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Transforming Learning: The Role of Artificial Intelligence in Shaping Higher Education for Students in Punjab

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***Abstract*: This research study aims to examine the impact of artificial intelligence on higher education in Indian universities, with a particular emphasis on issues such as academic achievement, student engagement, and workforce preparedness. The objective of the research is to raise awareness among policymakers, stakeholders, and educational institutions regarding the potential impact of artificial intelligence on the academic performance of students during their higher education and the Indian education system in the future. 500 students from a variety of colleges in the Hoshiarpur district were surveyed in this study, which employed a causal design and convenience sampling. 260 students responded to an eight-question Google form. This paper investigates the correlation between AI and the results of higher education by employing regression analysis on primary data. SPSS 25 version software is employed as a statistical instrument for multiple regression. The outcomes are indicative of the fruitful and profound role that AI performs in higher education. To optimize student learning, academic outcomes, and professional readiness, higher institutions should explore the integration of AI technology into administrative tasks, course planning, and other academic activities. Additionally, AI governance policies must remain cognizant of concerns such as academic integrity, algorithmic biases, and data privacy. Providing a focused evaluation of AI's function in Indian higher education, this work addresses a gap in the literature by delivering empirical findings based on primary data. It also urges the balanced adoption of AI to ensure that both the benefits and the ethical dilemma are clearly understood. The current investigation contributes to the current discussions regarding the function of artificial intelligence in education, particularly in India.**

***Keywords*: Personalized Learning, Higher Education, Educational Technology, Artificial Intelligence, Students, Punjab, Higher Education, Colleges.**

1. Introduction

Artificial intelligence is the comprehensive field of computer science that involves the development of intelligent machines that can perform tasks that would be considered intelligent when performed by a human.

Siri, Alexa, self-driving vehicles, Robo-advisors, conversational bots, and email spam filters are all examples of AI (Stanford Encyclopaedia of Philosophy, 2020). The COVID-19 pandemic has rendered artificial intelligence the most recent global trend, and the world is realizing that its implementation can be the difference between efficiency and time-wasting (Vaishya et al., 2020). AI was instrumental in the global response to the virus and in the preservation of educational and employment systems (UNESCO, 2020). It is crucial to illuminate the influence of artificial intelligence on higher education, which has become an essential component of the global community. This study critically evaluates the interference caused by AI in higher education by utilizing previous research, participant experiences, opinions, and predictions.

A. What is the Definition of Artificial Intelligence?

Artificial intelligence is a field of science that focuses on the development of computers and machines that are capable of learning, causing, and behaving in a manner that is typically associated with human intelligence. It encompasses a wide range of disciplines, such as computer science, data analytics and statistics, hardware and software engineering, education, linguistics, neuroscience and philosophy, and psychology.

AI is a collection of technologies that are developed using machine learning and are employed for a variety of purposes, including data analytics, predictions and forecasting, natural language processing, recommendations, and intelligent data retrieval.

B. Artificial Intelligence and Higher Education

The higher education community continues to grapple with the question of which applications of AI for learning and employment are appropriate and inappropriate. It was requested that respondents engage in a discussion regarding the applications of artificial intelligence in higher education that are considered acceptable and abhorrent. In general, the respondents clearly articulated the moral and open utilization of AI, irrespective of the very precise application. AI should be acknowledged as an emerging technology and, as such, should be given a place in the study with a concentration on ethical and legal considerations, implementation, adoption, research, and utilization.

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C. AI will be Implemented in Higher Education in the Future

The higher education community is currently in the process of reaching a consensus regarding the appropriate and inappropriate applications of AI in the realms of learning and labor. Interviewees were asked to respond to the appropriate and inappropriate applications of AI in higher education. Most respondents advocated for the ethical and transparent use of AI, regardless of the application. AI should be acknowledged as an emerging technology and should be included in the curriculum, with an emphasis on its ethical and legal implications, implementation, adoption, research, and utilization.

D. Applications of Artificial Intelligence in Higher Education

Personalized Student Support: This category encompasses a variety of applications, including tutoring, interpretation, academic and career guidance, administrative task optimization, ideation, proofreading, and use of access technologies. Research assistant: Examples include the following: the search for and evaluation of sources, the organization and summarization of information, the development of data visualizations, and predictive modeling. Administrative assistant: Audio transcription, writing, revising, and automation. Learning analytics is the process of surveying and reporting statistics about student performance to provide insights for attracting and retaining students. Digital literacy education: The instruction of digital literacy to children equips them with the necessary skills to navigate the digital workforce and society.

2. Literature Review

Chiu, T. K. (2024) The development of ethical citizens and professionals on a global scale is contingent upon the quality of higher education. The conventional educational paradigm has been confronted with both opportunities and challenges as a result of the introduction of generative AI (GenAI), such as ChatGPT. Nevertheless, the current discussions are primarily concerned with the development and evaluation of policies, with a scarcity of research on the future of higher education. GenAI's influence on pedagogy, assessment, and learning outcomes is essential for the advancement and reformation of the workforce. The objective of this qualitative study is to examine the impact of GenAI on higher education from the perspective of students. The study investigates the opportunities and challenges of AI in education by utilizing an initial conceptual framework that is grounded in a systematic literature review. This framework functions as an initial framework for data collection and analysis. They suggest six future research directions: competence for the future workforce and its self-assessment measures, AI literacy or competency measures, new literacies and their relationships, interdisciplinary teaching, innovative pedagogies and their evaluation, and new assessment and its acceptance.

Al-Mughairi, H., and Bhaskar, P. (2024). ChatGPT, a chatbot propelled by artificial intelligence (AI), has garnered significant attention in the academic community due to its potential to revolutionize the education sector. The analysis identified four themes under the category of motivating factors that motivate instructors to implement ChatGPT for educational purposes. This investigation enhances comprehension of educators' viewpoints regarding the implementation of ChatGPT in education. Policymakers can develop policies that are suitable for teachers and service providers can tailor their offerings to meet their needs by comprehending the perspectives of teachers. The study's results will be beneficial to higher education institutions (HEIs) as they develop policies to guarantee the effective and appropriate use of ChatGPT. The study will offer ChatGPT service providers recommendations to enable them to concentrate on motivating factors and resolve inhibiting factors, thereby facilitating the seamless adoption of ChatGPT among teachers.

Yusuf, A., Román-González, M., and Pervin, N. (2024) In recent years, technology has been extensively integrated into higher education (HE) worldwide, particularly in the areas of research and instruction. This trend is further accelerated by the emergence of generative Artificial Intelligence (GenAI). Nevertheless, concerns have been expressed regarding the potential of GenAI tools to automate teaching and research processes due to their increasing sophistication. In higher education, there is a dearth of multicultural perspectives on the impact and concerns of GenAI, despite the extensive research conducted in a variety of fields. This study addresses this gap by analyzing the benefits, concerns, and utilization of GenAI in higher education from a multicultural perspective. Notably, there is a robust correlation between respondents' perspectives on the advantages and drawbacks of GenAI, such as its potential for academic dishonesty and the necessity of ethical standards, and cultural dimensions. Consequently, we contended that the responsible application of GenAI tools can improve the learning process. However, to resolve concerns, it may be necessary to establish policies that are sensitive to cultural norms. To advance the ethical and effective incorporation of GenAI tools in higher education, we deliberated on the results and provided suggestions for researchers, educators, and policymakers.

Johnston, H., Wells, R. F., Shanks, E. M., Boey, T., and Parsons, B. N. (2024). The objective of this initiative was to gain insight into the perspectives of students regarding generative artificial intelligence (GAI) technologies, including the Chat generative Pre-Trained Transformer (ChatGPT), to inform amendments to the University of Liverpool Academic Integrity code of practice. The survey for this study was developed by a team of library students and was subsequently reviewed through focus groups. The findings of this study indicate that students necessitate explicit policies regarding the use of GAI and that these technologies should not be prohibited from university use. However, it is imperative to ensure that each student group has equitable access to the technologies.

Crompton, H., and Burke, D. (2023). This systematic review offers a contemporary analysis of artificial intelligence (AI) in higher education (HE) from 2016 to 2022, resulting in distinctive discoveries. 138 articles were identified for a comprehensive examination using the PRISMA principles and protocol. The data from the 138 articles were extracted, analyzed, and coded using a priori and grounded coding. The

results of this investigation indicate that the number of publications increased by nearly two to three times in 2021 and 2022 compared to the previous years. New trends have emerged because of the significant increase in the number of AIEd HE publications. The results indicate that research was conducted in six of the seven continents of the globe. The number of publications has shifted from the United States to China, with the latter being the leader.

Bearman, M., Ryan, J., and Ajjawi, R. (2023). The implications of artificial intelligence (AI) for higher education are substantial; however, the literature frequently contains vague and contentious references to AI. To comprehend the methods for advancing AI-related research and analysis, this critical review conducted a systematic search of the most prestigious higher education journals for references to the term "artificial intelligence." We examined the definitions and conducted a discourse analysis of the texts that were included. Our results indicate that there are few, ambiguous definitions, and minimal overt references to AI as a research object. Two Discourses were identified.

Chan, C. K. Y., and Hu, W. (2023). This study investigates the perceptions of generative AI (GenAI) technologies, including ChatGPT, among university students in higher education. It concentrates on the following factors: familiarity, willingness to engage, prospective benefits and challenges, and effective integration. In Hong Kong, a survey of 399 undergraduate and postgraduate students from a variety of disciplines revealed a generally positive attitude toward GenAI in the context of teaching and learning. Students acknowledged the potential for research and analysis capabilities, writing and ideation assistance, and personalized learning support. Nevertheless, there were also apprehensions regarding the impact on personal development, career prospects, and societal values, as well as privacy, ethics, and accuracy. Student perceptions have a substantial impact on learning approaches and outcomes, as per John Biggs' 3P model.

Malik, A. R., Pratiwi, Y., Andajani, K., Numertayasa, I. W., Suharti, S., and Darwis, A. (2023). A transformative intersection in education is formed when academic essay writing and artificial intelligence (AI) merge, with each discipline reciprocally refining and reforming the other. AI enhances academic writing by providing personalized educational journeys and dynamic, interactive learning environments through its innovative technologies and flexible learning strategies. The objective of this investigation was to investigate the perceptions of students regarding the use of AI in academic essay writing with a case study design. The study comprised 245 undergraduate students from 25 tertiary institutions in the Eastern and Central Indonesian provinces. Data was acquired using a Google Form to investigate students' perspectives regarding the use of AI tools in the composition of academic essays. The results suggested that AI-powered writing tools were well-received by students, who recognized their advantages in the areas of grammar checks, plagiarism detection, language translation, and essay outlines. AI was discovered to improve the writing skills, self-efficacy, and comprehension of academic integrity of students. Nevertheless, a few students expressed apprehension regarding the potential effects on their ethical writing practices, critical thinking, and creativity. The research underscored the importance of a balanced approach to AI integration, in which AI works in conjunction with human authors. Additionally, it identified the most frequently used AI tools among Indonesian students. Consequently, the research underscored the critical significance of maintaining a balanced integration to sustain human ingenuity and critical thought in academic discourse by highlighting AI's significant role in supporting academic writing and preserving human creativity and critical thinking.

A. Need of study

AI Tools in the School System: Increasing Integration of AI in Education The accelerated advancement of technology has resulted in the integration of AI tools into educational systems. Consequently, it is of the utmost importance to ascertain the extent to which innovative technological advancements influence student learning, academic performance, and workforce preparedness to optimize the use of these new technologies. Overcoming Challenges in Higher Education: Indian colleges are confronted with a high dropout rate, a low participation rate, and deficits in workforce preparedness. To enhance general educational outcomes, this paper will investigate the potential of AI to resolve these issues. Enhancing the Student Experience: The comprehensive result of understanding the relationship between AI and academic outcomes would be an enhanced student experience. Acknowledging that AI has the potential to enhance student engagement and academic performance could be a means for an institution to modify its teaching and learning strategy. Literature Contribution: Although there has been a significant amount of research conducted on the topic of artificial intelligence in education, the implications of AI in the Indian context have not been adequately addressed. This paper addresses this lacuna by illustrating the potential impact of artificial intelligence on higher education in India in the future.

B. Scope of Study

The investigation will concentrate on institutions located in India. Data will be gathered from 500 pupils who are enrolled in a few colleges situated in the Hoshiarpur district. A single geographic focus will enable the acquisition of a profound comprehension of the effects of AI in a specific ecosystem within the Indian educational context.

C. Objectives

1) To examine how AI enhances the personalized and concentrated learning experience of students.
2) To investigate the potential impact of AI on the labor of students who are pursuing a higher education.

D. Research Methodology

The research approach of this study is concentrated on 500 students who are enrolled in a variety of institutions in the Hoshiarpur district and are contemplating furthering their education. We employed convenience sampling to obtain 260 responses through a Google form to establish a minimum

response sample. The sampling unit is composed of a diverse set of students who are enrolled in various colleges in Hoshiarpur. The responses were obtained by contacting a variety of individuals, and convenience sampling was employed. The study is causal, and the eight inquiries in the Google form that make up its core data consist of personal details and potential effects of artificial intelligence on students who aspire to attend college. The responses provided by those students would serve as the foundation of the investigation.

Primary data can be collected in a variety of methods, and causal research can be conducted. The subjects of the eight queries in the Google Form are diverse. The statistical tool is the SPSS 25 version software, which is used for multiple regression.

3. Data Analysis and Interpretation

Data analysis is done while running Multiple regression to check the impact of the independent variable on the dependent variable.

Table 1
Model Summary

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.817[a]	.667	.665	.711

a. Predictors: (Constant), Artificial Intelligence

Source: Author

Interpretation: In Table 1, the model summary indicates that the correlation between AI and higher education is robust and advantageous. An R Square of.667 indicates a satisfactory fit in the model data, as AI accounted for 66.7% of the variance in higher education. Even after accounting for the number of predictors, the Adjusted R Square (.665) is slightly lower; however, it still suggests that the model is well-fitted. Finally, a low value suggests that the model is capable of effective prediction. The Standard Error of the Estimate (.711) quantifies the extent to which the observed values deviate from the predicted values of the model.

Table 2
ANOVA

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	261.183	1	261.183	516.159	.000[b]
	Residual	130.551	258	.506		
	Total	391.735	259			

a. Dependent Variable: Higher Education
b. Predictors: (Constant), Artificial Intelligence

Source: Author

Interpretation: In Table 2 the ANOVA TABLE demonstrates that the Residual Sum of Squares at 130.551 captures the errors or unexplained variation in Higher Education, while the Regression Sum of Squares at 261.183 represents the explained variation in Higher Education due to the regression model. The Total Sum of Squares, which is 391.735, captures the overall variation in the dependent variable. The model is statistically valid, as evidenced by the high F-statistic of 516.159 and p-value of 0.000, which is less than 0.05. Consequently, it describes a significant amount of variance in higher education. Therefore, Alternate Hypothesis HI is adopted, which posits that there is a significant relationship between AI and college students. The regression model demonstrates a robust, statistically significant positive correlation between higher education and accounts for approximately 66.7% of the variation.

4. Results

The model explains 66.7% of the variance in higher education, indicating a strong positive relationship between artificial intelligence and higher education, as revealed by the analysis. This implies an adequate fit with the data. The model's validity is still supported by the Adjusted R-squared value of 0.665, which is marginally lower than the original value due to the inclusion of predictors. The Standard Error of Estimate is a measure of the degree to which the observed values are in agreement with the predicted values. The regression sum of squares in the ANOVA analysis is 261.183, which effectively explains the variation in higher education. The unexplained variation is represented by a sum of squares of 130.551, contributing to a total variation of 391.735. The model's validity is further substantiated by an F-statistic of 516.159 and a p-value of 0.000, which suggest a statistically significant relationship between artificial intelligence and higher education ($p < 0.05$).

5. Recommendation

This investigation illustrated the proximity between artificial intelligence and higher education, indicating that AI has a significant influence on a wide range of student achievement criteria. The model's predictive accuracy is plausible when the Standard Error of Estimate is closer to the actual data values. Consequently, confidence in the accuracy of the prediction is significantly increased. The model also exhibits exceptional statistical validity, as evidenced by a p-value that is significantly lower than 0.05 and a high F-statistic, suggesting that the perceived correlation between AI and higher education is not coincidental. The model appears to accurately represent the relationship between AI and higher education, even though the Adjusted R Square is relatively low. Consequently, these observations suggest that additional funding for AI education programs is warranted.

6. Conclusion

Consequently, the investigation will reveal a critical connection between AI and higher education research, in which AI has a significant influence on a variety of student achievement areas. The model appears to be reasonable in terms of predictive accuracy when the Standard Error of Estimate is more closely aligned with the actual data values. The model demonstrates a high level of statistical validity, as evidenced by a p-value that is substantially below 0.05 and a high F-statistic. This suggests that the observed association between AI and increased education is not a mere coincidence. The model,

however, provides a comprehensive overview of the relationship between AI and higher education, despite the relatively low Adjusted R Square. This necessitates the continuation of funding for AI education programs.

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