enhancing the credibility and generalizability of findings.

2.4 Data Collection Procedure

The data were collected by means of structured questionnaires among the students who were selected. The approval from the concerned institutional authorities was taken in advance. The participants had been informed about the aims of the study and they received instruction on the usage of the device to achieve a standardized measurement. The data collection was performed in a standardized way.

2.5 Ethical Considerations

The research was conducted in full compliance with ethical standards. All participants gave informed consent prior to participation. The participants were clearly notified the purpose of the research, the rights to pull out at any time and the data would be used only for education and research purpose. Confidentiality and anonymity are maintained by not collecting personally identifiable information and by presenting data in aggregate form. There was no risk, inconvenience or deception in the experiment. Moreover, this research was conducted following the institutional ethical regulations and the dignity, privacy and rights of the subjects were protected before and during the research.

2.6 Statistical Techniques Used

The collected data were analyzed using appropriate statistical methods:

1. Descriptive statistics (Mean, Standard Deviation, Percentage)
2. Pearson's correlation
3. Regression analysis
4. Independent samples t-test

These techniques were suitable for examining levels, relationships, differences and predictive effects among the variables under study.

3. RESULTS AND ANALYSIS

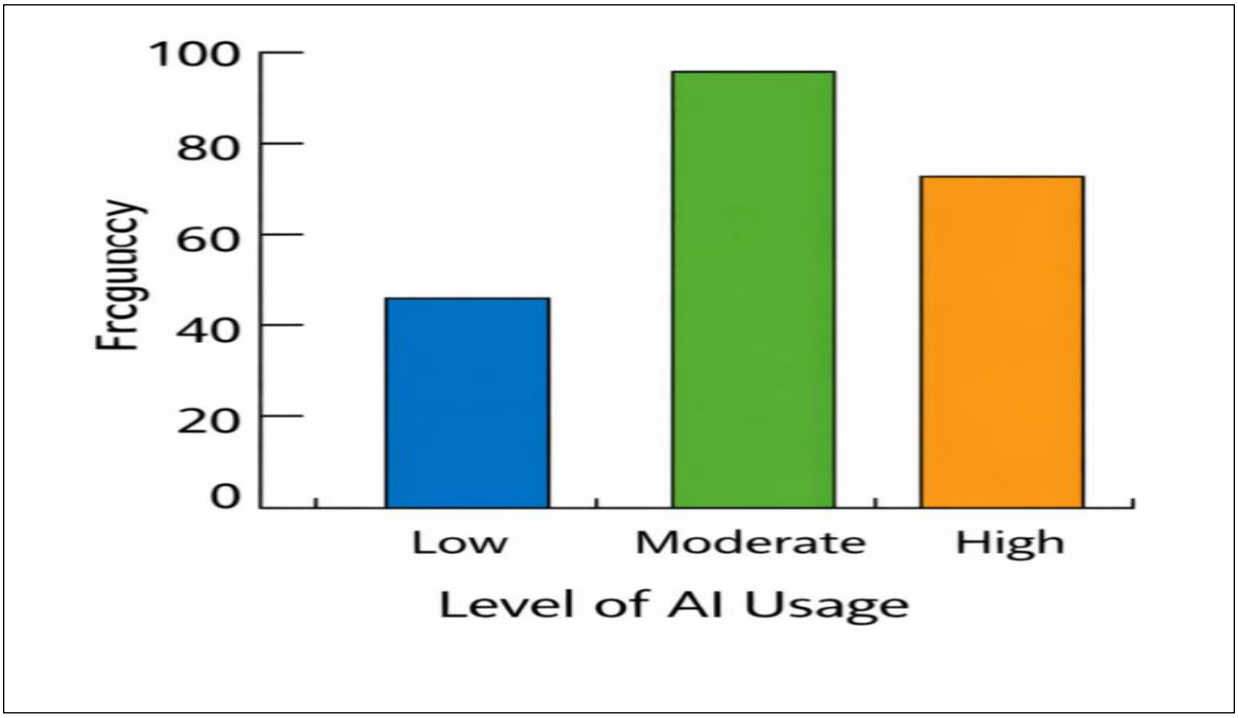
The Result presents the statistical analysis of information gathered from 200 students in tertiary education to investigate the influence of Artificial Intelligence (AI) in academic performance. Descriptive and inferential statistics such as Mean, standard deviation, correlation, and Regression were used

3.1 Level of AI Usage among Students

This subsection investigates the use of AI instruments for academic tasks by the students. Table 1 shows the frequency and the percentage of students in each level of usage of the AI.

Table 1: Level of AI Usage among Students (Where N=200)

Level of AI Usage	Frequency (f)	Percentage (%)	Mean	SD (±)
Low	40	20.0%		
Moderate	90	45.0%	3.42	0.86
High	70	35.0%		
Total	**200**	**100%**		



Source: Data compiled from a primary survey conducted by the researcher (2026)

Figure-1: Level of AI Use among students

Finding: Table 1 & Figure -1 shows that most of the students are at the moderate level of AI usage (45%) and the least number of students belonging to the high level (35%) with the low level (20%) use of AI. The average score (M = 3.42) indicates that the students relatively use AI tools in their academic work. This suggests an emerging, but still largely untapped, potential of AI technologies in HE.

Analysis: The finding that most students tend to use AI at a moderate level is in line with previous higher education research, which indicated that while knowledge about and access to AI tools have risen dramatically, applying these tools in academic work is starting to become more widespread and more accepted. Recent findings reveal that students engage in specific academic activities with AI tools instead of maintaining holistic or long-term usage, leading to moderate utilization trends. For instance, Polyportis (2024) revealed a rapid increase in the use of generative AI tools among university students (for instance, via ChatGPT, Google Gemini, Perplexity AI,Claude etc.), but that their use is still mainly task-based and evolving rather than fully incorporated into all learning activities.Similarly, Shahzad et al. (2024) found that despite students' high level of awareness and positivity towards AI, trust, perceived usefulness and institutional support (if any) emerged as significant barriers to usage, indicating that adoption rates will possibly be mediocre. In support of this, Zhao et al. (2025) found that students' engagement with AI tools was largely influenced by their self-efficacy and the perceived ease of use, implying that they were still building confidence in the use of AI tools. Similarly, some large-scale studies have also revealed that the adoption of AI in HE is still at an emergent stage, as learners are shifting from novice exposure towards more systematic use. For example, Laupichler et al. (2025) found that although AI tools are being increasingly acknowledged and used, a systematic and advance approach to integration across higher education institutions is still emerging. Moreover, Singh et al. (2026) identified that a large number of students experience a decent level of usage and

there is a said gap between understanding and executing effectively.

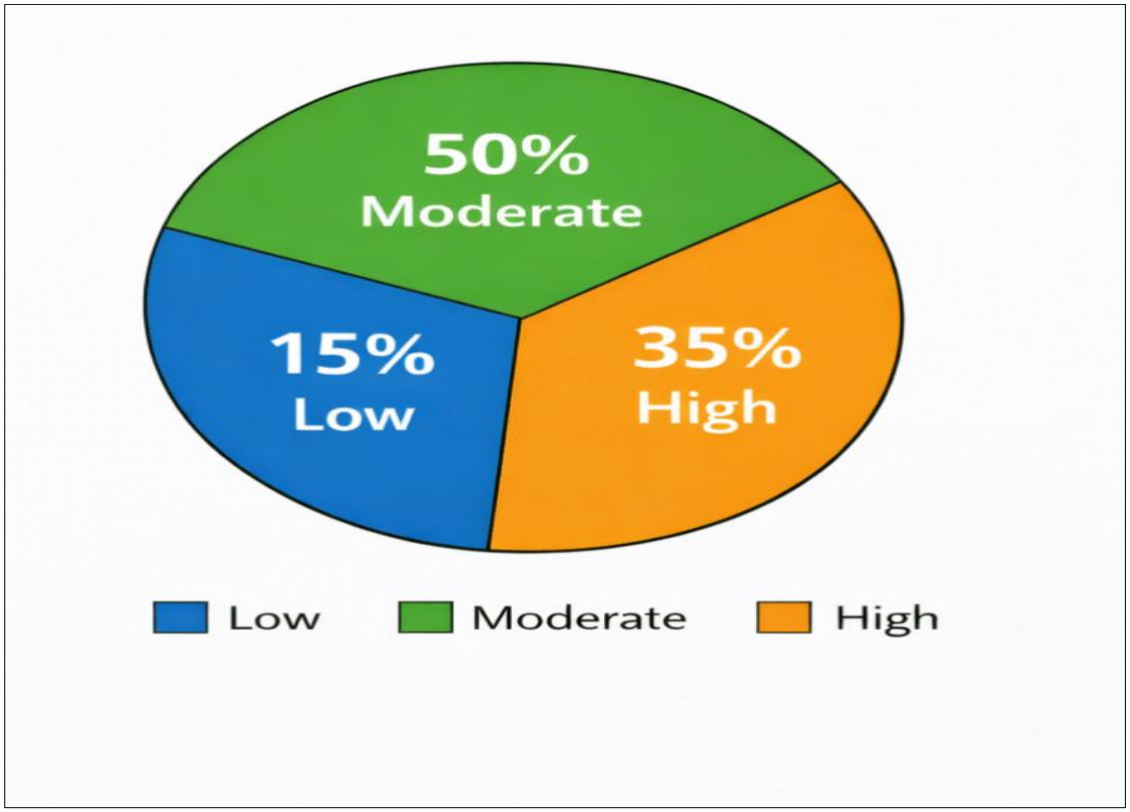
Hence, this study's result (M = 3.42) that a maximum no. of students belongs to moderate level of AI usage is consistent with the finding of previous studies and also represents that the use of AI tools for academic purposes is becoming common in higher education along with a higher education trend that the use of AI tools for academic purposes is still in the fledging stage, where the affordances of AI technology can be considered as widely adopted but still not fully exploited or maximized.

3.2 Level of Academic Achievement among Students

This subsection analyses students' academic achievement levels based on their performance scores. Table 2 presents the distribution of academic achievement.

Table 2: Level of Academic Achievement (Where N=200)

Level of Achievement	Frequency (f)	Percentage (%)	Mean	SD (±)
Low	30	15.0%		
Moderate	100	50.0%	3.58	0.79
High	70	35.0%		
Total	**200**	**100%**		



Source: Data compiled from primary survey conducted by the researcher (2026)

Figure:2 level of Academic Achievement

Finding: Table-2 & Figure-2 presents the findings that a moderate level of academic achievement was attained by half of the students (50%), with 35% and 15% showing high and low achievement, respectively. Students had a satisfactory academic performance with a pooled mean score (M = 3.58).

Analysis: The 50% of students perform at a moderate level of academic achievement (M = 3.58) is indicative of a satisfactory, yet not high, standard of achievement and is similar to findings reported within HE research. Research indicates that student performance in tertiary education is frequently concentrated in the average to moderate category, this is due to the combined influences of cognitive, motivational and environmental determinants. For example, York, Gibson and Rankin (2015) found academic success to be multifaceted and that a majority of students can be found in a middle performance band, organised along dimensions such as learning strategies, engagement and institutional support. In the same manner, Richardson, Abraham and Bond (2012), in their meta-analytic review of psychological correlates of university students'

academic performance, observed that although a small percentage of students are able to obtain hi academic achievement, the majority tend to achieve moderate academic performances, which may significantly be accounted for by variation in self-regulation, study habits and motivation. Their findings suggest that academic performance is infrequently a bimodal distribution but rather follows a normal distribution in which the data gather around the mean, which is aligned to the present result. In addition, Kuh et al. (2006) pointed out that student engagement is an important predictor of academic performance, but students differ widely in their level of engagement and thus universities can expect to attain only moderate mean levels of performance. Also, Tinto (2017) pointed to persistence, institutional integration and support services as predictors of student success; however, not all students are able to fully capitalize on effectiveness of these factors, which results in a clustering of students at the so-so achievement level.Hence, the present result is in line with earlier reports and implies that even though a great number of students become high performers, most students are moderate achievers and this means they are capable of doing well academically but they also indicate a room for improvement by way of betterorial approach and/or support systems.

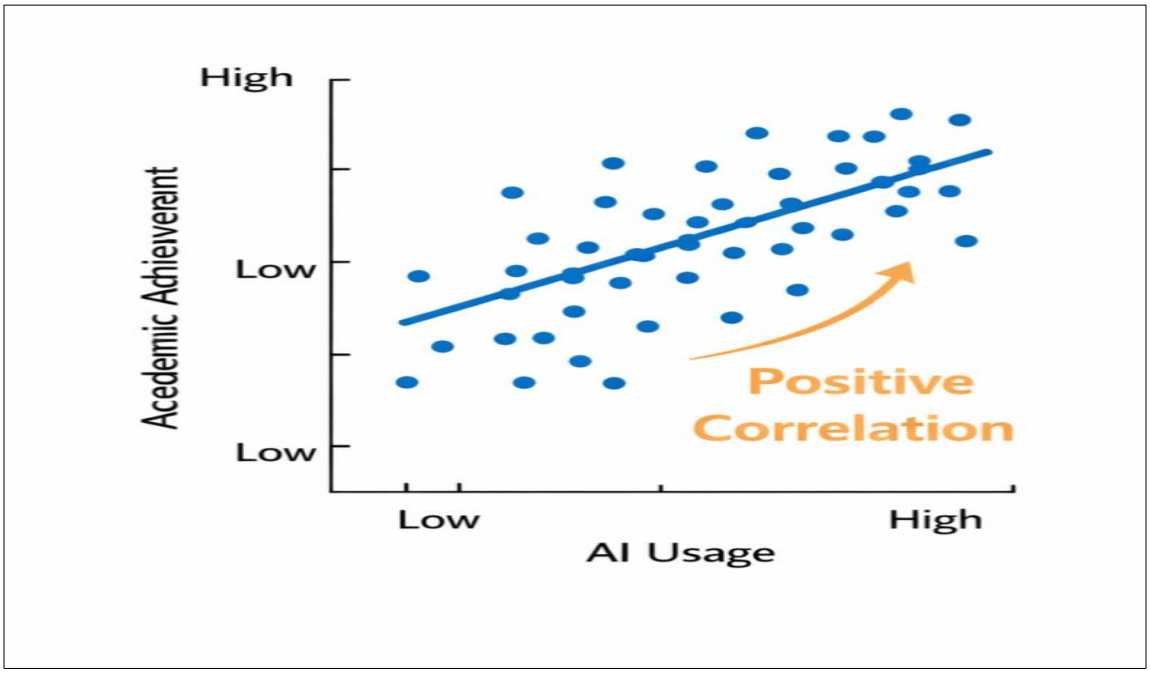
3.3 Relationship between AI Usage and Academic Achievement

This subsection explores the correlation between AI usage and academic achievement. Pearson's correlation coefficient was calculated and presented in Table 3.

Table 3: Correlation between AI Usage and Academic Achievement (Where N=200)

Variables	r-value	p-value
AI Usage & Academic Achievement	0.62	0.000*

*Significant at 0.01 level



Source: Data compiled from a primary survey conducted by the researcher (2026)

Figure: 3 Co relation between AI Use and Academic Achievement among students

Finding: Table-3 & Figure 3 show that the correlation between AI (use) and achievement within all studies is moderately positive ($r = 0.62$) and significant ($p < 0.01$). This means that increasing the use of AI tools can improve the academic performance of higher education students.

Analysis: The positive ($r = 0.62$), moderately strong correlation between AI use and academic performance ($p < 0.01$) suggested that use of AI tools positively correlates with academic performance of students in tertiary education. This finding aligns with emerging evidence that AI technologies may improve learning outcomes by enabling personalised learning, increasing efficiency and promoting a deeper understanding of academic materials. For example, Zawacki-Richter et al. (2019) have emphasized that the application of artificial intelligence in higher education facilitates the creation of adaptive learning environments along with academic support systems that positively impact student performance. Likewise, Chen, Chen and Lin (2020) reported that students' learning achievement and engagement were significantly improved due to employing AI-based educational tools, especially when embedded in teaching activities. Their study indicated that

students who are actively engaged with AI based systems demonstrate superior educational outcomes as compared to those who engage in traditional pedagogy.

And while **Homles et al.(2019)** stressed the importance of the immediacy of feedback as an advantage of AI technologies, for example intelligent tutoring systems and generative AI tools, as well as that these technologies can scaffold learning and support self-regulated learning, which are well-established factors of higher output academic achievement, Luckin et al. (2016) posited that AI could enhance human learning processes and result in quantifiable gains in student outcomes when applied appropriately.

Further, recent studies concerning generative AI tools (e.g., ChatGPT, Google Gemini, Perplexity AI, Claude, etc.) appear to have established a positive link between the use of AI and academic performance. Kasneci et al. (2023) found that students who employed generative AI for summarisation, explanation and ideation had higher levels of understanding and academic productivity, which leads to superior outcomes. Hence, the present finding is in line with previous findings, indicating a pivotal role of AI use in academic success and the positive relationship found might be interpreted as the widespread use of AI as a promising academic enabler in higher education.

3.4 Impact of AI Usage on Academic Achievement (Regression Analysis)

This subsection examines the predictive effect of AI usage on academic achievement using linear regression analysis. The results are presented in Table 4.

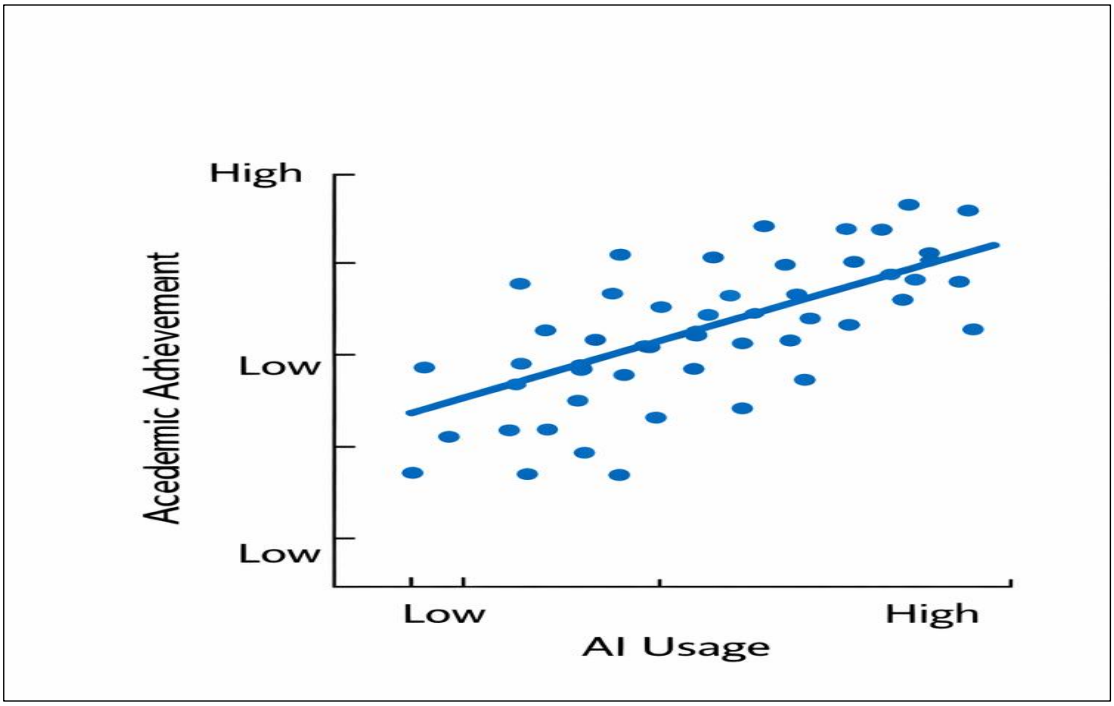
Table 4: Regression Analysis of AI Usage on Academic Achievement (Where N=200)

Variables	B	Std. Error	Beta (β)	t-value	p-value
Constant	1.25	0.32	—	3.90	0.000
AI Usage	0.68	0.08	0.62	8.50	0.000*

Table 4.1 Summary Table

Model Summary	R	R^2	Adjusted R^2
	0.62	0.38	0.37

*Significant at 0.01 level



Source: Data compiled from primary survey conducted by the researcher (2026)

Figure 4: Regression Analysis of Al Usage on Academic Achievement among students

Finding: Table-4 & Figure-4 shows that the AI usage was a positive predictor for academic performance ($\beta = 0.62$, $p < 0.01$). The model accounts for 38% of variance ($R^2 = 0.38$) for academic performance, which indicates that the usage of AI accounts for a respectable amount of variance. The positive beta value indicates that high use of AI tool corresponds to better academic performance.

Analysis: The result that AI usage predicts academic performance to a large extent ($\beta = 0.62$, $p < 0.01$), accounting for 38% of the variance ($R^2 = 0.38$) reveals that not only is AI related to, but it is also a strong determinant of, students' academic performance. This finding is consistent with previous studies indicating the highly predictive influence of TEL tools on educational performance. For example, Zawacki-Richter et al. (2019) found that AI-based educational systems have a positive impact on student achievement by providing instant personalized feedback, adaptive learning or data-driven learning path, as well as other elements that have a direct bearing on students' success in school.

Also a significant positive influence of AI applications in education on students' academic performance when being supported by interaction and engagement in the learning environment was obtained by Chen et al. (2020). Their result suggests that usage of AI can be considered as a predicting axis in academic performance, where students who work more with AI tools obtain better performances. **Homles et al. (2019)** also highlighted that AI enabled SRL, critical thinking and problem-solving skills, which are important determinants for academic achievement. Such features allow learners to better control their learning and learning outcomes. Supporting this view, Luckin et al. (2016) proposed that AI systems can extend human cognitive functions and hence offer performance improvements in learning and can be a strong factor of academic success.In line with this, recent empirical research on generative AI tools such as ChatGPT,Google Gemini,Perplexity AI,Claude etc. further supports this relation of prediction. Kasneci et al., 2023) demonstrated that generative AI potentially boosts academic productivity, understanding and task efficiency, ultimately forecasting stronger academic performance. The amount of explained variance in the current study, 38%, is also reasonable when considering the standards of research in social science not too low values of R2 are required to represent sufficient explanatory power, especially in studies of human cognition/learning.

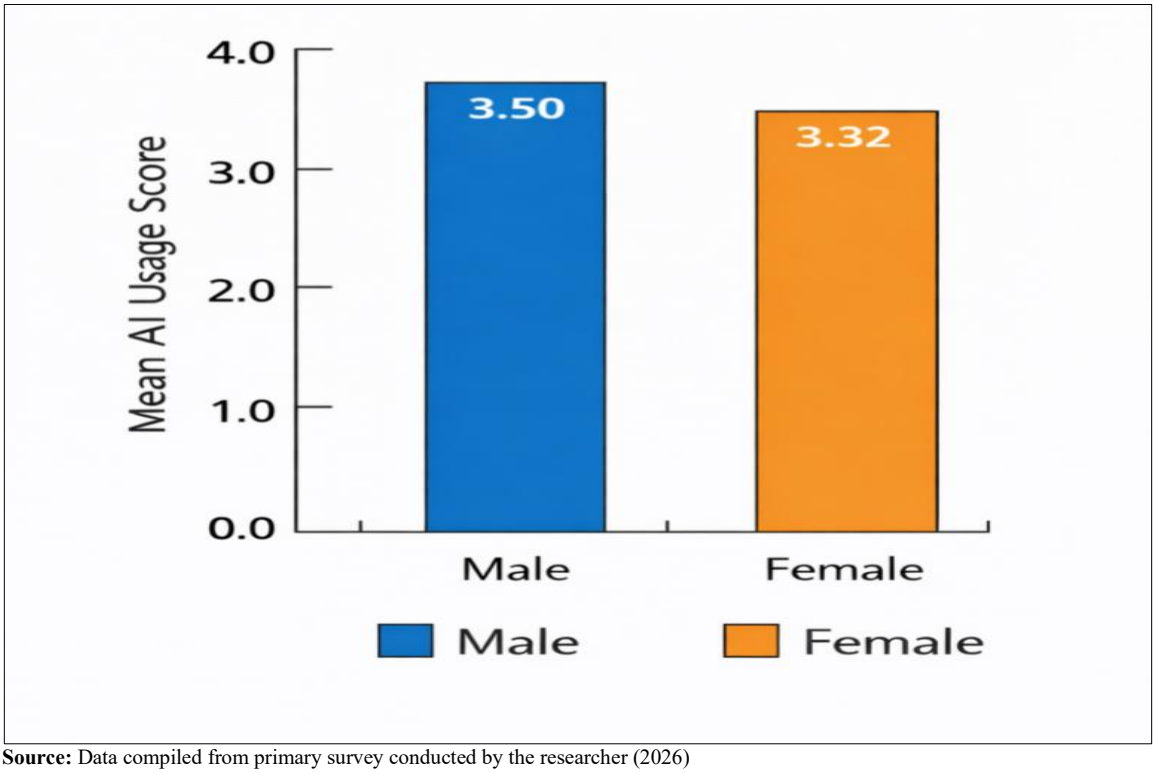
Hence, the results of this study are consistent with previous findings in the literature that AI service usage is a significant and meaningful antecedent of academic performance and the positive beta coefficient further affirms that a higher degree of utilization of the AI service among tertiary students leads to better academic performance.

4.5 Gender-wise Difference in AI Usage

This subsection investigates whether AI usage differs significantly between male and female students.

Table 5: Gender Difference in AI Usage (Where N=200)

Gender	N	Mean	SD	t-value	p-value
Male	110	3.50	0.82		
Female	90	3.32	0.90	1.52	0.130



Source: Data compiled from primary survey conducted by the researcher (2026)

Figure 5: Gender Difference in AI Uses

Finding: There were no statistically significant differences in AI usage by gender as displayed in Table 5 & Figure-5 ($p > 0.05$). male students account for a slightly higher usage, but the difference is not significant.

Analysis: The result that male students had higher mean scores in AI usage, but there was no significant gender difference ($p > 0.05$) is aligned with an increasing volume of literature reporting the diminishing of gender gaps in technology use in higher education contexts. This indicates that both female and male students are more or less equally exposed to and

knowledgeable about AI tools and hence, they show similar patterns of utilization.

Previous researches confirm this observation by indicating that gender is no longer a strong predictor when it comes to digital technology adoption for university students. For instance, Ong and Lai (2006) have observed that although earlier technology acceptance models reflect the gender differences, such differences decrease as users' expertise, exposure and confidence with digital tools grow. In the same vein, Venkatesh et al.(2012), in the Unified Theory of Acceptance and Use of Technology (UTAUT2), reported that gender disparities in technology use are highly situational and are reduced in situations with high levels of access, training and support.

In the area of artificial intelligence too, recent research shows that the gender gap is insignificant. Ogunleye et al. (2024) indicated an equal level of intention and actual use of AI tools between students of different genders (male and female) when the tools are applied in academic activities. In addition, Kasneci et al. (2023) revealed that gender did not have an impact on student preferences for generative AI tools such as ChatGPT,Google Gemini,Perplexity AI,Claude etc., but academic requirements and perceived usefulness were more influential predictors of use. In addition, Zhao et al. (2025) also highlighted an importance of digital literacy, self-efficacy and learning motivation over gender for AI usage.

Consequently, female and male students ... tend to demonstrate similar patterns of adoption and use of AI in higher education. Consequently, the current finding is consistent with previous research showing that gender does not have a substantial impact on the use of AI among university students and that any trivial differences in mean scores do not result in statistically significant differences.

4. DISCUSSION

This research investigated the effects of the use of AI on the academic performance of university students, considering the degree of AI use, the students' academic results, the correlation between academic results and the use of AI, the predictivity of academic results based on the use of AI and potential gender differences. The results of the research show that AI is a powerful technology support tool in higher education and has a positive impact on students' academic performance. The discussion of the findings is presented objective-wise by comparing the attained results with the previous research findings and theoretical prospective.

Objective-I: To investigate the degree of AI usage among university students

The first objective was to examine the level of AI application among university students. Results showed that the majority of the students (45%) were classified as having a moderate level of AI application, 35% showed a high level of application and 20% had a low level of application. The mean score was indicative ($M = 3.42$) of a moderate use of AI tools in education by university students. This indicates that AI tools (eg, ChatGPT, Google Gemini, Perplexity AI and Claude) are increasingly integrated by students in their academic work, yet their use is still at an early stage.This is consistent with the results of the study by Polyportis (2024), which found that university students tend to use generative AI tools for isolated academic tasks rather than embedding them holistically into their learning. Similarly, Shahzad et al. (2024) have demonstrated that trust, perceived usefulness and institutional support are key enablers for students' adoption of AI in higher education. Besides, Zhao et al. (2025) pointed out that self-efficacy and digital literacy are the critical influencing factors for students to engage in AI. Thus, in the light of the present study, moderate use of AI in education suggests that students know about AI tools and their educational possibilities, but their knowledge is not sufficient to use them in educational settings. The results are also consistent with the Technology Acceptance Model (TAM), which suggests that adoption of technology is based on the perceived usefulness and perceived ease of use (Venkatesh et al., 2012).

Objective-II: To evaluate the students' academic achievement

The second objective was to assess the level of academic performance of the higher education students. Results revealed that 50% of the students had a moderate academic achievement, 35% had a high academic performance and only 15percent were classified as having low academic accomplishment. The mean ($M = 3.58$) score showed that the students had satisfactory academic performance.It can be said that the result is similar to the result of Richardson, Abraham and Bond (2012) stating that achievement in higher education is predicted by a number of psychological and educational variables, including motivation, self-regulation and study strategies of a moderate percentage of the attending students. Similarly, York et al. (2015) viewed academic success as a multifaceted phenomenon that is affected by institutional support services, student engagement and student learning approaches. Hence, the current study's results imply that university students have a moderate academic success that can be improved by better learning support mechanisms, such as employing AI in educational practices. The results also support constructivist learning theory, which promotes active participation in learning and the use of technology to support learning to enhance academic performance.

Objective-III: To investigate the association between AI usage and academic performance

The third objective of this research investigated the correlation between the use of AI and learning outcomes. A Pearson correlation was conducted to test the association between use of AI and academic performance. This means students that use AI tools more, tends to have higher education.The result lends strong support to prior empirical studies on AI in education. Zawacki-Richter et al. (2019) stated that AI-based educational systems foster student learning by means of adaptive instruction, automated feedback and intelligent tutoring systems. Likewise, Chen, Chen and Lin (2020) found that students' engagement and learning achievement were significantly increased in AI-enhanced educational environments. Also, **Holmes, Bialik and Fadel (2019)** noted that the prospective implications of AI in education can be seen in support for self-regulated learning and personalized learning experiences with the promise of improved academic success. Additionally, Kasneci et al. (2023) demonstrated that generative AI tools bolster students' understanding, ideation and the quality of academic work. The current result thus supports the notion that AI acts as a scaffolding for academic with which it enhances the efficiency of learning, the availability of information and the depth of conceptual understanding. The positive relationship found between AI and learning outcomes also support the theoretical expectations of constructivist learning theory, which promotes learner-centred and technology supported knowledge construction.

Objective-IV: To analyse the predictive effect of AI usage on academic achievement

The fourth objective investigated whether AI use is a significant predictor for the academic achievement of higher education students. The regression analysis showed that the use of AI was a significant predictor of academic performance ($\beta = 0.62$, $p < 0.01$) and accounted for 38% of the variance in academic performance ($R^2 = 0.38$). This result suggests that the use of AI is not simply correlated to academic performance, but it is also a strong determinant of students' academic success. This is consistent with the work of Luckin et al. (2016) who proposed that AI technologies have the potential to augment human cognition and positively impact learning outcomes through adaptive and personalised learning systems. Chen et al. (2020) also found that learning environments supported by AI have a significant effect on students' learning outcomes by raising engagement and teaching effectiveness. In addition, Kasneci et al. (2023) found that generative AI tools increase productivity, comprehension and task completion, thus predicting better academic performance. The high predictive value achieved in the present study indicates that AI tools may revolutionize higher education, facilitating personalized learning, providing students with greater access to academic materials, and strengthening problem-solving skills. The finding also suggests that the utilization of AI-based solutions in teaching may have a positive impact on the quality of higher education in the Indian setting.

Objective-V: To investigate whether there are differences in AI usage among students

The fifth objective of investigation examined the gender-wise difference of AI uses by students. The results showed a nonsignificant difference in AI use by gender ($p > 0.05$), with male students scoring marginally higher than female students. This implies that male and female students have a comparable level of AI tools use in educational situation.

The result is in line with Venkatesh et al. (2012), who posited that gender differences in technology adoption diminish when users are provided with equal opportunities for access, exposure and technological support. Also, gender was not a statistically significant determinant of students' adoption of AI tools in education (Ogunleye et al., 2024). Ong and Lai (2006) also found that the gender gap in digital technology use narrowed with higher levels of familiarity and confidence in technology.Hence, the current study infers that AI technology is more readily available in higher education, through which the higher education students were not left behind accessibility- and gender-wise. The lack of a marked difference between male and female approach to AI also points to other factors being more powerful predictors of students' AI adoption (namely: digital literacy, perceived usefulness and academic needs), than gender persentage.In general, this research verifies the learning effect of Artificial Intelligence on the performance of students and contributes to the literature by showing how an important educational support and reinforcement system in tertiary education can be based on an emerging educational philosophy. These results emphasize the importance of properly embedding AI tools in higher education teaching-learning modules and augmenting digital literacy and ethical AI practice to best harness the educational prospects.

4.1 Testing of Hypotheses

The hypotheses were tested using suitable inferential statistics. The correlation between AI and academic performance was computed using the Pearsons correlation and a significant positive correlation was found ($r = 0.62$, $p < 0.01$). Thus, the null hypothesis (H_{01}) was dismissed and the alternative hypothesis (**H_{11}**) was retained for the following variables. Subsequently, linear regression analysis was performed to evaluate academic performance prediction ability of AI usage. The findings revealed a significant effect of AI on academic performance ($\beta = 0.62$, $p < 0.01$), which accounted for 38% of the variance ($R^2 = 0.38$). Therefore, **H_{02}** was rejected in favor of **H_{12}** proving that usage of AI is a powerful predictor of academic performance. Then, a separate sample t-test was conducted to investigate potential gender differences in AI use, showing no significant result ($p > 0.05$). As a result, the null hypothesis (**H_{03}**) was accepted and H_{13} was rejected, indicating that gender does not exert a significant effect on students at the tertiary level in using AI. In sum, the result of the hypothesis testing also substantiates that AI usage is significant in determining academic achievement while gender was not.

4.2 Educational Implications of the Study

The study's results are significant for educators, higher education and educational policy. Given the impact of AI usage on academic performance, a process for effective integration of AI tools into teaching–learning processes is urgently needed. The aim would be for the institutions to build AI-enabled learning experiences that support personalized learning and really thinking critically and problem-solving. Faculty also need to be trained to effectively use AI tools such as intelligent tutoring systems, adaptive platforms and generative AI products in the classroom in a way that makes pedagogical sense. Curriculum developers should also incorporate modules related to digital literacy and competency in AI, so students can take these technologies ethically and responsibly. The finding of moderate level of AI adoption among students suggests that AI need be further guided and more organized activities are expected to help students get the most out of AI. Hence, workshops, orientation and support system should be established to build students' confidence and competence for the use of AI tools. And as there were no gender differences, equal access and inclusive interventions may be highlighted to ensure that all students are able to make use of AI in their studies. In sum, the study reveals that there is a need for a comprehensive and fruitful strategy of AI use in education for the best possible learning achievements.

4.3 Limitations and Future Directions

In spite of its contributions, the present study also has limitations that were taken into account when interpreting the findings. Initially, the research was conducted on a sample of 200 students belonging to a particular tertiary-level context, which might restrict applying the outcomes to other contexts or locations. Secondly, students' perceptions of their use of AI and their academic performance might differ from what students really do and how well they perform due to response bias when self-reported data are used. Third, the study concentrated on quantitative outcomes with no investigation of qualitative issues such as the experiences, attitudes and difficulties of students in relation to employing AI applications. However, only certain variables were analysed and it is possible that other variables, such as socioeconomic status, institutional support and teaching method, could impact academic success. In order to increase generalisability, larger and more diverse samples across multiple institutions should be considered in future research. A mixed-methods design would provide a better understanding of how and why AI affects learning. It is also suggested to conduct longitudinal investigations to identify the dynamics of AI use and academic outcomes. In addition, future research may also investigate the role of particular AI tools, related ethical issues, as well as the influence of AI on higher-order cognitive processes in order to provide a more comprehensive understanding of its educational implications.

5.CONCLUSION

In conclusion, In short, this study evidences that AI has a substantial and a positive effect on the academic performance of the HE students. Results show that, although students have a moderate level of AI use and academic achievement, there is a positive and significant association between these variables. Use of AI is not only correlated but a significant predictor of academic performance, emphasizing the relevance of considering AI as an educational resource. The lack of gender differences suggests that the use of these AI tools is open and positive for all students, independent of gender. First of all, the moderate levels of use indicate that how to better employ and utilize AI in HE still has a long way to go. Hence, it is vital for the school of education to take the lead in the skilful handling of AI by introducing innovative approaches, offering good training and by deciding at what level such naturally will need to be integrated. In the end, the study highlights the potential of AI to transform teaching and learning and shape the future of education.

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