Effects of Artificial Intelligence on Students' Academic Performance at Higher Level

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ABSTRACT: Integration and alignment of Artificial Intelligence AI in academic activities is the teaching learning excellence and strength of student's achievement. Integration of Artificial Intelligence AI is also the capacity to rebuilt the student's performance in order to maintain teaching effectiveness and capability to show excellency in academic. In education, alignment of Artificial Intelligence AI tools is very necessary for both student's perspectives and teacher's perspective also, because it enhances academic excellence in teaching learning environment. The objectives of the study were to; identify the tools of Artificial Intelligence AI that students are using in academic excellence, effects of Artificial Intelligence AI tools on students' academic achievement, compare the performance before and after using Artificial Intelligence AI tools. The target population was all the public and private universities that were located in the City Lahore. The accessible population was the one public and one private university were the University of Lahore and the University of Management and Technology. Through stratified sampling techniques, 200 students were selected from both universities. The self-developed questionnaire was used for the study. After the pilot-testing of the research tools, the data were analyzed through statistical tests. After the data collection the results were interpreted that after using the AI tools the students' performance as compatibly better. It results was also reveals that the using of AI tools it was comprehensively better then without using this. The students improved their academic through AI tools, and their performance was much better. Both university students have used the AI tools in their studies.

KEYWORDS: Artificial Intelligence, Students Performance, Higher Level, The University of Lahore, University of Management and Technology

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Introduction

Nowadays, in the field of education and in the advancement of knowledge, the integration of Artificial Intelligence is a tool to enhance the teaching-learning process and provide effective teaching. Artificial Intelligence is transforming various subdivisions and subparts in education. Artificial Intelligence plays an important role in both

students' and teachers' well-being and in educational performance. Artificial Intelligence tools like ChatGPT, Quillbot, and paraphrase tools, and different meta sites for data gathering are mostly used in the academic field (Edtech, 2020).

In the teaching-learning process, teachers also gain learning experiences to get knowledge and data from different sites. Artificial Intelligence integration in education and its uses in students' learning stage (Chen et al., 2020). Artificial Intelligence has the potential to transform the education system through different tools (Holmes et al., 2019), and Artificial Intelligence also addresses the different needs of students in the academic learning stage. However, positive educational outcomes are also integrated with Artificial Intelligence and the adoption of advanced Artificial Intelligence tools (Castaneda & Selwyn, 2018; Du Boulay, 2000; Selwyn, 2016).

The integration of Artificial Intelligence in academic activities provides opportunities for students, such as fairness, openness, and different teaching methods. The effect of Artificial Intelligence on education is multidimensional. Artificial Intelligence provides positive learning that meets the needs of students at the higher education level. (Hennekeuser et al., 2025). The majority of studies indicate that students are using Artificial Intelligence tools n learning environments, and they develop more positive attitudes and performance toward their education (Roll et al., 2021).

These studies indicate that the experiences of Artificial Intelligence and its integration increase students' performance. Artificial Intelligence tools analyze vast amounts of data to identify learning gaps and provide a platform for students (Baker, 2021). Artificial Intelligence tools like platforms, such as positive learning systems, have been shown to enhance student learning opportunities and performance by providing feedback and customized learning approaches at different learning stages (Luckin et al., 2016; Zawacki-Richter et al., 2019).

As in previous studies, the integration of Artificial Intelligence, compared to traditional education, fortifies students in their learning process by developing learning skills and problem-solving. Students' critical thinking skills affect learning experiences in academia. However, the rapid change nowadays makes learning more difficult for the upcoming generation. For the insightful responses of Artificial Intelligence, it faced multiple challenges as well. Artificial Intelligence introduces different learning methods, question-and-answer techniques, and raises questions about the differences of opinion about learning and machine-based learning.

For example, Artificial Intelligence tools like ChatGPT, Claude, Gemini, and Perplexity can be used in the teaching and learning process and to analyze data (Luckin et al., 2016). These tools are used in studies, making assignments, quizzes, and preparing exams, and even in labs and projects. Artificial Intelligence integration ensures that students interact and can develop critical thinking skills through these tools (Wu, 2023).

Significance of the Study

This research study may be helpful for teachers to identify the tools of Artificial Intelligence; it also explores and helps the practices that students use for academic purposes. The study also helps teachers know about the practices and tools of Artificial Intelligence. The study also helps other students to know about the practices and tools of Artificial Intelligence and its use in the teaching-learning process.

The study also helps future research to further explore the tools and how these tools are used in academia and how to achieve good performance of students through Artificial Intelligence. This research holds a position as it enhances the performance of the students through Artificial Intelligence tools and their integration in academia.

Statement of Problem

At the higher level of learning, there are many research problems addressing Artificial Intelligence and its integration in learning. The problems address how Artificial Intelligence tools are used and how their practices are working at higher education-level institutes. The study examines the performance of students before and after using Artificial Intelligence tools. The study examines and identifies the practices and tools that are integrated with the education and teaching-learning process.

Objectives of the Study

Objectives of the following study were to;

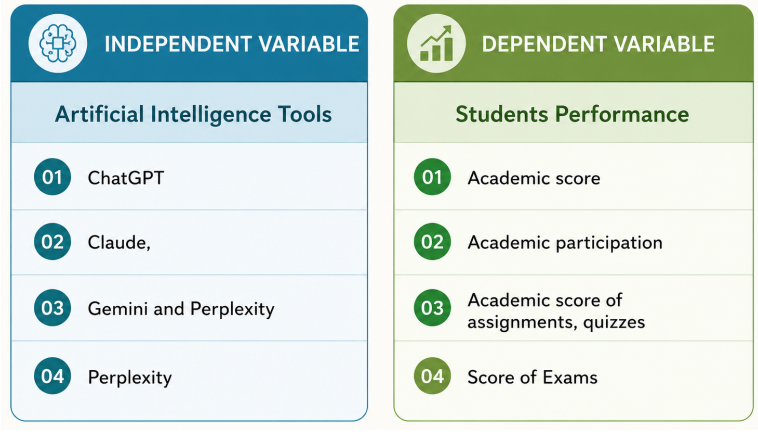
1. Examine the effects of Artificial Intelligence on students' academic performance at higher levels
2. Identify the Artificial Intelligence tools that students are using in studies
3. Identify the Artificial Intelligence practices used for academic purposes

Delimitation of the Study

- Higher education institutes of Lahore
- Students of higher education level
- Only two universities of Lahore

Figure 1

Conceptual Framework of the Study



Theoretical Framework of the Study

The theory of Venkatesh et al. (2012) explains that students adopt technological tools and use them in higher education for academic purposes. This theory, integrated with this research topic, suggests that students are used to Artificial Intelligence tools, and these technological tools improve learning and academic performance. This theory indicates the factors that are related to the research topic, performance score and competency, tools and practices of Artificial Intelligence, and its implications for academic purposes.

Review of Related Literature

The previous studies indicated that the use of Artificial Intelligence in education is not a challenge. The effective use of Artificial Intelligence and its integration in education requires a more valuable insight for the students as well as the teachers for the teaching-learning process (Alvi et al., 2021). Through Artificial Intelligence tools, students can reduce their academic pressure, save time, learn more, and develop critical thinking (Habib et al., 2024). Higher

education institutions place more emphasis on new challenges and their implications in the academic area. Artificial Intelligence enhances students' learning from an educational perspective, and it also addresses students' critical thinking and effectively addresses these challenges in learning (Holmes & Tuomi, 2022).

At a higher level of learning, Artificial Intelligence promotes students' abilities, and it also advances effective teaching and the process of learning and calculating data and its repercussions in different ways through different software and tools. Artificial Intelligence is much easier to use and implement in the education and learning field. Artificial intelligence tools are also helpful to teachers; they may use them for lesson planning and classroom management (Chen et al., 2020)

Artificial Intelligence integration in education raises critical queries about its preparation with well-known knowledge models. Artificial Intelligence has diverse determinations and their connotation with instructional designs (Selwyn, 2022).

This present study examines the effects of artificial intelligence tools and technologies on students' performance and learning processes and the academic scores of students at higher education-level institutes.

Research Methods and Procedure

The present study was quantitative in design, and it was an exploratory and descriptive type of research.

Population

The target population was all public and private sector universities located in the city of Lahore. The accessible population was the One Private (The University of Lahore) and the one Public (Punjab University) was the accessible population.

Sampling Techniques and Procedure

A simple random sampling technique was used to select the sample; 100 students from both universities were selected. A total of 200 students were selected from both universities.

Table 1

Sampling

Sr.No.	The University of Lahore	Punjab University
	100	100
Toral	200	

Table 2

Sampling and Sample Size

Sr.No.	The University of Lahore	Punjab University
1	Department of Education = 25	Department of Education = 25
2	Department of Mathematics = 25	Department of Mathematics = 25
3	Department of IT & CS = 25	Department of IT & CS = 25
4	Department of English = 25	Department of English = 25
Total	200	

Research Instruments

The researcher used a self-developed questionnaire and administered it to 8th-semester undergraduate students in both universities. The research tool was validated by 5 expert opinions and through pilot testing, and then the statistical analysis of Cronbach's Alpha was applied, and its value was 0.98, which shows that the tool was reliable.

Data Analysis and Interpretations

Descriptive analysis of Scale Artificial Intelligence

Table 3

University Type (one Public and one Private)

University (Type)	F	% Public	% Private
Public	50	50	50
Private	50		

The above table shows that the results were 50% public and 50% private students.

Table 4

University Type (one Public and one Private)

University (Type)	F	% Public	% Private
The University of Lahore	50	50	50
Punjab University	50		

The above table shows that the results were 50% respondents were from the University of Lahore and 50% respondents were from the Punjab University.

Figure 2

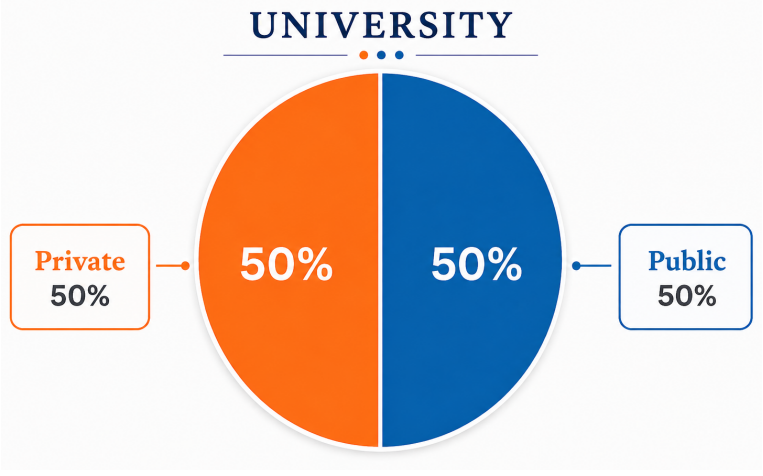


Table 5

Frequency Distribution regarding Gender

Gender	F	%	University (Type)	
			% Public	% Private
Male	45	45	45	55
Female	55	55	55	45
Total	100	100		

Table 5 shows the frequency distribution of gender wise comparison of university teachers of City Lahore. The male students of private universities were 55%, and female students were 45. The percentage of male students was 45%, and the percentage of female students was 55% in Public sector universities. The total number of university students of public and private sector universities was 200.

Figure 3

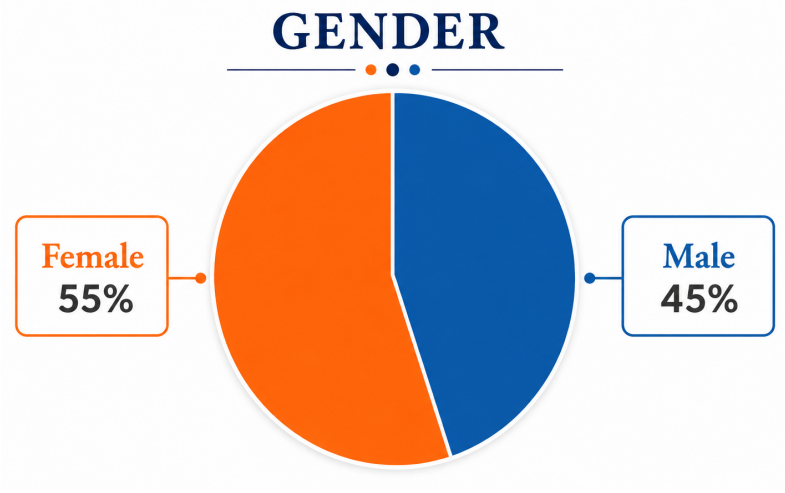


Table 6

Frequency Distribution regarding Distribution of Department

Gender	F	%	University (Type)	
			% Public	% Private
Department of Education	50	25	50	50
Department of Mathematics	50	25	55	45
Department of IT &CS	50	25		
Department of English	50	25		
Total	200	100		

Table 6 shows that the number of participant of education department was 25 in each public and private both participants of mathematics was 25 in each university, participants of IT and CS was 25 in each university and participants of English was 25 in each university.

Figure 4

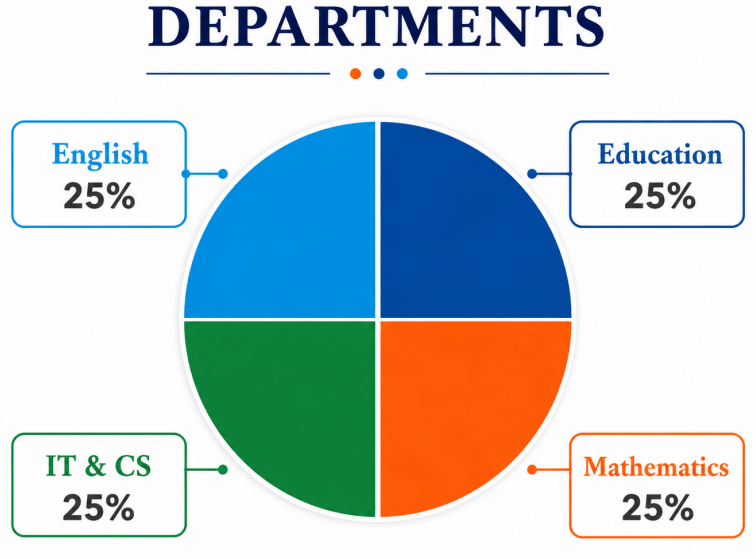


Table 7

Percentage of the Respondents of Use of Artificial Intelligence in Academic

Dimensions	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
Use of Artificial Intelligence in Academic	76.0	23.4	.01	1.7	0.1
Learning Effectiveness through Artificial Intelligence	78.4	21.1	1.1	2.1	1.6
Academic engagement through Artificial Intelligence	64.2	33.1	3.2	3.2	1.2
Student learning achievement	74.1	23.2	2.7	1.2	0.1
Critical thinking through Artificial Intelligence	51.1	48.2	1.3	3.1	1.2
Problem solving through Artificial Intelligence	62.2	38.2	1.4	1.1	0.3

Table 7 shows the percentage of the respondents of the Artificial Intelligence scale. Overall, the percentage of respondents who remained undecided ranged from 16.1% (Academic engagement through Artificial Intelligence); those who disagreed ranged from 0% to 3.1% (Critical thinking through Artificial Intelligence); and those who agreed and strongly agreed ranged from 62% to 97.2%.

Table 8

University-wise Comparison of Use of Artificial Intelligence among University Students'

Study Variable	University	N	Mean	SD	T	T
Artificial Intelligence	University of the Punjab	100	5.56	.69	.89	.89
	The University of Lahore	100	54.52	.43		

Level of significance= 0.05

The above table shows that there is a significant difference between the opinions of Punjab University students and the opinions of University of Lahore students. The result shows that the mean score of University of Lahore students was higher as compared to the mean score of Punjab University students. The results show that the University of Lahore students' use of Artificial Intelligence in academics is higher as compared to students of Punjab University.

Table 9

Comparison of Use of Artificial Intelligence among University Students regarding Department, Public and Private Sector Universities

Departments/Disciplines	N	Mean	SD	T	p-Value
Department of Education	50	48.30	25.00	.70	.001
Department of Mathematics	50	74.70	26.50	.50	.002
IT & CS	50	77.70	19.90	.80	.041
Department of English	50	68.50	15.80	.40	.032
Total	200				

Table 9 shows the department-wise comparison of university students. The total number of public and private university students was 200 from both public and private sectors. The mean value shows that the departments of Mathematics, IT, and CS are more likely to use Artificial Intelligence tools in their learning. There is also a significant difference in the opinions of students from different departments. The comparison of departments shows that the IT & CS students of both universities are more likely to use Artificial Intelligence tools in their learning. The

mathematics students are also more likely to use Artificial Intelligence tools in their study; moreover, the students of the education department are also more likely to use Artificial Intelligence tools in their studies. Overall, the result shows that the students used Artificial Intelligence tools frequently for academic purposes.

Table 10

Relationship between Artificial Intelligence and students' performance (Pearson Correlation)

Variables	N	R	P
Artificial Intelligence	200	.932**	.000
Students' Performance			

Note. (p<0.05) level (2-tailed)

Table 10 shows the correlation between Artificial Intelligence and students' performance. The result shows that there is a very positive and strong correlation between Artificial Intelligence and students' performance. There is a significant (p.000) relationship; the value is significant, and the relationship is positive between Artificial Intelligence and students' performance.

Findings of the Study

1. The above table shows that the results were 50% public and 50% private students.
2. The 50% respondents were from the University of Lahore, and 50% were from the Punjab University.
3. The frequency distribution of gender wise comparison of university teachers in Lahore City. The male students of private universities were 55%, and female students were 45. The percentage of male students was 45%, and the percentage of female students was 55% in Public sector universities. The total number of university students in public and private sector universities was 200.
4. The number of participants in the education department was 25 in each public and private sector university; the number of participants in mathematics was 25 in each university; the number of participants in IT and CS was 25 in each university; and the number of participants in English was 25 in each university.
5. The percentage of the respondents of the Scale of Artificial Intelligence. Overall, the percentage of respondents who remained undecided ranged from 16.1% (Academic engagement through Artificial Intelligence); those who disagreed ranged from 0% to 3.1% (Critical thinking through Artificial Intelligence); and those who agreed and strongly agreed ranged from 62% to 97.2%.
6. There is a significant difference between the opinions of Punjab University students and the opinions of University of Lahore students. The result shows that the mean score of University of Lahore students was higher as compared to the mean score of Punjab University students. The results show that the University of Lahore students' use of Artificial Intelligence in academics is higher as compared to students of Punjab University.
7. The department-wise comparison of university students. The total number of public and private university students was 200 from both public and private universities. The mean value shows that the departments of Mathematics, IT & CS use Artificial Intelligence tools more in their learning. There is also a significant difference in the opinions of students from different departments. The comparison of departments shows that the IT & CS students of both universities are more used to Artificial Intelligence tools in their learning. The mathematics students are also more likely to use Artificial Intelligence tools in their study; moreover, the students of the education department are also more likely to use Artificial Intelligence tools in their studies. Overall, the result shows that the students used Artificial Intelligence tools frequently for academic purposes.

8. The correlation between Artificial Intelligence and students' performance. The result shows that there is a very positive and strong correlation between Artificial Intelligence and students' performance. There is a significant (p.000) relationship; the value is significant, and the relationship is positive between Artificial Intelligence and students' performance.

Conclusion of the Study

1. The results show that 50% were public and 50% were private students.
2. It was concluded that, gender-wise, the comparison of university teachers in City Lahore showed that private university male students were 55% and female students were 45. The total number of university students in the public and private sectors was 200.
3. It was concluded that the education department participants were 25 in each public and private university; participants of mathematics were 25 in each university; participants of IT and CS were 25 in each university; and participants of English were 25 in each university.
4. It was concluded that the overall percentage of the respondents who remained undecided ranged from 16.1% (Academic engagement through Artificial Intelligence); those who disagreed ranged from 0% to 3.1% (Critical thinking through Artificial Intelligence); and those who agreed and strongly agreed ranged from 62% to 97.2%.
5. It was concluded that a significant difference between the opinions of Punjab University students and the opinions of University of Lahore students was found statistically. The result shows that the mean score of University of Lahore students was higher as compared to the mean score of Punjab University students. The results show that the University of Lahore students' use of Artificial Intelligence in academics is higher as compared to students of Punjab University.
6. It was concluded that the department-wise comparison of university students. The total number of public and private university students was 200 from both public and private universities. The mean value shows that the departments of Mathematics, IT, and CS are more likely to use Artificial Intelligence tools in their learning. There is also a significant difference in the opinions of students from different departments. The comparison of departments shows that the IT & CS students of both universities are more likely to use Artificial Intelligence tools in their learning. The mathematics students are also more likely to use Artificial Intelligence tools in their study; moreover, the students of the education department are also more likely to use Artificial Intelligence tools in their studies. Overall, the result shows that the students used Artificial Intelligence tools frequently for academic purposes.
7. It was concluded that there is a correlation between Artificial Intelligence and students' performance. The result shows that there is a very positive and strong correlation between Artificial Intelligence and students' performance. There is a significant (p.000) relationship; the value is significant, and the relationship is positive between Artificial Intelligence and students' performance.
8. It was also concluded that the students' performance was better after using the Artificial Intelligence tool in studies. The performance score was high as compared to when using the Artificial Intelligence tools.

Discussion of the Study

The present study aligned with the previous studies discussed, which showed that Artificial Intelligence tools are helpful for students in their studies. The present study used Artificial Intelligence tools in studies and their effects on performance. The performance score was very satisfactory after using the Artificial Intelligence tool for academic purposes. The present study findings showed a strong and positive relationship between Artificial Intelligence tools

and students' performance; this study aligns with the previous study, by Dong (2025) research with shows the same results as the present study indicates.

Recommendations Thoughts

1. The present study was a quantitative analysis; future research may be conducted through qualitative or mixed-method research.
2. Future research may be conducted at the postgraduate level; researchers may use artificial intelligence tools for research purposes.
3. The relationship indicates strong, so regression analysis may also find for the future study.
4. For further research, artificial intelligence tools can be added to studies; this study was on a few tools.

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