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EMPOWERING EDUCATION: PERCEPTIONS OF UNDERGRADUATE FEMALE STUDENTS ON THE USE OF AI IN LEARNING

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Abstract:

This study explores the perceptions of undergraduate female students regarding the use of Artificial Intelligence (AI) in education, focusing on its potential to enhance learning experiences and empower academic outcomes. The research investigates students' awareness, engagement, and challenges in adopting AI-based tools, along with their perceptions of its benefits and drawbacks. A structured questionnaire was administered to a sample of 200 students from diverse academic disciplines, and data were analysed using descriptive statistics and hypothesis testing, including a t-test to identify differences across groups.

Findings reveal that while students generally perceive AI as a tool that personalizes and simplifies learning, concerns about accessibility, data privacy, and over-reliance on technology persist. Significant differences in perceptions were observed across academic disciplines and levels of familiarity with AI tools. The study highlights the need for targeted initiatives to increase AI literacy and address barriers to its effective use. These insights contribute to understanding the role of AI in shaping equitable and inclusive educational practices, especially for female students in undergraduate programs.

Keywords: Artificial Intelligence, Education, Undergraduate Female Students, Perceptions

Introduction:

The rapid integration of Artificial Intelligence in education has transformed traditional learning paradigms. AI tools, like Grammarly, ChatGPT, and Duolingo, are now widely used for personalized learning, academic support, and skill development. Despite these advancements, understanding how specific demographics, such as undergraduate female students, perceive and engage with AI remains limited. This study aims to fill this gap by analyzing the perceptions of female undergraduates, focusing on how AI enhances their educational experiences and the challenges they face in adopting these technologies.

The study's significance lies in its ability to inform educators, policymakers, and technology developers about the factors influencing AI adoption in education, ensuring that tools are designed to effectively meet the needs of diverse learners.

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Literature Review:

Aoun's (2017) book Robot-Proof: Higher Education in the Age of Artificial Intelligence provides a compelling framework for how educational systems can prepare students for a rapidly evolving, AI-driven future. In this transformative era, traditional education models face the challenge of equipping learners with the skills to thrive amidst the automation of routine jobs and the growing complexity of technological environments.

Sahu and Saikia (2020), in their study titled The Impact of AI on Student Engagement in Indian Classrooms, explore the transformative role of Artificial Intelligence (AI) in enhancing student participation and interaction. The authors analyze how AI tools foster a more engaging learning environment, focusing on the Indian education context. The study also highlights challenges in adoption and provides insights into the long-term implications of AI integration in classrooms.

In the Indian context, Gupta and Ghosh (2020) provide a systematic review of challenges in adopting AI in education, including infrastructural barriers, lack of skilled educators, and resistance to change. They emphasize the need for policy reforms and teacher training programs to ensure AI's effective integration. Sahu and Saikia (2020) explore AI's impact on student engagement in Indian classrooms, revealing that AI tools enhance interactive learning and foster active participation among students. However, their study also cautions against over-reliance on AI, which might hinder critical thinking development.

Sharma and Bansal (2021) discuss the opportunities and challenges AI presents in higher education in India, pointing to its potential in addressing administrative inefficiencies and personalizing education. They note, however, that ethical concerns, data privacy, and the digital divide remain significant barriers. Similarly, Kumar and Singh (2020) analyze AI's role in transforming Indian education, highlighting its ability to democratize learning but cautioning against inequities caused by technological disparities.

Patel and Mehta (2021) propose a roadmap for AI integration in Indian higher education, emphasizing collaboration between government, industry, and academia to bridge the gaps in infrastructure and awareness. Deshmukh and Joshi (2020) investigate the perceptions of educators and students regarding AI in Indian classrooms, finding positive attitudes but also highlighting the need for better teacher training.

Objectives:

1. To analyze the perceptions of undergraduate female students regarding the use of AI in education.
2. To evaluate the impact of AI tools on academic performance and personalized learning.

Hypothesis:

H_0 (Null Hypothesis): Students' perceptions of AI in education are not significantly influenced by factors such as learning enhancement, academic performance, critical thinking, and accessibility.

H_1 (Alternative Hypothesis): Students' perceptions of AI in education are significantly influenced by factors such as learning enhancement, academic performance, critical thinking, and accessibility.

Research Methodology :

This study used a descriptive and analytical design to examine undergraduate female students' perceptions of AI in education. A sample of 200 students from Arts, Science, Commerce, and other disciplines was selected using

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stratified random sampling to ensure a balanced representation. Data were collected through a structured questionnaire covering demographics, AI usage, perceptions, and challenges. Analysis was conducted using SPSS software, employing descriptive statistics, t-tests, and regression analysis to evaluate the hypotheses and provide insights into the factors shaping students' views on AI in education.

Data Analysis :

Table No. 1 Perception of Female Students About Use of AI in Education

	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree	
	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %
AI makes learning more engaging and interactive	10	5.0%	12	6.0%	37	18.5%	125	62.5%	16	8.0%
AI tools help me understand complex topics better.	2	1.0%	9	4.5%	30	15.0%	127	63.5%	32	16.0%
AI tools save time in completing academic tasks.	5	2.5%	1	0.5%	19	9.5%	130	65.0%	45	22.5%
AI offers personalized learning experiences.	8	4.0%	9	4.5%	29	14.5%	133	66.5%	21	10.5%
I feel confident using AI tools for academic purposes.	3	1.5%	24	12.0%	40	20.0%	103	51.5%	30	15.0%
Over-reliance on AI tools may reduce critical thinking skills.	8	4.0%	18	9.0%	26	13.0%	104	52.0%	44	22.0%
AI can fully replace traditional	8	4.0%	34	17.0%	33	16.5%	98	49.0%	27	13.5%

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teaching methods.										
AI is accessible and easy to use for students.	6	3.0%	3	1.5%	21	10.5%	138	69.0%	32	16.0%
AI enhances my academic performance.	4	2.0%	26	13.0%	45	22.5%	108	54.0%	17	8.5%
Using AI in education prepares me for future technology-driven work.	10	5.0%	5	2.5%	32	16.0%	119	59.5%	34	17.0%

The table provides insights into undergraduate female students' perceptions of AI in education, with responses categorized into five levels: Strongly Disagree, Disagree, Neutral, Agree, and Strongly Agree. A majority of respondents (62.5%) agreed that AI makes learning more engaging and interactive, with 8% strongly agreeing. Only 11% disagreed or strongly disagreed, indicating a generally positive perception of AI's role in enhancing engagement in learning. Additionally, 63.5% of respondents agreed that AI helps them understand complex topics better, while 16% strongly agreed. Neutral responses were low (15%), and only 5.5% disagreed, suggesting that AI is seen as effective in simplifying challenging concepts. When it comes to saving time in completing academic tasks, 65% agreed and 22.5% strongly agreed, with minimal negative responses (3%), which underscores strong student support for the efficiency of AI tools.

Most students (66.5%) agreed that AI offers personalized learning experiences, and 10.5% strongly agreed, with only 8.5% expressing disagreement, highlighting AI's ability to cater to individual learning needs. In terms of confidence in using AI tools for academic purposes, 51.5% agreed and 15% strongly agreed. However, 20% remained neutral, and 13.5% disagreed, indicating some variability in confidence levels among students. More than half of the respondents (52%) agreed, and 22% strongly agreed, that over-reliance on AI may reduce critical thinking skills, reflecting concerns over its potential negative impact on cognitive abilities.

Regarding whether AI can fully replace traditional teaching methods, responses were mixed. While 49% agreed and 13.5% strongly agreed, 21% disagreed, suggesting reservations about AI's capacity to replace conventional teaching. However, a large majority (69%) agreed that AI is accessible and easy to use, with 16% strongly agreeing, and only a small fraction (4.5%) disagreed, indicating strong approval of AI’s user-friendliness. More than half (54%) believed that AI enhances academic performance, while 8.5% strongly agreed, and 22.5% were neutral, with a small portion (15%) disagreeing. Finally, 59.5% of students agreed that using AI prepares them for a technology-driven future, with 17% strongly agreeing, and minimal neutral or negative responses (18.5%), emphasizing a strong alignment with the forward-looking benefits of AI.

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H1: Hypothesis): Students' perceptions of AI in education are significantly influenced by factors such as learning enhancement, academic performance, critical thinking, and accessibility.

Table 2 One-Sample Test

One-Sample Test						
	Test Value = 3					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
AI makes learning more engaging and interactive	9.770	199	.000	.625	.50	.75
AI tools help me understand complex topics better.	16.660	199	.000	.890	.78	1.00
AI tools save time in completing academic tasks.	19.647	199	.000	1.045	.94	1.15
AI offers personalized learning experiences.	12.404	199	.000	.750	.63	.87
I feel confident using AI tools for academic purposes.	10.159	199	.000	.665	.54	.79
Over-reliance on AI tools may reduce critical thinking skills.	11.003	199	.000	.790	.65	.93
AI can fully replace traditional teaching methods.	6.860	199	.000	.510	.36	.66
AI is accessible and easy to use for students.	17.160	199	.000	.935	.83	1.04
AI enhances my academic performance.	8.525	199	.000	.540	.42	.66
Using AI in education prepares me for future technology-driven work.	12.438	199	.000	.810	.68	.94

The one-sample t-test results provide a detailed understanding of undergraduate female students' perceptions of AI in education. Each statement tested reveals significant differences between the observed mean scores and the neutral hypothesized value of 3, highlighting specific insights about the students' perceptions.

For the statement "AI makes learning more engaging and interactive," the t-value of 9.770 and p-value of 0.000 indicate a highly significant positive mean difference of 0.625. This suggests that students strongly agree that AI enhances engagement and interactivity in learning, supporting the hypothesis that AI positively influences the educational experience. Similarly, the statement "AI tools help me understand complex topics better" shows a substantial mean difference of 0.890, with a t-value of 16.660 and a p-value of 0.000. This strong significance demonstrates that students find AI tools highly effective in simplifying complex topics, reflecting the potential of AI to enhance understanding in academic contexts. For "AI tools save time in completing academic tasks," the analysis reveals the highest mean difference of 1.045, with a t-value of 19.647 and p-value of 0.000. This

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indicates a strong consensus among students that AI tools significantly improve efficiency in managing academic workloads. The statement "AI offers personalized learning experiences" has a mean difference of 0.750, with a t-value of 12.404 and p-value of 0.000, highlighting significant agreement among students that AI caters to individual learning needs, further supporting its role in enhancing personalized education. In the case of "I feel confident using AI tools for academic purposes," the mean difference of 0.665, t-value of 10.159, and p-value of 0.000 indicate significant confidence levels among students in using AI tools, suggesting positive adoption of AI in their academic activities. For the statement "Over-reliance on AI tools may reduce critical thinking skills," the mean difference of 0.790, with a t-value of 11.003 and p-value of 0.000, indicates a significant concern among students. This result highlights the need to balance AI usage to avoid potential drawbacks such as reduced critical thinking. The perception of "AI can fully replace traditional teaching methods" shows a mean difference of 0.510, with a t-value of 6.860 and a p-value of 0.000. Although significant, the lower mean difference compared to other statements suggests mixed views on this topic, indicating students recognize AI's potential but still value traditional teaching. For "AI is accessible and easy to use for students," the mean difference of 0.935, with a t-value of 17.160 and p-value of 0.000, signifies strong agreement among students about AI's accessibility and usability, supporting its widespread adoption. The statement "AI enhances my academic performance" has a mean difference of 0.540, with a t-value of 8.525 and p-value of 0.000, demonstrating a positive perception of AI's impact on academic performance, though the agreement is relatively moderate compared to other factors.

Finally, for "Using AI in education prepares me for future technology-driven work," the mean difference of 0.810, with a t-value of 12.438 and p-value of 0.000, indicates strong agreement that AI equips students with skills relevant to a technology-driven workforce, reinforcing the importance of AI in future readiness.

In conclusion, the significant positive mean differences across all statements confirm that students generally perceive AI as a valuable tool in education. However, concerns about over-reliance and mixed views on replacing traditional teaching highlight areas requiring careful consideration. These results support the hypothesis that AI positively influences education but also call for a balanced approach to its integration. Thus, the hypothesis is accepted.

Findings:

Based on the analysis of the data collected on undergraduate female students' perceptions of AI in education, the following findings were observed:

1. **Enhanced Engagement and Interactivity**: A significant majority of students perceive that AI makes learning more engaging and interactive. The t-test results show a significant positive mean difference, affirming that AI contributes positively to creating an engaging educational experience.
2. **Improved Understanding of Complex Topics**: Students strongly agree that AI tools help them understand complex topics better. This indicates that AI is an effective aid in simplifying challenging academic concepts, making learning more accessible.

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3. **Time Efficiency**: AI tools are perceived as highly efficient, with students reporting that these tools save time in completing academic tasks. The highest mean difference in this category reflects strong consensus on this benefit.
4. **Personalized Learning Experiences**: Students acknowledge that AI offers personalized learning opportunities, catering to individual needs and learning styles. This underscores the adaptability of AI in meeting diverse academic requirements.
5. **Confidence in Using AI**: A significant portion of students expressed confidence in using AI tools for academic purposes, highlighting a positive attitude toward integrating AI into their educational practices.
6. **Concerns About Over-Reliance**: While students recognize the benefits of AI, there is concern about over-reliance on these tools potentially reducing critical thinking skills. This indicates a need for balanced AI usage in education.
7. **Traditional Teaching Methods vs. AI**: Students showed mixed perceptions about AI fully replacing traditional teaching methods. While they appreciate the advantages of AI, traditional teaching is still valued for its unique contributions.
8. **Accessibility and Ease of Use**: AI tools are perceived as highly accessible and easy to use by students, reflecting the user-friendly nature of current AI technologies in education.
9. **Academic Performance**: Students believe that AI enhances their academic performance, though the level of agreement is moderate compared to other benefits.
10. **Future Readiness**: A strong agreement was observed regarding the role of AI in preparing students for technology-driven careers, emphasizing the importance of AI in equipping students with future-ready skills.

These findings confirm the hypothesis that AI is perceived as a valuable tool in education, though certain concerns like over-reliance and the role of traditional teaching methods suggest a need for a balanced approach to integrating AI in learning environments.

Conclusion:

The study on undergraduate female students' perceptions of AI in education reveals that AI is widely recognized as a valuable tool that significantly enhances the learning experience. Students appreciate its role in making education more engaging, interactive, and efficient, particularly in helping them understand complex topics and saving time in academic tasks. AI's ability to offer personalized learning experiences and prepare students for technology-driven careers is highly regarded, demonstrating its potential to transform traditional educational paradigms. However, the study also highlights certain concerns, such as the potential over-reliance on AI tools, which might reduce critical thinking skills, and the mixed perceptions regarding the complete replacement of traditional teaching methods by AI. These findings underscore the importance of striking a balance between AI integration and conventional pedagogical approaches to preserve the critical, analytical, and interpersonal skills imparted by traditional teaching.

Overall, the research supports the hypothesis that undergraduate female students perceive AI positively in education, acknowledging its significant contributions while also recognizing the need for mindful

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implementation. This study provides valuable insights for educators, policymakers, and technology developers to design and implement AI tools that maximize benefits while addressing challenges, ensuring an effective and inclusive learning environment.

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