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To study the impact of AI-based tools on organizational performance with the mediating effect of students' performance in HEIs in Lucknow from the perspective of students.

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ABSTRACT

The higher education authorities of the Government of India have realised that artificial intelligence and other cutting-edge technologies must be used in HEIs to enrich the quality of teaching, students, teachers and organisational performance. Technology plays a vital role in enhancing educational service quality and it needed an immediate paradigm change in terms of the use of artificial intelligence (AI) enabled tools in teaching-learning environments. Switching from a traditional teaching methodology to technology-based system will not be easy for all the stakeholders of Higher education Institutions (HEIs) and it is going to pose further challenges and new possibilities. The present exploratory research was based on primary data collected from a sample of 546 students of government and private HEIs in Lucknow.

The outcomes of the research revealed that the use of AI-based tools in higher educational institutions has a positive and significant impact on students as well as institutions' performance. Results revealed that AI-based tools play a major role in improving students' performance which leads to enhanced organisational performance. Therefore HEIs must encourage all the stakeholders to maximise the learning and utilisation of AI-enabled tools. The use of AI-based tools offers outstanding opportunities for customized and effective teaching, learning, and other institutions' administrative activities.

Keywords: AI-based tools, Higher Education Institutions (HEIs), Students' Performance & Organisational Performance.

1. Introduction

The Department of Higher Education, MoE, Government of India, is responsible for the overall development of policy and planning regarding the basic infrastructure, and qualitative improvement of Higher Education Institutions (HEIs). Policy-making authorities have realised that

the artificial intelligence and other cutting-edge technologies must be used in HEIs to improve the quality of teaching, students, teachers and organisational performance. Governments in both developed and developing nations pursue to improve the quality of education. This may be accomplished by utilising contemporary technologies such as AI (Cremer and Bettignies 2013). To promote higher education via the use of current technology, governments throughout the globe are increasing their spending (Buckner 2011). Switching from a traditional teaching methodology to technology-based system will not be easy for all the stakeholders of HEIs and it is going to pose further challenges and new possibilities. It has been shown via several research that **AI-assisted learning is always superior to conventional teacher-centred settings** (Scieluna et al., 2012). Technology plays a vital role in enhancing educational service quality and it needed an immediate paradigm change in terms of the use of AI-enabled tools in teaching-learning environments.
In the context of implementing AI applications in India's higher education, it may be referred to as computer systems capable of engaging in human-like actions, such as adapting, learning, synthesising, correcting, and using various data sources required for performing challenging tasks (Stefan and Sharon 2017). The possible use of AI in HEIs involves analysing the potential learning advantages for teachers and students, as well as the management's capacity to improve their performance and make correct and timely decisions. The implications of artificial intelligence on higher education have been brought to light by a number of academics (Ma, Yizhi, & Siau, Keng L., 2018; Chaudhary, S., 2017), and as a result, it has been shown that artificial intelligence will have an effect on higher education in every field. AI has created new opportunities and enticing challenges for India's higher education system (Silander and Stigmar 2019).

AI is anticipated to be of great use to students, professors, administrative personnel, and researchers in higher education; thus, AI must be utilised (Menon et al. 2014) and must be accepted by students, teachers and administrators to experience its advantages. In order to reach excellence in education, Ocaa-Fernández, et al. (2019) claimed that using artificial intelligence and contemporary technologies can help instructors and students gain more educational experience as well as inform teachers and management about the essential procedures and use of artificial intelligence in education. The focus of this research is to analyse the impact of the use of AI-based tools on organizational performance with mediating effect of students' performance in HEIs in Lucknow from the perspective of students.

2. Objectives

The primary objectives of this study are to evaluate the impact of AI-enabled technologies on the overall efficacy of higher educational institutions (HEIs) and on students' performance. This involves assessing how these technologies influence institutional effectiveness and student outcomes. Additionally, the study aims to identify the challenges and obstacles faced by stakeholders in implementing AI-based technologies within educational settings. Understanding these barriers is crucial for developing strategies to overcome them. Finally, the research seeks to explore methods for optimizing the application of AI tools to enhance both administrative and instructional processes at HEIs. By addressing these objectives, the study aims to provide actionable insights that can improve the integration and utilization of AI technologies in higher education.

3. Scope and Methodology

This study explores the influence of AI-based tools on the organizational performance of higher educational institutions (HEIs), with a particular focus on how students' performance mediates this relationship. It is situated within the context of HEIs in Lucknow, encompassing both government and private institutions. The research aims to evaluate the effectiveness of various AI technologies in enhancing institutional outcomes and to understand the role of students' performance in this dynamic. By targeting a specific geographical region and including a range of academic institutions, the study seeks to provide a nuanced understanding of the interaction between AI tool usage and educational performance. The findings are expected to offer valuable insights for policymakers, educators, and administrators looking to leverage AI technologies to improve organizational effectiveness and student success in higher education.

The present exploratory research was based on primary data collected from a sample of 546 students of government and private HEIs in Lucknow. A close-ended structured questionnaire having Likert scale-based questions was developed to collect data through scheduling, and a Google form link was created and was also sent to the students through emails and WhatsApp. Factor analysis was performed to identify the most important variables of three dimensions- the use of AI-based tools, students' performance and organisational performance. Organisational performance of higher educational institutions was measured by the variables- Competition to get admission, No. of vacant seats, Results of the students of all the classes, Percentage of passed students, Placement facilities for the students. On the other hand, students' performance was measured by the variables- Academic Performance, Grades in the previous Class, Participation in academic activities, Participation in extra-curricular activities and Team skills. Further, regression analysis was performed to analyse the impact the impact of the level of use of AI-based tools (IV) on the organisational performance (DV) with mediating effect of students' performance (MV) in Lucknow. The value of Cronbach alpha for the level of use of AI-based tools was 0.409 (11 items), for organisational performance was 0.684 (5 items) and for students' performance was 0.738 (5 items) which shows that data has high reliability except in case of the dimension level of use of AI-based tools.

In order to decide the level of dimensions of the study- level of use of AI-based tools; organisational performance and students' performance, an index was developed for all the 3 dimensions. Z scores of the data were computed and added for 3 dimensions. This total of z scores was divided by 5 to find the class interval and consequently, levels were decided for 3 dimensions.

4. Literature Review

2. 4.1 Role of AI in Higher Education

Numerous studies have sought to explore the general form of education after using artificial intelligence, including Ocaa-Fernández, et al. (2019); Mynbayeva A. et al. (2017); and Groff (2013). The researchers came to the conclusion that artificial intelligence applications have balanced improved capabilities, prompting a dramatic overhaul of the current educational laws. In current Information Technology literature, the adoption of modern technology by users is often shown as a key study topic (Williams et al. 2009). Chaudhary S. (2017) stated that AI

apps are advantageous for both learners and teachers since they facilitate collaborative learning and the creation of a learning environment. Educators and students may obtain additional experience via the use of artificial intelligence and new technology. It will give teachers and administration knowledge on the necessary practises and scope of artificial intelligence in education for achieving greatness.

Regarding the teaching-learning environment and administrative operations at the higher education level in India, there is an acute need for a paradigm change (Menon et al. 2014). For the purpose of guaranteeing the quality of education, we must pay particular attention to a number of fundamental factors (Kremer et al. 2013). Researchers are of the opinion that Artificial Intelligence (AI) and other cutting-edge technologies must be rapidly implemented in Indian higher education (Croxford and Raffe 2015). AI might provide such an individualised approach to learning. Diverse AI applications would personalise the learning experience (Kumar 2019). According to Chaudhary S. (2017), students and instructors benefit from artificial intelligence since it is utilised to build an educational environment and facilitate collaborative learning.

Due to the fact that many people are unable to meet the financial requirements for higher education, there may be a discernible drop in the number of people enrolling in university programmes. According to Ocaa-Fernández et al. (2019), the transition from traditional language to digital language will be one of the major implications that higher education will have to deal with in the next years. The digital language used by students in order to discuss applications of artificial intelligence.

There are several practical applications of AI-based tools in HEIs that help in tutoring, students grading, enhancing the performance of administrative duties and global classroom (Boulay, Benedict, 2016)**.** Due to the capabilities offered by AI technology, students and teachers are able to choose the most conducive learning settings and enhance their educational abilities irrespective of their location (McArthur, D. et al. 2005).

In a review of the effects of artificial intelligence on higher education, Ocaa-Fernández, Y., et al. (2019) came to the conclusion that in the near future, universities will transition from their traditional roles to new ones, such as replacing the conventional language with the digital language and developing teaching methods in a new way that calls for improving students' adaptability skills. The consequences of AI on higher education were discussed by Ma, Yizhi, and Keng L. Siau (2018), who used the demand for new skill sets and a reduction in the use of human resources in education as examples of these effects. Higher education faces difficulty in preparing learners for the AI revolution and giving them the necessary skill sets to flourish in the AI era.

Khare, K., et al. (2018) made an effort to demonstrate how artificial intelligence might favourably affect student achievement. When artificial intelligence is used in education, students will rely more on administrative staff, and teachers at the Institute while faculty members supervise management systems learning. The conclusion was that the deployment of artificial intelligence will improve educational institutions' ability to fulfil their core duties of teaching, learning, and research.

Chatbots can give customised assistance to handle any pressing situation. It can address the **specific requirements** of students. As technology advances, an AI-enabled chatbot may accurately respond to a student's specific question (Chrisinger 2019). These AI-powered chatbots may give students answers outside of class time. This kind of **AI-powered system** may also assist with **student admission inquiries**, **administrative decision-making**, etc. AI technology may potentially be effective for creating **"intelligent content"** (Kumar 2019). This might include **digitalized textbook guides** and **adaptable digital learning interfaces** for various levels of education. AI might aid higher education in a variety of ways (Ahmad 2019). Due to the rising number of learners, the workload is increasing. This perilous circumstance requires the implementation of advanced technology, such as AI, at this time (Andrea et al. 2015). **Unless** students, teaching and non-teaching staff, as well as administrative staff (stakeholders), **accept AI**, **its benefits cannot be realised**. The stakeholders must be incentivized to use this cutting-edge technology, which is anticipated to result in **overall improvements** to India's higher education system (Norris and Phillips 2013).

The uses of AI would update the system of **student evaluation and development**. This would allow the pupils to determine where they are (Bigg, and J., and Tang, C. 2007). AI will facilitate the use of AI to **enhance the quality of higher education** (Bonder et al. 2001). The importance of artificial intelligence (AI) in education is **substantial and growing**. An important example is well-established **personalised teaching systems**, for which proof of their efficiency in **enhancing learning** is emerging (Kulik & Fletcher, 2016).

4.2 Artificial Intelligence and Performance Evaluation in Higher Education

Explanations in educational environments take a variety of forms, based on the stakeholders and their respective goals or duties. There is a requirement for understanding because educators must be held responsible (e.g., to students, parents, or the government); when giving feedback to students on an individual basis; when giving feedback to teachers to aid them in comprehending where a class of students needs more focus; and when consulting with parents to support students' learning.

In higher education, feedback for both students and teachers is a kind of explanation that is crucial for accomplishing academic objectives. Improvement suggestions, guidance and encouragement for self-monitoring are the three most common sorts of explanations that instructors give to students regarding their performance in certain activities. Affect-level comments are also frequently used (Hattie & Timperley, 2007).

Additionally, the feedback's major purpose is to support learning, including the growth of topic knowledge, self-control skills, and a feeling of self. The study of teaching (Boyer, 1990) views teachers as learners who, through reflections on the feedback, create instructional expertise (such as instructional design) and pedagogical knowledge (such as pedagogical content knowledge) that allow teachers to undertake successful instruction (Kreber, 2005). Feedback for teachers is crucial to this model of learning.

The operation of an educational entity and its continuous improvement depend on the use of data

to present the overall profile and performance of an institution, including student admission data, academic performance (e.g., teaching & research quality), employee profile, effectiveness, and retention, research outputs, organisation revenue, teacher-student ratio, and others. These types of justifications, which are largely directed at administrators and managers, have been monitored and insights gained from them using business intelligence on a large scale (Drake & Walz, 2018).

4.3 Benefits of AI for Educational Stakeholders

Educational stakeholders including policymakers agreed that there are educational benefits of AI that facilitate co-design and co-creation of value (Dollinger, et al., 2019) and enable them to make deliberate choices on whether or not to embrace AI and how to utilise AI to maximise values. In contrast, AI is essential for facilitating the socio-cultural process of knowledge, in which teacher-student interactions are essential for guiding students through zones of proximal growth (Rieber & Carton, 1987).

Despite the fact that AI may considerably enhance efficiency by automating certain monotonous educational tasks, the social function of instructors in the learning process cannot be replaced by AI (Miao, 2021; Selwyn, 2019). For instance, dialogic teachings (Lyle, 2008), and Moore's transactional distance theory (Moore, 2013), and the paradigm of the community of inquiry (Garrison, 2016) emphasize the significance of student-teacher relationships in establishing a learning environment where students feel encouraged.

5. Result and Discussion

Out of a total 546 students, 57.1% of respondents were from Government Universities/Institutes and 42.9% of respondents were from Private Universities/Institute. The majority of students (81.0%) aged between 19-24 years and 19.0% of respondents aged between 25-30 years. There were 58.2% male and 41.8% female. 29.1% of students were graduates, 50.7% were postgraduate, 12.3% were PhD research scholars and 7.9% of respondents were perusing other courses. Factor Analysis was performed to determine the most important factors of **AI-based tools** for Students. The KMO measure of sampling adequacy was **0.635** ($p < 0.001$) which indicates that the data was adequate and had sufficient correlation between variables. Results of the total variance explained showed that the 11 variables were divided into 4 components (factors) after varimax rotation. The most important factor 1 explained 22.759% of the total variance, factor 2 explained 16.717% of the total variance, factor 3 explained 14.650% of the total variance and factor 4 explained 11.523% of total variance.

Figure- 1 **Scree Plot**

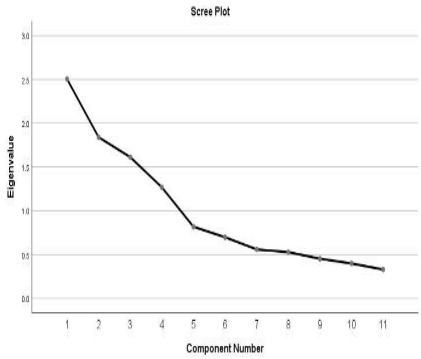


Table-1: Rotated Component Matrix

RCM[a]				
	Component			
	1	2	3	4
ICT tools for video recording of lectures.	**.882**	-.011	-.031	.018
Biometric Attendance Machine for ensuring maximum presence of students in class.	**.807**	.193	.061	.133
Internet-based plagiarism detection Software (Turntin etc)	**-.572**	.298	-.263	.371
Cloud-based typing assistant software (Grammarly etc)	**-.556**	.437	-.078	.417
Availability of software for Simulations and Infographics.	.033	**.816**	-.015	-.094
AI-powered libraries	-.003	**.804**	.048	-.060
Availability of AI Systems for personalised teaching and learning.	.047	-.116	**.816**	-.020
Reference manager software (Mendley etc)	.075	.032	**.773**	.006
Smart Classes	-.019	.170	**.542**	.365
AI-enabled Chabot	.278	-.153	-.008	**.812**
Internet-based paraphrasing tool (Quillbot etc)	-.321	-.110	.217	**.660**

The most important factors of the Level of use of AI based tools for Students are-

Factor -1 includes the following **4** variables

- ICT tools for video recording of lectures.
- Biometric Attendance Machine for ensuring maximum presence of students in class.
- Internet-based plagiarism detection Software (Turntin etc)
- Cloud-based typing assistant software (Grammarly etc)

Factor -2 includes the following **2** variables

- 27. Availability of software for Simulations and Infographics.
- 23. AI-powered libraries

Factor -3 includes the following **3** variables

- 32. Availability of AI Systems for personalised teaching and learning.
- 31. Reference manager software (Mendley etc)
- 22. Smart Classes

Factor -4 includes the following **2** variables

- 24. AI-enabled Chabot
- 30. Internet-based paraphrasing tools (Quillbot etc)

Table-2: Correlations

Correlations				
		Organisational Performance Level	Students' Performance Level	Level of use of AI based tools
Pearson Correlation	Organisational Performance Level	1.000	.247	.138
	Students' Performance Level	.247	1.000	.133
	Level of use of AI based tools	.138	.133	1.000
Sig. (1-tailed)	Organisational Performance Level	.	.000	.001
	Students' Performance Level	.000	.	.001
	Level of use of AI based tools	.001	.001	.
N	Organisational Performance Level	546	546	546
	Students' Performance Level	546	546	546

	Level of use of AI based tools	546	546	546

The results of correlations analysis shows that organizational performance has positive correlation with students' performance (0.247) and Level of use of AI based tools (0.138). The results are realistic as the level of use of AI-based tools is still not playing a significant role in higher educational institutions, therefore, contributing to organizational performance not as much as expected.

- **Mediation effects Analysis: Regression & Sobel Test**

Research Objectives: To analyse the impact of the level of use of AI-based tools on organisational performance with the mediating effect of students' performance in Lucknow.

The mediation model looks at the relationship between the independent and dependent variables, the independent and mediator variables, and the link between the dependent and mediator variables (Baron and Kenny, 1986). In the present study, the Use of AI-based tools is Independent Variable (IV); organisational performance is the Dependent Variable (DV) and students' performance is the Mediator Variable (MV). In model-1, the proportion of explained variance as measured by R-Square ($R^{2)}$ was 0.072, which indicates that about 7.2% of the variance in organisational performance (dependent variable) was explained by use of AI-based tools and students' performance. The p-value (0.0000) associated with F value (21.152) is less than 0.05, which indicates that the independent variables reliably predict the dependent variable.

H0-1: Level Students' Performance Level has positive and a significant impact on Organisational Performance Level.

H0-2: The level of use of AI-based tools has positive and a significant impact on Organisational Performance Levels.

Table 3: Results of Regression Analysis (IV on DV and MV on DV)

Coefficients[a]					
Model	Unstandardized Coefficients	Standardized Coefficients	t	Sig.	Correlations

		B	Std. Error	Beta			Zero-order	Partial	Part
1	(Constant)	1.305	.276		4.722	.000			
	Students' Performance Level	.332	.059	.233	5.578	.000	.247	.233	.231
	Level of use of AI based tools	.137	.053	.107	2.574	.010	.138	.110	.106
a. Dependent Variable: Organisational Performance Level									

Students' Performance Level: The value of standardised coefficients (Beta) is 0.332, it means that 1-unit positive change in dimension- Students' Performance Level would result in the increase of Organisational Performance Level (DV) by 0.332 units. Since, the value of coefficient is significant (.000), thus, it can be concluded that Students' Performance Level has positive and a significant impact on Organisational Performance Level. Therefore, it can be said that H0-1 is rejected.

Level of use of AI-based tools: The value of standardised coefficients (Beta) is 0.137, it means that 1-unit positive change in dimension- Level of use of AI-based tools would result in the increase of of Organisational Performance Level (DV) by 0.137 units. Since, the value of coefficient is significant (.010), thus, it can be concluded that Level of use of AI based tools has positive and a significant impact on Organisational Performance Level. Therefore, it can be said that H0-2 is rejected.

Level of use of AI based tools is IV and Students' Performance Level is DV. In **model**-2, the proportion of explained variance as measured by R-Square was **(R2=0.018)** which indicates that about **1.8%** of the variance in organisational performance (DV) was explained by students' performance. The p-value (0.002) associated with F value (9.778) is less than 0.05, which indicates that the I.V. reliably predicts the DV.

H0-3: The level of use of AI-based tools has positive and a significant impact on Students' Performance Levels.

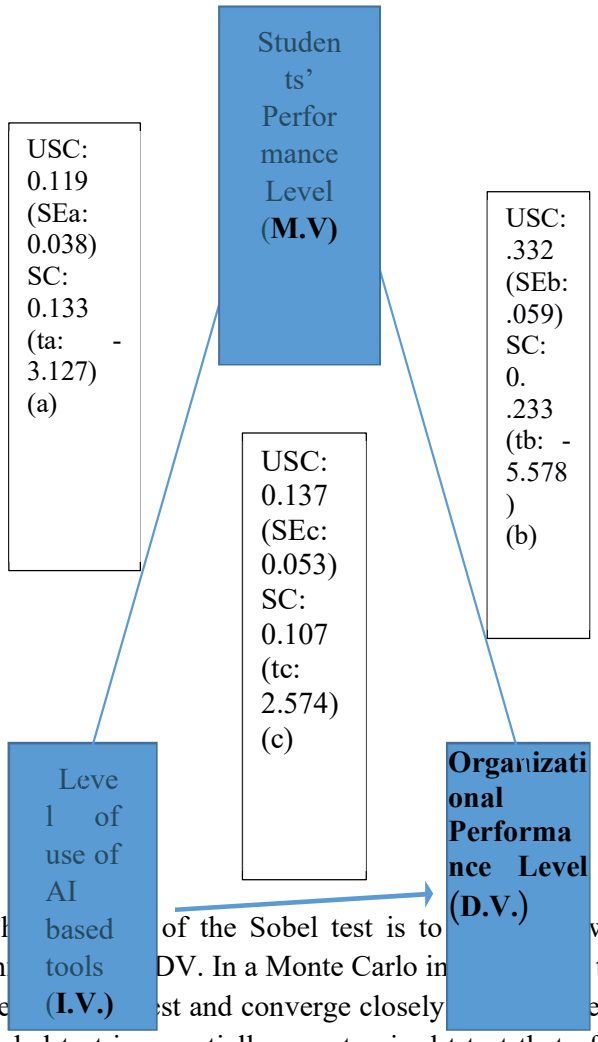
Table-4: Results of Regression Analysis (IV on MV)

Coefficients[a]									
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations		
		B	Std. Error	Beta			Zero-order	Partial	Part
1	(Constant)	3.672	.122		30.044	.000			
	Level of use of AI based tools	.119	.038	.133	3.127	.002	.133	.133	.133
a. Dependent Variable: Students' Performance Level									

Level of use of AI based tools: The value of standardised coefficients (Beta) is 0.137, it means that 1-unit positive change in dimension- Level of use of AI based tools would result in the increase of of Organisational Performance Level (DV) by 0.137 units. Since, the value of coefficient is significant (.010), thus, it can be concluded that Level of use of AI based tools has positive and a significant impact on Organisational Performance Level. Therefore, it can be said that H0-3 is rejected.

H0-4: There is no positive and significant impact of students' performance on the organisational performance with mediating effect of the level of use of AI based tools in Lucknow.

Figure-2: Mediation Effect Model



Th of the Sobel test is to whether a mediator transmits an IV's in DV. In a Monte Carlo in the Sobel and Aroian tests appeared to pe st and converge closely e sizes greater than or equal to 50. The Sobel test is essentially a customised t test that offers a means to ascertain whether the mediation effect is statistically significant if the independent variable's effect is reduced significantly after the mediator is included in the model.

An estimation of the standard error of this ab product (SEab) is required to put up a z test statistic. For SEab, Sobel (1982) offered the following reasonable estimate.

Sobel Test Equation: z-value = a*b/SQRT(b2*sa2 + a2*sb2)

$$SE_{ab} \approx \sqrt{b^2 s_a^2 + a^2 s_b^2},$$

Aroian test equation: z-value = a*b/SQRT(b2*sa2 + a2*sb2 + sa2*sb2)

Goodman test equation: z-value = a*b/SQRT(b2*sa2 + a2*sb2 - sa2*sb2)
Where:
a = raw (unstandardized) regression coefficient for the association between IV and mediator.
s_a = standard error of *a*.
b = raw coefficient for the association between the mediator and the DV (when the IV is also a predictor of the DV).
s_b = standard error of *b*.

H0: The mediated effect equals zero in the population. (H0: ab = 0)
The test ratio's critical values, which include the centre 95% of the unit normal distribution, are +/- 1.96. In order to determine whether the indirect effect of the IV on the DV via the mediator is significantly different from zero, this programme determined the critical ratio.

Table-5: Sobel Test Statistics

Input			Test Statistics	Std. Error	p-value
a	.119	Sobel Test	2.736	0.0144	0.006
b	.332	Aroian Test	2.703	0.0146	0.006
S_a	.038	Goodman Test	2.769	0.0142	0.005
S_b	.059				

5.1. As an alternative, the t-test statistics for the difference between the a and b coefficients and zero were entered into the cells below as ta and tb. Except for rounding error, the results should be the same as the first test.

5.1. Table-6: Sobel t-Test Statistics

Input			Test Statistics	p-value
		Sobel Test	2.727	0.006
t_a	3.127	Aroian Test	2.694	0.007
t_b	5.578	Goodman Test	2.761	0.005

The ab product is judged to be statistically significant if z is greater than +1.96 or less than –1.96. The test statistic for the Sobel test is -3.147 (Critical Ratio (C.R.) value), with an associated *p*-value (0.000) less than 0.01. The Critical Ratio (C.R.) values for all the three tests were greater than ± 1.96, indicating significant regression coefficient is achieved. Hence, it can be concluded that the H0 is rejected.

Therefore, it can be concluded that indirect effect (a*b) the association between the IV and the DV (in this case, Level of use of AI based tools and Organisational Performance Level) is statistically significant by the inclusion of the mediator (in this case, Students' Performance Level) in the model; hence it can be concluded that there is evidence of mediation.

The estimate of Indirect Effect (a*b) is 0.039. It can be seen that the value of unstandardized coefficient for indirect effect is less than direct effect; therefore, it can be concluded that mediating variable has also the significant impact on dependent variable but direct effect is more than the indirect effect.

The Sobel test results are comparable to the Aroian test results, which were likewise shown to be significant ($p < .01$). The Aroian tests don't presumptively assume that the sum of the standard errors of the two regression coefficients employed in the calculation is "vanishingly" tiny (Aroian, 1947; Baron & Kenny, 1986; Preacher & Hayes, 2004). Researchers are using this Aroian test as an additional method for evaluating mediation. Thus, the principal hypothesis of the study was fully validated by all statistical tests, which showed that students' performance level mediates the relationship between the level of use of AI-based technologies and organisational performance level in higher educational institutions in Lucknow. Therefore, it can be concluded that H0-4 is rejected.

6. Findings

The study surveyed 546 students from both government and private higher education institutions to investigate the impact of AI-based tools on organizational performance, with a particular focus on how students' performance mediates this relationship. Of the respondents, 57.1% were affiliated with government institutions, while 42.9% were from private universities. The age distribution was notably skewed towards younger students, with 81.0% falling between the ages of 19 and 24, and 19.0% between 25 and 30 years. Gender distribution was fairly balanced, with 58.2% male and 41.8% female students. Among the academic levels, 29.1% were graduates, 50.7% were postgraduates, 12.3% were PhD research scholars, and 7.9% were pursuing other courses.

Factor Analysis revealed four significant components regarding the use of AI-based tools. The first factor, accounting for 22.759% of the variance, included ICT tools for video recording, biometric attendance systems, internet-based plagiarism detection software, and cloud-based typing assistants. The second factor, explaining 16.717% of the variance, comprised software for simulations and infographics, as well as AI-powered libraries. The third factor, which accounted for 14.650% of the variance, included AI systems for personalized learning, reference management software, and smart classes. Lastly, the fourth factor, contributing 11.523% to the variance, involved AI-enabled chatbots and internet-based paraphrasing tools.

Correlation analysis demonstrated a moderate positive correlation between organizational performance and students' performance (0.247) and a weaker positive correlation with the level of AI-based tools usage (0.138). These correlations suggest that while there is some influence of AI tools on organizational performance, it is not yet highly significant, possibly due to the early stage of AI tool integration in educational settings.

Regression analysis and Sobel tests further explored the mediation effects of students' performance. The results showed that students' performance had a significant positive impact on organizational performance, with a standardized coefficient of 0.332 ($p < 0.001$). Similarly, the level of use of AI-based tools positively affected organizational performance, though to a lesser extent, with a standardized coefficient of 0.137 ($p = 0.010$).

The Sobel test confirmed a significant indirect effect of AI-based tools on organizational performance through students' performance, with a z-value of 2.736 ($p = 0.0144$). This indicates that students' performance mediates the relationship between the use of AI tools and organizational performance. Although the direct effect of AI tools on organizational performance is stronger than the indirect effect mediated by students' performance, the mediation effect is still statistically significant.

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7. Limitations and Research Gaps

This study faces several limitations that affect its overall generalizability and accuracy. The sample was restricted to students from government and private universities in Lucknow, which may not fully represent the diverse educational environments across different regions or types of institutions. Additionally, the reliance on self-reported data introduces potential biases, as respondents may overstate or understate their use of AI-based tools and their impact. The cross-sectional design of the study also limits the ability to capture longitudinal changes and causal relationships between AI tool usage, students' performance, and organizational outcomes.
Several research gaps warrant further exploration. The study's focus on a specific geographic area and institutional types suggests the need for broader research that includes various regions and diverse educational contexts to enhance generalizability. Moreover, a longitudinal approach would provide deeper insights into how the impact of AI tools and students' performance evolve over time. Additionally, the study did not examine potential moderating variables, such as technological infrastructure or faculty training, which could influence the effectiveness of AI-based tools. Future research could benefit from incorporating qualitative methods to explore the specific mechanisms and contextual factors affecting the use of AI in education, offering a more comprehensive understanding of its impacts.

8. Conclusion

Results of the study revealed that the use of AI based tools in higher educational institutions have positive impact on students as well as intitutions' performance. Though the values of R^2 comes out to be low due to the lesser level of use of AI enabled tools in HEIs in Lucknow, yet

it has positive and significant impact. It can be concluded that AI based tools plays a major role in improving students' performance which leads to enhanced organisational performance. Therefore HEIs must encourage all the stakeholders to maximise the learning and utilisation of AI enabled tools.

Facility of Smart Classes enhances the productivity of teachers as well as the learning outcomes. ICT tools for video recording of lectures facilitates students in case they were unable to attend the lecture and it also reduces the efforts of teachers as they don't have to repeat lecture. Students learning outcomes are positively impacted by the availability and use of software for Simulations and Infographics during lecture to explain complicated aspects of the topics. Avaiability of several other AI based tools such as Cloud-based typing assistant softwares (Grammarly etc), Internet-based paraphrasing tools (Quillbot etc) are contributing to the effectiveness and efficiency of students. In higher education, problem of plagiary detection is solved by the Internet-based plagiarism detection Software (Turntin etc). Proper referencing is facilitated by Reference manager softwares (Mendley etc). The use of AI based tools are certianly supporting students and are contributing to personalised teaching and learning experience. AI-powered libraries reduces the efforts on the part of institution and may enhance the learning experience at HEIs, similar conclusion wasd drawn by Cox et al. (2019). Numerous administrative activities are also supported by AI based tools such as AI-enabled Chabot for dealing with admission inquiries; Biometric Attendance Machine for monitoring and ensuring maximum presence of students in class. AI enabled chatbot can be very useful for students and HEIs as they can provide customised assistance to handle any pressing situation. Chrisinger (2019) also propounded that it can accurately respond to a student's specific question. The use of AI systems offers outstanding opportunities for effective teaching, learning, and other institutions' administrative activities. It can also customize teaching methodology for specific group of students which is also propounded by (Kumar 2019). Therefore, HEIs must encourage the use of AI based tools to enhance the quality of educational service delivery methods. It will not only help to improve the performance of students and teachers but also enhance organisational performance.

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