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Artificial Intelligence as a Learning Partner: Exploring Motivation, Creativity, and Academic Performance

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ABSTRACT

Artificial intelligence (AI) has become an important educational technology that enhances personalized learning and supports students' academic development. This study investigated artificial intelligence as a learning partner and its impact on motivation, creativity, and academic performance of university students in Punjab and Sindh, Pakistan. The study utilized a cross-sectional quantitative research design. A structured questionnaire built on validated scales was employed. Data were collected from 368 students of both undergraduate and postgraduate studies using Google Forms and were enrolled in public and private universities located in University of the Punjab, Bahauddin Zakariya University, Government College University Faisalabad, The Islamia University of Bahawalpur, University of Karachi, University of Sindh, and Mehran University of Engineering and Technology. The data were screened and cleaned using Microsoft Excel and analyzed using descriptive statistics, IBM SPSS, Pearson correlation, multiple linear regression, independent samples t-test, and one-way ANOVA. The study showed that using artificial intelligence as a learning partner increased students' motivation, creativity, and academic performance. The study was highly effective to further develop the learning process and educational attainment. The study was also helpful to educators, policymakers, and leaders of higher education institutions to adopt artificial intelligence in teaching and learning. The study used artificial intelligence in education and learning and was a highly positive addition to the growing studies in this field.

Introduction

The implementation of artificial intelligence (AI) within education has altered how individuals obtain information and practice educational skills. This advancement has also changed how individuals interact with educational content. Unlike previous technologies, which served primarily as databases or means of interaction within the educational community, AI-based learning systems have become potential intelligent learning partners. They have the capability to offer a variety of supports—including personalized guidance and feedback as well as assistance throughout the learning process that is fully integrated and responsive. Recent innovations in generative AI, especially in the areas of conversational agents and intelligent tutoring systems, have made it possible for learners to receive explanations in real-time, assist with idea generation and problem-solving, and gain learning support on an individualized basis. Because more educational institutions are starting to

integrate AI-based technologies, researchers are beginning to conceptualize how AI, when implemented in the education sector, is no longer a passive technological tool. Rather, it is an active partner that plays a significant role in the cognitive, motivational, and academic development of learners. This evolution illustrates the capacity for AI to change the landscape of education, engaging learners and fostering the development of autonomous learning as well as improving learning and teaching outcomes (Holmes et al., 2022; Zawacki-Richter et al., 2019).

AI has improved its capacity from merely enabling the automation of educational administration tasks to designing customized learning pathways, offering intelligent tutoring and evaluation, and providing interactive academic support and assistance. Antoninis et al. (2023), argued that personalization to such an extent wherein instructional content is appropriately matched to the individual needs and learning advancement of students is made possible by AI. Kasneci et al. (2023) supported this claim by noting that students are now able to engage more fully with instructional content as a result of the support provided by generative AI in the areas of conceptual clarity, idea generation, and problem-solving. Furthermore, learning now occurs with a greater degree of effectiveness.

The introduction of artificial intelligence in education has changed how students view themselves and how teachers view themselves, including the roles they play, and even the knowledge that is taught in the classroom. First, AI assists learners on an individual basis by providing continuous feedback, personalized recommendations, and suggestions to monitor learning progress. Through these systems, teachers are given the opportunity to shift their focus from traditional classroom teachings to higher-order learning concepts and techniques. In their work, Luckin and Cukurova (2019), and Dwivedi et al. (2023), have differed when addressing these intelligent educational systems, with Luckin and Cukurova discussing the systems challenge of building self-autonomous learners and systems providing personalized instructions, whereas Dwivedi and colleagues have discussed systems facilitating critical thinking, self-regulated learning, and higher-order digital skills. With the above in view, AI is perceived by many more to be a learning partner.

Artificial Intelligence as a Learning Partner

When AI is viewed as a learning partner, it shifts the learner and the system to work collaboratively. Moreover, it does not promote the idea of fully automating the educational processes. AI learning systems personalize elements of the learning journey by offering suggestions to learners, providing adaptive learning pathways, feedback and learning progress assessments, and offering individualized learning pathways. AI systems offer personalized support by assisting learners in identifying their learning strengths and weaknesses, and encourages the learners to be active participants in the learning process. According to Lin, H et al., (2024), AI systems provide self-learning environments and offer personalized instructional processes, and as a result, self-learning systems have a positive impact on knowledge attainment and on learners' engagement in the learning process.

AI differs from other digital education tools in that it is a digital education companion that invites learners to engage in exploration, problem solving, and critical thinking. Conversational AI, intelligent tutoring systems, and adaptive learning apps give students the ability to get answers to questions, come up with ideas, and get help with homework at any time. As stated by Chen (2025), these tools promote learner autonomy and self-regulated learning by offering learning opportunities and assistance in a more timely and on-demand manner.

Because of the fast evolution of AI, its role in the higher education space is broadening to include the facilitation of learning beyond the boundaries of the university and beyond the role of the lecturer in that space, to include learning how to think critically, and self-regulated learning. AI systems allow the lecturer to focus on other important aspects of learning such as mentoring and facilitating class discussions, and group work. Singh, H et al. (2025) believes the proper use of AI tools in the classroom creates an optimal learning environment and develops the digital skills necessary in the current epoch for learners. AI is coming to be regarded as a learning companion that enhances the learning experience and promotes learning.

Motivation, Creativity, and Academic Performance

Motivation is a key element of learning and has the greatest impact on overall persistence and effort. Learning with AI tools offers students the chance to engage with activities that adapt to the learner, offer many avenues and types of feedback, and ultimately lead the user to a more positive and confident disposition to learn. Learning environments that promote an individual’s sense of autonomy and competence strengthen intrinsic motivation. Learners can move through educational materials at their own pace and with the assistance of tools and strategies that are supportive and to their level. AI tools strengthen the learning environment and allow sustained and continuous engagement of the students.

Motivation is the first element of learning, but creativity is the second and is perhaps the most important cognitive skill to possess in the 21st century. AI tools are especially important when considering a broad and diverse array of cognitive skills.

For example, idea generation, brainstorming, and problem solving are enhanced with the assistance of learning tools and Generative AI. Learning environments foster creative tasks when they allow students to see and work through many diverse and competing views, reflect, and learn in a collaborative manner. Rather than replacing human creative thought, AI tools promote deep thought and the generation of diverse ideas.

The added synergy of boost in motivation and creativity is expected to have a favorable cumulative influence on students' performance. This is because the elements of motivation and creativity are likely to enhance the efficiency of the learning process, retention of knowledge, and educational achievements. More motivated and creative students are likely to deal with learning materials critically, and this is likely to translate into better academic performance. Hence, analyzing the interrelationships of AI, motivation, creativity, and academic performance is critical to understanding the broader significance of AI as an intelligent learning partner in modern-day higher education scenarios (Bhidodiya, M et al., 2026).

Research Objectives

- To examine the impact of artificial intelligence as a learning partner on students' academic performance.
- To investigate the effect of artificial intelligence as a learning partner on students' motivation and creativity.
- To assess the influence of students' motivation and creativity on academic performance in AI-supported learning environments.

Research Questions

- How does artificial intelligence as a learning partner influence students' academic performance?
- How does artificial intelligence as a learning partner affect students' motivation and creativity?
- How do students' motivation and creativity influence academic performance in AI-supported learning environments?

Problem Statement

The ways in which students gather information and destress academic tasks is evolving with the introduction of AI in educational systems. With the technologies of AI being introduced to learning systems as learning partners where personalized instructions, flexible updates, and real-time academic service are offered, not much evidence exists to show the influence such systems have on the motivation, creativity, and academic performance of students. Most studies focus on the technologies and the acceptance of AI, and not on the effects of AI in learning on the psychological and cognitive aspects of learners. The links between AI as a learning partner, the motivation and creativity of the learners, and academic performance, are also poorly documented in higher education systems of developing nations where the adoption of AI is rampant. Because of this, there is a lot of ambiguity for educators and policy makers to effectively integrate AI in the teaching and learning process. Considering this gap, this research aims to provide evidence regarding artificial intelligence as a learning partner and its effect on students' motivation, creativity, and academic performance, thus supporting research-based decisions in education.

Significance of the Study

This study aims to expand the literature on AI in education by investigating its learning partner role and its effects on motivation, creativity, and academic performance. This study is likely to provide evidence for educators on the possible uses of AI learning tools to increase students' motivation and creativity and to improve learning. The study will provide guidance for AI learning tools developers, educators, and educational policymakers for the safe and beneficial use of AI technologies in higher education. The results will improve understanding of students' learning needs and provide recommendations for the design of AI learning tools. The study aims to provide a new understanding of the learning partner role of AI, motivation, creativity, and academic performance. It will provide a new reference for researchers of AI-enhanced learning and student learning in various educational systems.

Literature Review

Artificial Intelligence (AI) is rapidly becoming a disrupter in education. At its most fundamental level AI is changing the way students learn, how they engage, and most interestingly - how students solve problems. Traditional educational technologies acted as digital libraries or digital communication tools, and aside from the better presentation of education, that was the extent of their involvement in the learning process. Fan, G et al. (2025) superficially state that the role of AI in education, at

its most core level, is the first presentation of a tool that breaks the rigid structures of teaching. AI integrates the real-time needs of students into the learning process. They note that AI systems learn student behavior, find areas where students struggle, and develop teaching methods to address that area and adapt as the students learn. Daniel, K et al. (2024) indicates that the AI tools push teaching from a systems approach to a more fluid teaching methodology, that is - from a teacher focused approach to a more student centric approach. The advancements in AI tools encourage most education systems to view AI as more than a technological investment, but as a partner in the teaching and learning process.

The model of AI as a learning partner stems from the idea that learning takes place best when there is room for iteration, interaction, and responsive cognitive engagement support. AI systems are not designed to replace teachers; rather, they are intended to be supporting agents that further optimize the learning process by providing instant answers, personalized task elaboration, and lesson customization. As Wei, L (2023) indicates, intelligent learning systems are designed to be of assistance to the learner at each stage of the learning process, including planning, practice, testing, and reflection. These systems take advantage of machine learning (ML) and natural language processing (NLP) to track the learner's development and provide targeted instructional content that is tailored to their developmental needs. In addition, Moemeke, C (2024) stated that AI-enhanced learning environments foster more active learning, self-directed learning, and higher levels of learning by providing the learner with learning support that is not constrained by time or location. For these reasons, AI fosters a partnership with the learner that enhances learning. It also provides greater flexibility and a broader approach to learning with built-in support at every stage.

Recent developments in generative artificial intelligence have made AI learning partners more effective. Large language models are examples of newly developed conversational AI systems. With these new systems, students now have new ways to access information, develop ideas, receive explanations, and complete learning tasks. As reported by Mansor, N (2025), generative AI systems have the potential to transform education by providing personalized virtual tutoring and participating in and/or guiding the user through interactive problem solving. In addition, generative AI systems can engage in reflective learning and provide virtual assistance at any stage of the writing and/or reviewing process of academic texts. In a similar vein, Xu, Y et al. (2024) reported that the use of generative AI in learning systems fostered curiosity, and the exploration of knowledge and/or learning, and collaborative learning, and among other benefits, systems that previously were not possible with conventional systems of instruction. Nevertheless, researchers have noted that if AI systems are utilized learning too much and without a critical/reflective thinking approach, learning becomes less autonomous and more artificial. For these reasons, the use of AI in educational settings should be aimed at strengthening natural learning.

Artificial Intelligence and Student Motivation

It is widely accepted that motivational factors are critical to achieving goals because motivation helps learners engage in activities, endure, and accomplish their goals. The quick incorporation of artificial intelligence (AI) in the modern classroom has created multiple pathways to strengthen student motivation as a result of the development of personalized, flexible, and user-friendly platforms and tools. Traditional instructions offer the same type of learning opportunities for all students. In contrast, AI learning systems provide instructional content based on learners' abilities, choices, and progression. As stated by Chen, Y et al., (2023) motivation is enhanced by the experience of autonomy, competence, and relatedness in the learning environment. The mentioned factors are all attainable through the use of intelligent educational technologies. In the same vein, Shahzad, M et al. (2024) noted that AI learning environments promote motivation and stimulate greater student engagement through individualized learning pathways, timely feedback, and supportive learning. With all the factors mentioned, AI has most likely become an educational partner in creating motivational learning environments in the classroom.

Perhaps the most notable impact of AI on students' motivation is the potential of personalized learning to elevate students' interest and motivation to learn. Traditional classroom learning often does not account for students' learning differences and, as such, can diminish students' motivation and interest. AI adaptive learning systems have the advantage of working around this by examining and adapting to students' learning needs. According to Umali, J (2024), smart tutoring systems innately learn using neural networks to analyze a student's knowledge and learning gaps to provide tailored learning aids and feedback, thereby enhancing a student's learning satisfaction and confidence. Likewise, Rahayu, S et al. (2023) pointed out that personalized learning experiences that harness AI lead to an increased perception of competence and learning self-efficacy, both of which influence the development of intrinsic motivation. When learning experiences and supports are tailored to students' needs, students' learning efforts and persistence towards a goal are markedly increased.

One of the more effective ways AI can boost student motivation is through the provision of constant, rapid feedback. Educational psychology reiterates the value of speed in the feedback loop used to build student buy-in and facilitate student engagement and self-improvement. AI-centered education software is capable of assessing a student's work in real time,

diagnosing learning problems, and providing timely, corrective interventions. Writing in Educational Technology, Holmes, W. (2020), states that intelligent educational systems allow students to monitor their own learning progress, identify areas of desired progress, and reinforce learning progress that has already been achieved. In addition, Ahmed, N. et al. (2024), noted that generative AI is capable of engaging students in two-way communication through the provision of feedback, explaining learning gaps, and offering corrective feedback. The other side of the back-and-forth that is ongoing and real is the interactive nature and the responsiveness on the part of the teaching and learning system. The AI feedback loop is vital in the construction of learning systems that maintain student motivation and improve student performance. As feedback is provided in real time, the learning progress is reinforced, student frustration is greatly minimized, and engagement is attainable. Learning resilience and positive attitudes toward learning and the academic environment are obtained as well.

Artificial Intelligence and Student Creativity

One skill that is expected to be important in the 21st century is creativity. Creativity allows individuals to develop new ideas, solve unusual problems, and modify themselves to fit new scenarios in work and school. In a university context, creativity includes not just the performing arts, but the expression of critical and innovative thinking, the consolidation of knowledge, and the ability to formulate unique answers to problems. Creativity will be the most important skill with the most importance in the school of the future, and the most disruptive technology, artificial intelligence (AI), will be the most important school of the future. AI provides extremely intelligent tools to students and aids them in problem solving and creative collaboration. People like, Pedro, F et al. (2019), claim that creativity and experimentation with new points of view and lots of new information and different learning scenarios that promote creative innovations come about through the use of AI. It also comes about in the learning environments of AI, which provide ample room for personalization and flexible learning and which support the development of advanced cognitive skills. The incorporation of AI promotes creativity across numerous areas of study because it is the latest technology.

AI is important for creativity in education, especially for brainstorming and divergent thinking. Traditional learning may use more rigid instructions which leaves less time for divergent thinking and perceiving things from multiple angles, whereas traditional AI may offer different angles, examples, and exercises that push learners out of their thinking comfort zone. As per Manzoor, A et al (2025), generative AI can present various answers for learners to critique and constructively build on. Likewise, Sajja, R et al (2024), remarked that conversational AI encourages students to continuously dialogue and challenge and diversify their perceptions of the academic task at hand. AI expands learners' thinking and creativity in a way that is necessary for success in both the workplace and the classroom.

Artificial Intelligence enhances creativity by facilitating collaborative learning and providing opportunities for personalization when building knowledge. It has been suggested that creativity appears when there is interaction, reflection, and a variety of stimuli and information. AI is capable of using learning interests and abilities to provide suggestions, feedback, and resources tailored to the individual. As cited in Zhang, Q et al., (2025), smart learning technologies promote exploration of learning strategies and provide, in real time, assistance that is tailored to the learner's level. Zawacki-Richter et al. (2019) observed that the integration of AI in the learning process stimulates proactive contact with the learning material, personalized and dynamic instructions, and interactive learning situations that foster the confidence to be creative and the willingness to learn independently. The personalization of AI learning technologies assists students in looking at a problem from various perspectives, combining several fields of knowledge, and proposing new solutions that have an academic and practical basis.

Academic Performance in AI-Supported Learning Environments

Performance in an academic setting is a primary measure of success in education systems globally. While it denotes students' abilities to master skills, knowledge, and competencies or to meet learning goals, it is frequently indicated by scores, test results, learning milestones, and performance in the evaluation of logical and academic progression. The most prominent impact of the incorporation of Artificial Intelligence within the higher education system has been observed in the learning processes, the way students interact with the content, and the manner in which students carry out activities aimed at improving performance. Compared to traditional methods of teaching that follow a uniform structure, AI-based learning systems are more effective in helping students tackle learning obstacles by offering personalized learning, flexible design, smart tutoring, and real-time feedback. As noted by Griffith, A et al. (2023), the introduction of AI in Educational Systems has streamlined the individualization of learning for students in a diverse system of learning. By providing the design of learning systems that is responsive to the instructional needs of an individual student, AI-based educational systems influence learning in a positive way by fostering meaningful participation and improving performance.

An improvement in academic performance due to AI can mainly be attributed to personalized learning. In most traditional schools, the methods and materials taught to students are the same and do not take into consideration a student’s background knowledge, learning speed, or even academic strengths and weaknesses. Because of this uniform way of teaching, some

students may even be held back because of the differing needs and capabilities of the students. AI-based educational systems reduce this problem by analyzing the way a student learns, the strengths and weaknesses of a student, and then modifies the learning material. Williyan, A et al. (2024) state that there is a use of machine learning in intelligent tutoring systems that develops custom learning flows. This aids in the understanding and retention of knowledge as well as the ability to apply the learned knowledge. Similarly, UNESCO (2023) explained that adaptive learning systems allow the learner to receive prompt support based on how they have performed, allowing the learner to first understand the subject matter before proceeding to higher level concepts. Personalized learning has a measurable impact as it leads to the valorization of students and a measurable increase in learning achievement.

AI learning environments offer users the benefit of instantaneous feedback on exercises as well as ongoing academic support. Research in education indicates timely feedback assists learners in identifying, understanding, and correcting learning errors and ineffective learning strategies before fellow students adopt learning misconceptions. AI educational systems can analyze students' assignments, quizzes, and educational activities in real time, providing feedback, analysis, and recommendations. Jagannath, K et al. (2023) claim that generative AI functions as a smart academic assistant, answering students' questions and explaining difficult concepts, as well as generating practice problems, and encouraging learners to work independently and outside of the classroom. Dwivedi et al. (2023) additionally believe that conversational AI assists students in learning, engaging with educational content, and achieving a greater level of learning through conversation and dialogue. AI learning environments accompanied with feedback encourage students to participate in the learning process, work together to achieve a greater level of knowledge, and cultivate the practice of self-improvement in order to promote better performance and results.

Research Gap

The incorporation of artificial intelligence (AI) in education has developed into a multifaceted field of study. However, literature attempting to place AI in the role of a collaborative learning partner and its impact on students' motivation, creativity, and performance has been largely absent. Prior research has dealt with the isolated constructs of technology acceptance, AI involvement, personalized learning, learning satisfaction, and academic achievement. There has not been significant research on the interrelated constructs of the aforementioned outcomes in education. Additionally, the majority of research in this field has been conducted in developed nations, which results in a lack of applicability when considering developing nations where there are significant disparities in AI involvement and the availability of educational technologies and digital learning. Research has also been limited in attempting to determine the ways in which AI learning environments foster motivation and creativity and how these constructs may influence academic achievement. Therefore, there are significant theoretical and practical voids in the study of AI as a learning partner. This research attempts to fill this void by analyzing the impact of AI as a learning partner on student motivation, creativity, and academic achievement. The results may advocate for the integration of AI into higher education and may assist in the development of educational research.

Hypotheses

H1: There is a significant positive correlation between artificial intelligence as a learning partner and students' academic performance.

H2: Artificial intelligence as a learning partner, student motivation, and student creativity significantly predict students' academic performance.

H3: There is a significant difference in academic performance between male and female students regarding the use of artificial intelligence as a learning partner.

H4: There is a significant difference in students' academic performance across different academic years based on the use of artificial intelligence as a learning partner.

Conceptual Framework

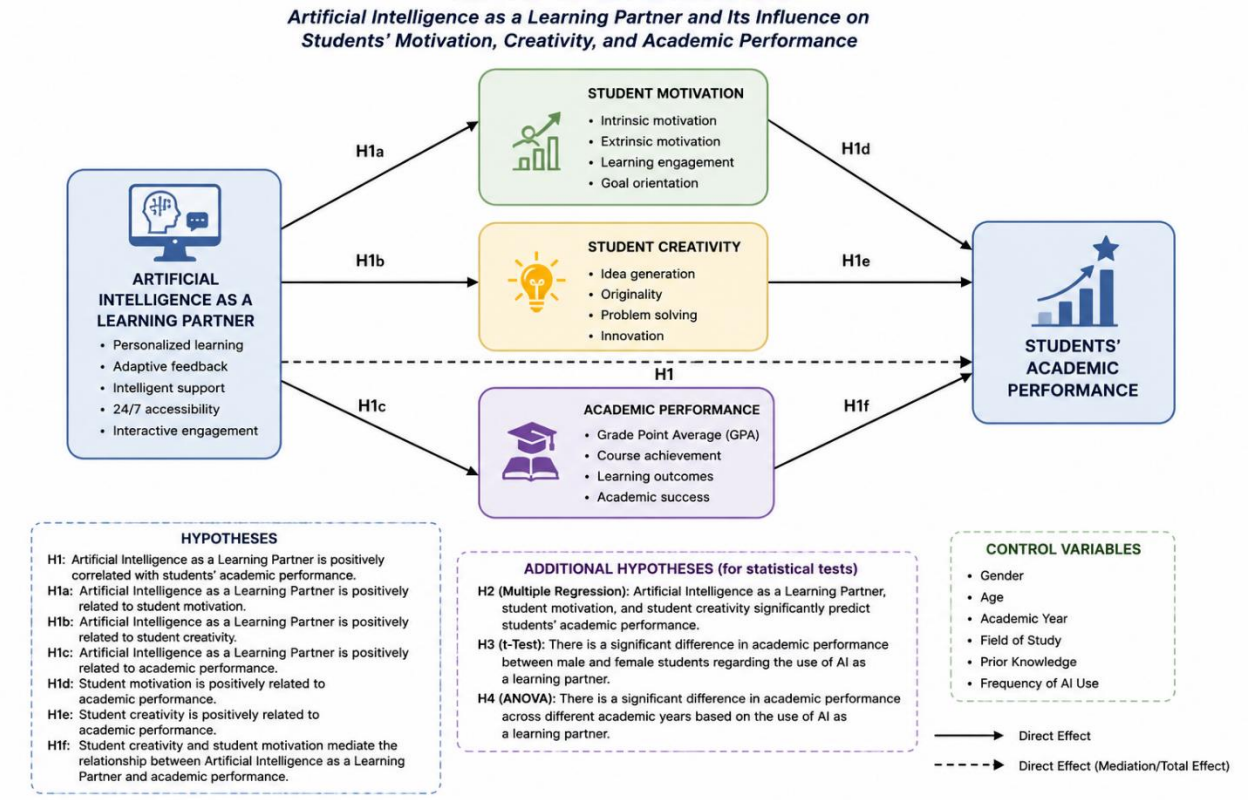

Figure: 1 Conceptual Framework

Methodology

Research Design

The primary purpose of this research was to identify the nature of the relationship if any between artificial intelligence as a learning partner, student motivation, student creativity and students' academic performance. To achieve this purpose, the researcher opted for a cross-sectional survey research design. A quantitative approach was ideal because it allows the researcher to describe a phenomenon with the aid of numerical data. Students' responses were captured using a structured questionnaire. Utilizing a cross-sectional design means the researcher can quickly and easily analyze student perceptions of artificial intelligence in the classroom by collecting data at one given time.

Population

The participants of this study were both undergraduate and postgraduate students in all public and private universities of the Punjab and Sindh provinces of Pakistan. This study included the major learning institutions of all those cities that are in the radius of Lahore, Multan, Faisalabad, Rawalpindi, Gujranwala, Bahawalpur, and all those cities that are in the radius of Islamabad, Karachi, Hyderabad, Sukkur and Jamshoro. The students were surveyed at the University of the Punjab, Bahauddin Zakariya University, Government College University Faisalabad, The Islamia University of Bahawalpur, University of Engineering and Technology Lahore, University of Karachi, Shah Abdul Latif University Khairpur, Mehran University of Engineering and Technology Jamshoro and the University of Sindh. These institutions cover a range of AI supported learning technologies and a range of disciplines.

Target Audience

Undergraduate and postgraduate students utilizing AI apps for learning, research, writing, problem-solving, and learning were the primary focal point of the study. AI learning apps have attracted students of Management Sciences, Computer Science, Engineering, Social Sciences, Education, Business Administration, and IT. These students have provided valuable

insight concerning AI learning. Participants were restricted to students who have previously used AI educational tools at least once.

Sampling Technique

The study employed purposive sampling to recruit students based on their learning experience with the AI systems. This was an appropriate method of sampling for this study since participants were required to have learning experience with AI systems. Participants were chosen based on their interest to participate and their experience with AI systems learning tools such as ChatGPT, Gemini, Microsoft Copilot, and other AI learning tools.

Sample Size

The study covered 368 respondents. This sample size was adequate to carry out Pearson correlation, multiple linear regression, independent samples t-test, and one-way ANOVA with the study variables of interest while maintaining adequate statistical power.

Data Collection Procedure

Data were gathered using a structured questionnaire with five sections: demographic information, Artificial Intelligence as Learning Partner, Student Motivation, Student Creativity, and Student Academic Performance. This questionnaire was designed using items from Chiu et al., (2023) and Kasneci et al. (2023) and used to describe students' views of personalized learning, adaptive feedback, learning resource accessibility, and intelligent learning support. Items used to describe Student Motivation were derived from the Motivated Strategies for Learning Questionnaire (MSLQ) developed by Pintrich et al. (1993) and were based on the students' intrinsic motivation, learning engagement, and goal setting. The Student Creativity scale was described using the Zhou and George (2001) scale, which describes the generation of ideas, originality, innovation, and creative problem-solving. The Academic Performance scale was based on the Richardson, Abraham, and Bond (2012) scale, which describes students' Academic Performance, learning outcomes, and Educational Performance.

The questionnaire was administered using Google Forms. The survey link was emailed to students in Punjab and Sindh using WhatsApp, Facebook, and other academic communication platforms. The survey was voluntary, and students were informed of the study's purpose. The data collected in Google Forms were transferred to Microsoft Excel for cleaning, coding, and screening, then imported to IBM SPSS for analysis.

Ethical Considerations

Ethics guidelines were incorporated during each stage of research. Participation was not mandatory, and respondents were made aware of the study's purpose prior to their response. Consent was obtained in the digital format. Participants were given the assurance that their names would be anonymous, and that their information would be treated sensitive and confidential. It would only be used for other research in an academic setting. Participants were also informed of their right to withdraw from the survey without any consequence. No information that would identify respondents was collected, and the data that was collected was done in a way that treated the participants' privacy.

Data Analysis

Once the data collection process was complete, responses were downloaded from Google Forms and were uploaded to Microsoft Excel to do an initial screening and cleaning. This dataset was then uploaded to IBM SPSS to do the statistical analysis. To describe the demographic of the respondents, descriptive statistics were employed. The analysis of the relationship of each of the research variables of the study employed a Pearson correlation analysis. A multiple regression analysis for the research variables of artificial intelligence of a learning partner, student motivation and creativity was used to predict academic performance. Lastly, the analysis of the influence of student gender on academic performance utilized an independent samples t-test, and the analysis of the academic performance of students from different academic years utilized a one-way analysis of variance (ANOVA). The interpretations of the results were done at the 0.05 significance.

Table 1: Demographic Characteristics of the Respondents (N = 368)

Demographic Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	196	53.3
	Female	172	46.7
	Total	**368**	**100.0**

Demographic Variable	Category	Frequency (n)	Percentage (%)
Age	18–22 Years	132	35.9
	23–27 Years	158	42.9
	28–32 Years	56	15.2
	Above 32 Years	22	6.0
	Total	**368**	**100.0**
Academic Level	Undergraduate	224	60.9
	Postgraduate	144	39.1
	Total	**368**	**100.0**
Academic Year	First Year	82	22.3
	Second Year	94	25.5
	Third Year	103	28.0
	Fourth Year or Above	89	24.2
	Total	**368**	**100.0**
Province	Punjab	221	60.1
	Sindh	147	39.9
	Total	**368**	**100.0**
Type of University	Public University	243	66.0
	Private University	125	34.0
	Total	**368**	**100.0**
Field of Study	Computer Science & IT	82	22.3
	Business & Management	94	25.5
	Engineering	61	16.6
	Social Sciences	70	19.0
	Education	61	16.6
	Total	**368**	**100.0**
Frequency of AI Usage	Daily	168	45.7
	Several Times a Week	112	30.4
	Once a Week	58	15.8
	Rarely	30	8.1
	Total	**368**	**100.0**

The demographic analysis shows that the comprehensive survey captured a broad, balanced sample of 368 university students studying in the public and private sectors in Punjab and Sindh provinces of Pakistan. There was a fairly even gender distribution, but there were slightly more males than females. Most survey participants were in the age range of 23 to 27, which corresponds to the age of most of the students at the postgraduate and undergraduate levels. The survey sample was mostly from the undergraduate level, but there was a good representation from different levels and different disciplines, which provided a good range of different educational backgrounds. There was an overwhelming representation of students from public sector universities, and the majority were from Punjab, followed by Sindh. Most of the participants indicated that they used AI tools for their studies on a daily basis or several times a week, which means that the participants had a good level of exposure to AI tools for their studies. Overall, the demographic information provided good justification for studying the impact of AI as a learning partner on student motivation, creativity, and academic performance.

Table 2: Pearson Correlation Analysis Among the Study Variables (N = 368)

Variables	1	2	3	4
1. Artificial Intelligence as a Learning Partner	1			
2. Student Motivation	.689**	1		
3. Student Creativity	.653**	.712**	1	
4. Academic Performance	.741**	.694**	.667**	1

All variables exhibited the same positive relationships in the Pearson correlation analysis. AI learning partners showed a positive and robust correlation to academic performance ($r = .741$, $p < .01$), suggesting that the use of learning partners with AI among university students leads to a higher level of academic performance. AI learning partners were also positively correlated to student motivation ($r = .689$, $p < .01$) and student creativity ($r = .653$, $p < .01$). This suggests that students who view AI as a learning partner showed higher motivation and greater creativity in their academic activities. Additionally, student motivation was positively correlated to student creativity ($r = .712$, $p < .01$) and academic performance ($r = .694$, $p < .01$). Student creativity was positively correlated to academic Performance ($r = .667$, $p < .01$). As such, all variables positively and significantly correlated, which demonstrates that the use of AI in learning among university students correlates positively to the level of motivation and creativity, as well as the level of academic performance.

Table 3: Multiple Linear Regression Analysis Predicting Academic Performance (N = 368)

Predictor Variables	B	Std. Error	Beta (β)	t	Sig.
(Constant)	0.524	0.186	–	2.817	.005
Artificial Intelligence as a Learning Partner	0.431	0.052	0.412	8.289	.000
Student Motivation	0.284	0.049	0.296	5.796	.000
Student Creativity	0.197	0.047	0.214	4.191	.000

Model Summary

R	R^2	Adjusted R^2	Std. Error of the Estimate	F	Sig.
.812	.659	.656	0.432	234.761	.000

The overall regression model was found to be statistically significant ($F = 234.761$, $p < .001$), and predictor variables explained a significant amount of variation in the performance of respondents. A high correlation was captured within the model ($R = .812$) and the model accounted for nearly two-thirds of the variance in respondents' academic performance ($R^2 = .659$); the model's adjusted R^2 was .656. From all predictors, the strongest positive influence was noted for the use of Artificial Intelligence as a Learning Partner ($\beta = .412$, $t = 8.289$, $p < .001$), followed by Student Motivation ($\beta = .296$, $t = 5.796$, $p < .001$) and Student Creativity ($\beta = .214$, $t = 4.191$, $p < .001$). This indicates that the combined use of Artificial Intelligence as a learning partner and considerations for the levels of student motivation and creativity resulted in an improvement of performance for university students. The findings also implied that Artificial Intelligence as a Learning Partner, in addition to providing direct educational solutions, plays a critical role in the improvement of educational outcomes through the facilitation of the critical psychological factors of motivation and creativity.

Table 4: Independent Samples t-Test for Academic Performance by Gender (N = 368)

Gender	N	Mean	Std. Deviation	t	df	Sig. (2-tailed)
Male	196	4.08	0.56	2.483	366	.014
Female	172	3.93	0.60			

An independent samples t-test was used to see if there was a difference in the academic performance of males and females when using AI as a learning partner. Males ($M = 4.08$, $SD = 0.56$) seem to score higher (perform better) than females ($M = 3.93$, $SD = 0.60$). Results show that there is a significant difference ($t(366) = 2.483$, $p = .014$). This shows that the performance of students is significantly different when AI is used as a learning partner based on the gender of the student. This means that both males and females of the sample area of the study (students) performed highly, but AI as a learning partner seemed to benefit males more. The data used shows that gender can be used to classify the performance of students in an AI-based learning environment.

Table 5: One-Way ANOVA for Academic Performance Across Academic Years (N = 368)

Source of Variation	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	8.472	3	2.824	8.137	.000
Within Groups	126.324	364	0.347		
Total	**134.796**	**367**			

Group Statistics

Academic Year	N	Mean	Std. Deviation
First Year	82	3.79	0.61
Second Year	94	3.96	0.57
Third Year	103	4.15	0.52
Fourth Year or Above	89	4.22	0.49
Total	**368**	**4.04**	**0.56**

One-way ANOVA was utilized to investigate the role of academic year in shaping the levels of academic performance in the AI learning partner context. The analysis showed a statistically significant difference among the four academic year groups ($F(3, 364) = 8.137$, $p < .001$). The results indicated that fourth-year students and above ($M = 4.22$, $SD = 0.49$) outperformed the third-year ($M = 4.15$, $SD = 0.52$), the second-year ($M = 3.96$, $SD = 0.57$), and the first-year ($M = 3.79$, $SD = 0.61$) students, respectively. It can, therefore, be considered that students' academic year is a significant predictor of the variations in the students' academic performance in AI learning partner context. As such, it can be speculated that the observed differences in the levels of academic performance among the first-year, second-year, third-year, and fourth–year (and above) students are as a result of students' level of academic exposure, students' familiarity with the AI learning partner, and students' levels of advanced independent learning skills.

Discussion

The current research focused on the role of artificial intelligence (AI) as a learning partner and the effect on motivation, creativity, and academic performance of university students in Punjab and Sindh, Pakistan. The results revealed that the AI assisted learning systems improve teaching and learning systems by means of academic performance, creativity, and engagement. With the addition of AI systems in the field of higher education, AI systems are not regarded as pure systems of technology, but as learning partners who provide opportunities for creating personalized learning, engaged learning, and learning systems that provide adaptive learning as well as support throughout the learning process. The findings of the research provide evidence that the students perceive a great deal of benefits from the educational system, and AI systems are becoming more critical and important in the teaching and learning systems, and support the teaching and learning systems. The results of this research are in agreement with the current trends in higher education systems and the teaching and learning systems that integrate technology to support the learning process. AI systems that can integrate with other systems and provide support in learning, teaching, and the development of academic skills at a higher level are becoming more important.

The correlation analysis examined relationships among AI as a partner in learning, motivation, creativity, and academic performance. It found a positive correlation among these factors. Notably, those who viewed AI as a learning partner reported more motivation, creativity, and better academic performance. The strong correlation between AI and academic performance suggests that learning technologies create engaging and meaningful learning opportunities. This is likely due to educational technologies that offer tailored learning pathways, instructional guidance, and instant feedback. The results support the systematic review of Zawacki-Richter et al. (2019), which claimed that AI systems in education help to improve learners' outcomes and engagement in learning. In the same vein, Holmes et al. (2022) claimed that AI-enabled educational systems improve academic performance while meeting the diverse educational requirements of learners through individualized instruction and active engagement. The results of this study show further support for the claim that AI as a partner in learning engages the cognitive as well as the emotional aspects of the learning process.

Regression analyses indicated that when used as a learning partner, AI, student motivation, and student creativity predicted student academic performance, the most critical among the three being AI. It can be interpreted that AI, in its ability to enhance learning, directly improves educational outcomes and develops student motivation and creativity within the context of learning. Due to the various AI techniques that deliver personalized suggestions, intelligent tutoring, adaptive learning with

real-time assessments, and ongoing learning feedback, students can comprehend complex ideas and be kept interested throughout the educational engagement. This is consistent with the argument made by Luckin and Cukurova (2019), saying that learning is made more effective by intelligent educational systems due to their ability to personalize teaching to the individual level of the learning trainee. Likewise, Dwivedi et al. (2023) indicated that generative AI systems promote more effective learning that is based on self learning and collaboration, and that they improve educational outcomes. The findings provided go toward the evidence that AI-maintained learning systems make possible effective cognitive learning and superior educational achievement.

This study recognized the relationship between student motivation and academic performance and the role of psychological mechanisms of AI in determining academic performance. AI-based education systems provide feedback, instructions, and support continuously. This offers reinforcement to students. This increases the students' self-efficacy and willingness to learn. Such people are willing to put in the hard work and are resilient in the face of obstacles in the academic pursuits. This study reinforces the theory of self-determination by Ryan and Deci (2020), that once a student has the freedom to exercise self-control and feels competent, their intrinsic motivation to learn coupled with their academic performance is likely to rise. Ryan and Deci assert that students' control and competence levels in learning determine their intrinsic motivation to learn and, consequently, their academic performance. AI helps students control the learning process by allowing them to learn at their most optimal pace and guides and helps them in learning to a great extent. In addition, Panadero (2017) proposed that the extent to which learning is self-regulated determines the quality of learning. Regulated learning is enhanced by AI learning. The motivational effects of AI learning innovations described in this study support the conclusion that AI learning innovations improve academic performance through motivational innovations.

This study also highlights how student creativity positively correlates with their academic performance. AI-infused educational technology enables learners to advance their creativity and explore multiple viewpoints. AI technology even allows students to engage in creative problem-solving and devise advanced academic solutions. Although AI technologies supplement academic intelligence, students are encouraged to review and target AI-infused data. This study also corroborates the findings of Kasneci et al., (2023). Amabile and Pratt, (2016) also noted that creativity is developed when students and individuals are afforded the opportunity to experiment and explore. AI-infused learning environments offer the opportunity to develop creativity, reach new findings in science, and derive solutions to strict disciplinary concepts. The findings in the present study suggest that creativity served as an educational opportunity to improve student achievement when AI was incorporated into learning environments.

The independent samples t-test found significant differences in academic performances between male and female students using AI as a learning partner. While both reported high academic performance, males scored higher than females. This finding might indicate differences in some areas such as technology preference, confidence and exposure, and even learning preferences. The research relating to gender differences regarding technology in education has shown mixed results. Some researchers have posited that male students show higher confidence in using technology, while others say confidence relates to the level of digital literacy and the availability of technology. As such, findings regarding gender differences should be viewed critically and assessed for the context of the university that participants come from, as opposed to being considered a general tendency regarding AI use.

Conclusion

This research focused on AI and its role as a learning partner and its effect on the motivation, creativity, and academic performance of university students in Punjab and Sindh, Pakistan. Learning AI has become an essential tool for learners, enabling them to learn on their own with the help of personalized lessons, adaptive learning, and the provision of learning assistance. The analysis conducted in the study showed that the desire to learn AI, combined with the motivation, creativity, and academic performance of students, was expressed at a higher level among students who actively used learning AI technologies. AI, student motivation, and creativity also served as important indicators of academic performance. This speaks to the importance of both the technological and psychological aspects of the learning process. The research also revealed that there are differences in the performance of students based on gender and the year of study, which suggests that the students' learning experiences with AI will differ on the basis of learning maturity and demographic characteristics.

The study indicates that AI acts as a learning partner that engages students and helps them think creatively, while also enhancing their learning and performance. This helps educators because AI acts as a smart teaching assistant that helps students learn and understand academic-related work. This study helps add to the literature of AI in education by giving research that includes AI, creativity, learning, and academic performance in education in a single umbrella concept. This study also shows that AI can be used in a careful manner in higher education to enhance learning and academic performance

on a broader level. This also helps create an educational space where students learn and prepare for the future in a learning space that is innovative, digital, and different from the learning spaces of the present.

Recommendations

1. Universities should integrate artificial intelligence tools into teaching and learning practices to enhance students' academic performance.
2. Educators should encourage the responsible and ethical use of AI as a learning partner while promoting critical thinking and independent learning.
3. Higher education institutions should organize AI literacy and digital skills training programs for both students and faculty members.
4. Universities should adopt AI-powered personalized learning platforms that provide adaptive feedback and individualized learning support.
5. Educational policymakers should develop institutional guidelines and policies to ensure the ethical, secure, and effective implementation of AI in higher education.
6. Faculty members should design learning activities that utilize AI to foster student motivation, creativity, and collaborative problem-solving.
7. Future researchers should examine the role of additional variables, such as self-regulated learning, digital literacy, academic self-efficacy, and technology acceptance, to gain a more comprehensive understanding of AI-supported learning in different educational contexts.

Future Implications

Future educational research and practice stand to greatly benefit from the results of this study. The use of artificial intelligence (AI) within higher education is likely to develop beyond the personal learning and academic assistance we currently recognize. This includes intelligent assessment, virtual adaptive learning, virtual tutors, and adaptive collaborative learning. Future research should focus on the potential impact of AI-assisted learning on students' critical thinking and problem-solving, along with students' digital literacy and learning skills in the lifelong learning framework. This type of research could also focus on the role of academic confidence and self-regulated learning, along with the digital and learning engagement competencies, to better understand education that is augmented with artificial intelligence. More research is needed on the role of AI in various learning contexts through different academic disciplines and learning cultures. This future research will help develop educational theories grounded in the ethical and responsible use of artificial intelligence in teaching and learning, with the overall goal to positively impact the student learning experience and academic outcomes.

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