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The Usage of AI in Academics: Its Impact on Learning Autonomy and Academic Motivation among University Students

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Abstract: *Artificial Intelligence (AI) has become an important component of higher education, offering personalized learning experiences and enhancing students' engagement in the learning process. The present study aimed to examine how AI can contribute to the field of education by understanding the impact it has on learning autonomy and academic motivation among university students. A quantitative correlational cross sectional research design was used. The sample was 226 university students from various universities selected using convenient sampling technique. Three questionnaires were used to collect data: the Questionnaire on the Use of AI in Education (QUIA; Vera, 2023), RATTC Self-Directed Learning Scale (Lounsbury & Gibson, 2009), and Academic Motivation Scale (AMS; Vallerand et al., 1992). Data were analyzed statistically using SPSS, descriptive statistics, reliability analysis, Pearson correlation and regression analysis. The results showed strong positive connections between the use of AI in learning, the autonomy of learning, and the motivation to learn. In addition, the use of AI was a significant predictor of learning autonomy and academic motivation. The findings indicate that students in universities who use AI technologies more are more motivated in learning and self-directed learning. The results underscore the potential of AI-driven learning tools to foster self-directed learning and motivate students in higher education.*

Keywords: Artificial Intelligence, Learning Autonomy and Academic Motivation

Introduction

The field of Artificial Intelligence (AI) has become one of the most impactful technological innovations in today's education, revolutionizing the way teaching and learning are conducted in higher educational institutions. With the advent of AI, new possibilities have emerged to boost the quality of education and positively impact learning outcomes, such as the use of intelligent tutoring systems, adaptive learning platforms, virtual assistants, automated assessment tools, and generative AI applications (Alneyadi et al., 2023; Khan et al., 2022; Shrivastava et al., 2023). These technologies can measure how learners perform, what they like and dislike, and their learning styles to offer customised teaching, instant feedback and adaptive support to create more effective and learner-centred learning environments (Yang et al., 2022). Moreover, AI-driven Chatbots and Virtual Learning Assistants deliver real-time learning

support and interactive learning experiences, fostering student engagement and learning outcomes (Samad et al., 2022). While privacy, cost, and algorithmic bias are concerns, AI still has significant potential to improve educational outcomes and to assist with personalized learning (Jarrah et al., 2022; Madasamy et al., 2022). Generative AI technologies, like ChatGPT, have further driven the integration of AI into higher education as these have progressed rapidly. Students use these technologies more and more for academic writing, information retrieval, problem-solving, language assistance and content generation, and educators for instructional design, assessment management and personalized learner support (Eaton et al., 2023). AI tools have become increasingly accessible and user-friendly, leading to their widespread use among university students.

Accessibility and user-friendliness of AI tools have greatly increased the adoption rate amongst University students. Based on the research found, AI-based education systems are known to support independent learning, where learners are able to access information independently, monitor their learning and receive personalized feedback based on their learning needs (Karyadi, 2023; Hajri, 2023). Furthermore, the implementation of AI technologies can help improve student engagement and participation by providing personalized learning paths and enabling continuous interaction with learning content (Fadhil & Villafiorita, 2017; Crown et al., 2011). Learning autonomy is one of the most crucial educational outcomes linked to the use of AI in the classroom. Learning autonomy is the ability of a person who can plan, manage, monitor, and evaluate his/her own learning process (Knowles, 1980; Merriam & Caffarella, 1999; Ponton, 1999).

As a result, the autonomous learners exhibit characteristics like being able to be self-initiated, self-persistent, self-regulated, and able to use learning resources effectively, which help them achieve academic success and effective learning throughout their lives (Ponton et al., 2000). It is significant that learning autonomy has become more relevant in higher education as students are expected to learn independently from knowledge and acquire self-directed learning skills. AI technologies can enable the creation of learning autonomy through self-paced learning, individualized feedback and goal setting, and self-evaluation opportunities. There is recent evidence that indicates that AI-based learning environments foster independent learning behaviours and support learners' self-regulated learning capacities (Szabó & Szoke, 2024). Academic motivation is also an important variable for students' learning engagement, persistence, and achievement. Motivation is what students' effort put into learning activities and how committed they are when facing learning difficulties (Schunk et al., 2008). The literature consistently reveals that more motivated students are more likely to use effective learning strategies, show more persistence and succeed academically than less motivated students (Miltiadou & Savenye, 2003; Semmar, 2006). In the technology-enhanced learning environment, motivation is important because students have more responsibility for their learning activities. AI can assist in promoting academic motivation by providing personalized feedback, adaptive learning experiences, and creating interactive learning environments that tailor instruction to the needs and preferences of individual learners (Mohamed et al., 2024). This individualized assistance can enhance students' learning interest, participation and satisfaction. While the implementation of AI in education holds significant promise, there are also some concerns about its use.

There are many advantages to integrating AI in education, but there are some concerns. Overuse of AI-generated content can lead to a decline in students' critical thinking, creativity, and problem-solving skills (Kasneci et al., 2023; Zhai et al., 2024). Furthermore, the challenges of academic integrity, plagiarism, ethical usage of AI tools, and data privacy are now gaining significant attention in the academic environment (Cotton et al., 2023; UNESCO, 2023). The issues underscore the need to study the positive and possible negative impacts of AI applications in educational settings. While the educational aspect of AI has been proven and the role of AI in personalized learning has been studied, fewer studies have studied the connection between AI with learning autonomy and student academic motivation in the university environment. In today's higher education landscape, characterized by the rapidly growing acceptance of AI tools into students' learning journeys, these connections are especially pertinent. Thus, the aim of the current study was to explore the role of AI in education and to predict learning autonomy and academic motivation of university students.

Significance of the study

The present is relevant because it examines how artificial intelligence (AI) in the learning process impacts learning autonomy and academic motivation of university students. With the increased use of AI technologies in educational environments, it's crucial to comprehend their impact on students' learning habits and motivational results. The findings of this study will add to the existing literature by providing empirical findings on the relationship between the use of AI, learning autonomy, and academic motivation, particularly in the higher education landscape in Pakistan where few studies have been conducted on this subject. The results of the study can help academic and educational institutions, public policy makers and teachers to better understand the education and psychological impacts of AI learning tools on students. The research can help teachers and institutions create effective strategies to use AI in education responsibly and productively to foster independent learning and improve students' academic motivation. The results of the study could also influence future research on future consequences and psychological issues of AI in higher education.

Objectives

1. To analyse the effect of the tools based on artificial intelligence on the autonomy of the student's learning.
2. To explore how AI tools affect students' motivation in academic motivation.
3. To explore the correlation between the use of AI tools, learning autonomy and academic motivation of university students.
4. To share suggestions for leveraging AI in higher education for improving learning autonomy and motivation.

Hypothesis

1. The use of artificial intelligence tools will show a positive relationship between the use of the technology and the autonomy of learning.
2. The use of artificial intelligence tools will have a positive relationship with the academic motivation of students.

3. University students' academic motivation will have a positive correlation with learning autonomy.
4. The use of the AI tool will significantly predict student's learning autonomy and learning motivation.

Method

Research Design

For this study, a quantitative research design with correlational and cross-sectional study was used to explore the relationships between the use of artificial intelligence (AI) in education, learning autonomy, and academic motivation among university students. To observe the direction and intensity of relationships between the study variables this correlational design was used and to collect data at one time point in the study this cross-sectional approach was used. Additionally, regression analysis was performed to assess the predictive power of the use of AI on learning autonomy and academic motivation.

Sample and Sampling Strategy

The study was carried out on the university students of the university level education institutions in Multan, Pakistan. Twenty-two-six students were included in the study as a convenience sample. Participants included both male and female students from various academic fields and educational stages to capture a broad range of insights into how AI is being used, students' autonomy in learning, and their motivation to learn.

Instruments

Questionnaire on the Use of Artificial Intelligence in Education (QUIA)

The Questionnaire on the Use of Artificial Intelligence in Education (QUIA) designed by Vera (2023) was applied to the students' perception, attitude, and use of AI in higher education. There are 25 items on a 5 point Likert Scale from Strongly Disagree to Strongly Agree. It consists of five dimensions: General Perception of AI in Higher Education, Current Use of AI, Impact of AI on Student Experience, Concerns About AI Use, and Future Expectations of AI in Higher Education. The scores are higher, the more endorsed the usage of AI in education. Excellent internal consistency ($\alpha = .93$) was reported in the original study.

Self-Directed Learning Scale (RATTC)

The Resource Associates Transition to College (RATTC) Self-Directed Learning Scale from Lounsbury and Gibson (2009) was used to assess learning autonomy. The scale has 10 items measuring the ability of the learner to take responsibility for and manage his/her learning. The responses are captured on a 5 point Likert scale from Strongly Disagree to Strongly Agree. High scores indicates high self-directed learning level. The scale has been found to have high reliability ($\alpha = .92$).

Academic Motivation Scale (AMS-C28)

The Academic Motivation Scale - College Version (AMS-C28) of Vallerand et al. (1992) was used to assess academic motivation. The scale measures 28 items related to intrinsic motivation, extrinsic motivation and amotivation. Responses are scored on a 7-point scale from

1 (Does not correspond at all) to 7 (Corresponds exactly). The higher the score, the greater the students' motivation in learning. The scale has been shown to have good reliability (α = .83).

Procedure

Once approved by appropriate University officials, the participants were approached in universities and explained the purpose of the study. Data collection was done after receiving informed consent. Participants were informed that they would be kept confidential and anonymous, and that they could withdraw at any point during the research. All questionnaires were analysed after screening for missing and inconsistent responses.

Data Analysis

The data was analyzed with Statistical Package for the Social Sciences (SPSS). Preliminary screening was performed for the detection of missing values, outliers, and for checking normality assumption. Descriptive statistics were used to describe the participants' characteristics and study variables. The Pearson product-moment correlation technique was used to explore the correlation among the use of AI, learning autonomy, and academic motivation. Furthermore, simple linear regression analyses were conducted to evaluate the predictive effect of the AI use on learning autonomy and academic motivation.

Result

The results section presents the statistical analysis that was performed to investigate the influence of Artificial Intelligence in Education on learning autonomy and academic motivation of university students. Descriptive statistics, reliability analysis, correlation analysis and regression analysis were performed using SPSS. The questionnaires were circulated amongst a total of 226 university students. The findings are presented in the following tables.

Table 1: ***Demographic Characteristics of Sample (n=226)***

Variables		**N**	**%**
Gender	Male	24	10.6
	Female	202	89.4
Age	18-20y	4	1.8
	21-23y	22	9.7
	24-26y	145	64.2
	27y and above	55	24.3
Education	BS/Undergraduate	121	53.5
	MS/ MPhil	71	31.4
	PhD	34	15.0

Note: N= total number of participants, % = percentage

The demographics characteristics of the sample (N =226) showed that the majority of participants were female (89.4%), whereas male participants represented only 10.6% of the sample. In terms of age, most participants belonged to the 24-26 years age group (64.2%), followed by participants aged 27 years and above (24.3%). A smaller proportion of participants were aged 21-23y (9.7%), while only 1.8% were between 18-20 years of age. Regarding education level, more than half of the participants were BS/ Undergraduate students (53.5%), whereas PhD students constituted 15.0% of the sample. Overall, the sample primarily consisted of female undergraduate students aged between 24-26 years.

Table 2: ***Number of items and alpha reliability of all scales (N=226).***

Scales	N	*a*
QUIA	25	.935
RATTC	10	.925
AMS	28	.832

Note. a = Alpha reliability, *n* = total no of items

QUIA = Questionnaire on the Use of Artificial Intelligence; RATTC = The RATTC Self - Directed Learning Scale; AMS = Academic Motivation Scale. In Table 2, we find the alpha reliability of all scales. The number of items and alpha Reliability is mentioned (Table 2)

Table 3: ***Mean, Standard deviation, minimum and maximum scores of major study variable***

Variable	**N**	***M***	***SD***	**Min**	**Max**	**Skewness**	**Kurtosis**
Gender of Respondent	226	1.89	.309	1	2	-2.574	4.664
Age of Respondent	226	3.11	.633	1	4	-.516	1.140
Education of Respondent	226	1.62	.735	1	3	.748	-.787
QUIA	226	86.07	17.37	41.00	104.00	-1.275	.289
RATTC	226	39.26	8.90	15.00	49.00	-1.465	.825
AMC	226	130.08	23.20	71.00	161.00	-1.105	.200

Note. QUIA = Questionnaire on the Use of Artificial Intelligence; RATTC = The Self-Directed Learning Scale; AMS = Academic Motivation Scale; M = Mean; SD = Standard deviation. Table 3 displays descriptive statistics for the study variables (N = 226). Results indicated that the mean score for the Questionnaire on the use of artificial intelligence was 86.07 (SD = 17.37), the mean score for the RATTC self-directed learning scale was 39.26 (SD = 8.90), and the mean score for the Academic Motivation Scale was 130.08 (SD = 23.20). The values for

skewness and kurtosis of the major study variables were within acceptable limits and thus suggested that the data, to a large extent, were normally distributed.

Table 4: ***Correlation Coefficients for study variables to explore the relationship between AI usage, learning autonomy and academic motivation. (N = 226)***

						95% CI	
Variables	***B***	***SE***	**β**	***t***	***P***	***UL***	***LL***
Constant	.995	1.49		.66	.50	3.93	-1.94
Variables	*B*	*SE*	β	*t*	*P*	*UL*	*LL*
Constant	.995	1.49		.66	.50	3.93	-1.94
Artificial Intelligence	.445	.017	.86	26.15	<.001	.47	.41
R^2	.75						
Artificial Intelligence	.445	.017	.86	26.15	<.001	.47	.41
R^2	.75						

Variable	**1**	**2**	**3**
QUIA	-	.868**	.777**
RATTC		-	.862**
AMS			-

Note. *** *p <.001;* QUIA = Questionnaire on the Use of Artificial Intelligence; RATTC = The RATTC Sel-Directed Learning Scale; AMS = Academic Motivation Scale. The results indicated significant positive relationship among artificial intelligence usage in education, academic motivation and self-directed learning. This propose that higher use of AI tools is connected with greater academic motivation and stronger self-directed learning. Overall, the findings highlight a meaningful and strong association among the constructs, showing that they are closely interconnected within the study framework.

Table 5: ***Simple Linear Regression Analysis with Artificial Intelligence predicting Learning Autonomy (N =226)***

Note. B = Unstandardized regression coefficient; SE = Standard Error; β = Standardized beta coefficient; CI = Confidence Interval; P = Significant level. The R^2 value represent the proportion of variance explained by the predictor. All results are statistically significant at P < .001. Results indicated that artificial intelligence in education significantly positively predicted learning autonomy, β = .86, t = 26.15, p = < .001. The regression model explained 75% of the variance in learning autonomy (R^2 = .75).

Table 6: ***Simple Linear Regression Analysis with Artificial Intelligence predicting Academic Motivation***

Note. B = Unstandardized regression coefficient; SE = Standard Error; β = Standardized beta coefficient; CI = Confidence Interval; P = Significant level. A linear regression analysis was conducted to examine the effect of artificial intelligence usage on academic motivation. Results indicated that artificial intelligence usage significantly predicted academic motivation, β = .777, t = 18.49, p = < .001. The overall model was statistically significant and explained 60% of the variance in academic motivation (R^2 = .60).

Discussion

This study explored the effects of using artificial intelligence (AI) on learning autonomy and academic motivation in university students. The results showed that learning autonomy was positively correlated with the use of AI, as was academic motivation. In addition, learning autonomy showed positive and significant correlation with academic motivation. The regression analyses also showed that the use of AI had a significant predictive power for two of the three hypotheses put forward in the study, with learning autonomy and academic motivation significantly predicted by the use of AI. The correlation between AI usage and learning autonomy shows promise of how AI can improve student autonomy in learning, thereby supporting education.

The positive correlation between the use of AI and learning autonomy implies that AI-based educational tools can increase the learning autonomy of students. AI technologies offer personalized learning experiences, instant feedback and an ease of access to learning resources, which helps students to plan, monitor and regulate their learning activities more effectively. These findings are consistent with previous studies that have highlighted the role of AI-enhanced learning environments in promoting self-regulated learning and learner autonomy among university students (Yang, 2026; Lan & Zhou, 2025). Likewise, there was a positive correlation between use of AI and academic motivation. The students who indicated a higher level of engagement with the AI tools indicated higher levels of motivation toward their academic activities. This is partly due to the interactive, adaptive and accessible features of AI-driven learning platforms, which can help to boost students' motivation, self-confidence, and participation in learning. The results of this study align with previous research showing that AI-supported education has a positive impact on students' motivation and learning experiences (Bai & Wang, 2025; Alqurni, 2026).

						95% CI	
Variables	***B***	***SE***	**β**	***t***	***P***	***UL***	***LL***
Constant	40.75	4.92		8.26	<.001	50.46	31.03
Artificial Intelligence	1.038	.056	.777	18.49	<.001	1.14	.92
R^2	.60						

The study also confirmed that there was a significant positive correlation between learning autonomy and academic motivation. Pupils who are motivated to take charge and control their learning, generally have greater motivation toward learning. It is consistent with Self-Determination Theory, which highlights autonomy as a key psychological requirement that leads to intrinsic motivation and engagement in learning. Autonomous learners will take initiative in their learning, stay engaged with learning objectives and will be more persistent in learning tasks. Furthermore, the application of AI proved to be an important predictor of both learning autonomy and academic motivation. The results indicate that AI technologies can be considered as a possible tool to encourage independent learning attitudes and contribute to students' motivational development. The findings of this study align with previous research showing that AI tools in education can lead to higher levels of autonomy, self-directed motivation, and positive learning outcomes for learners (Zhai & Nezakatgoo, 2025; Dai et al., 2025).

The results overall suggest that AI technologies could help improve students' educational experiences by fostering learning autonomy and motivation. But while AI has great promise in the field of education, heavy use of such technologies could reduce the space for thinking and solving problems independently. Thus, HEIs should support responsible and ethical AI usage alongside promoting the development of students' analytical and self-directed learning abilities. Research into the long-term impacts of AI in students' academic growth and learning outcomes in various educational settings could also be explored in the future.

Implications and limitations for Future Research Directions

There are some limitations to this study. First, the sample consisted of university students, which could limit the applicability of the results to other schools. Second, the cross-sectional design of this study is not able to explain the cause and effect between the variables that are studied. Future studies should use longitudinal or experimental research methods to explore the long-term impact of the use of AI on students' learning outcomes. Also, the use of self-report measures could have led to the introduction of response bias. This research could be expanded to include qualitative or mixed-method analysis to better understand students' experiences with AI in the future. Additionally, the potential impact of AI on other educational and psychological aspects needs to be examined, including academic performance, critical thinking, self-efficacy, digital knowledge, and psychological well-being. This study's results indicate that AI technologies can be a powerful instrument for improving learning autonomy and academic motivations in university students. AI tools can be used in education to offer tailored learning experiences, instant feedback, and more access to learning resources for educational institutions and instructors. Additionally, universities need to encourage responsible and ethical use of AI and foster students' abilities to learn independently and think critically, in addition to their technological skills.

Conclusion

In the present study, the relationship between the use of AI in education, learning autonomy and academic motivation among university students was investigated. The results showed that the use of AI was positively correlated with learning autonomy and academic motivation. The use of AI in education seems to help students learn on their own and be engaged in learning through accessible, flexible and personalized learning experiences. In conclusion, the study

indicates that AI can be a beneficial educational tool when used responsibly, helping to enhance learning experiences and empower students to take control of their education and remain motivated in higher learning.

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