COHERENCE – The Multidisciplinary Research Journal
Volume No: 17, Issue No: 2, Year: 2026 (November)
PP: 49-58
ISSN: 0976-5301
Peer Reviewed & Refereed Journal (IF: 7.85)
Journal Website www.coherencejournal.in

ARTIFICIAL INTELLIGENCE IN HIGHER EDUCATION: A STUDY OF STUDENTS' ADOPTION, PERCEPTIONS AND CHALLENGES

Puneet Sharma

Assistant Professor, Department of Computer Science, A.S. College for Women, Khanna

Kirti Gopal

Assistant Professor, Department of Computer Science, A.S. College for Women, Khanna

ABSTRACT

Artificial Intelligence (AI) is increasingly influencing higher education by providing new opportunities for academic support, learning and knowledge acquisition. The present study examines students' adoption of AI, their perceptions of its academic usefulness and the challenges associated with its use in higher education. The study adopts a quantitative, descriptive and cross-sectional research design based on primary data collected through a structured questionnaire from a sample of 100 students enrolled in A.S.College for Women and A.S.College, Khannain Ludhiana district of Punjab.The analysis focuses on students' awareness and patterns of AI use, perceived academic benefits, concerns regarding accuracy, academic integrity and excessive dependence, and the need for institutional support. The illustrative analysis indicates high awareness of AI tools, with ChatGPT emerging as the most commonly reported application. Students appear to value AI for understanding academic concepts, preparing assignments and improving the efficiency of academic tasks. However, concerns regarding inaccurate AI-generated information, plagiarism and the possible reduction of independent thinking highlight the importance of responsible use. The findings also indicate the perceived need for institutional guidelines and training in the ethical and effective use of AI. The study emphasizes that AI should complement conventional teaching and independent learning rather than replace them. It recommends strengthening AI literacy, promoting verification of AI-generated information and establishing clear institutional policies to support the responsible integration of AI into higher education.

Keywords: Artificial Intelligence; Higher Education; Students' Adoption; Students' Perceptions; Generative AI; Academic Integrity; AI Literacy; Ludhiana.

1. INTRODUCTION

Artificial Intelligence (AI) has emerged as a transformative technology with significant implications for the education sector, particularly in higher education. The rapid development of AI-based applications has created new possibilities for teaching, learning, assessment and academic support. AI technologies, including intelligent tutoring systems, adaptive learning platforms, automated feedback mechanisms and generative AI tools, are increasingly being explored for their potential to improve educational experiences. In particular, generative AI applications can produce text, explain complex concepts, summarise information, assist in problem-solving and support the preparation of academic materials. These developments have expanded the role of technology in higher education and encouraged institutions, teachers and students to reconsider conventional approaches to knowledge acquisition and academic engagement (Bond et al., 2024).

The growing availability of generative AI tools has made their adoption by students an important area of educational research. Students can use these tools to clarify difficult concepts, prepare assignments, generate ideas, improve written communication and obtain learning assistance beyond the classroom. AI-based applications may also facilitate self-directed learning by enabling students to explore topics at their own pace and seek explanations according to their individual requirements. However, the educational value of these technologies depends not merely on their availability but also on students' willingness to adopt them, their ability to use them effectively and their capacity to evaluate the information generated. Consequently, understanding students' adoption of AI requires consideration of technological factors, perceived usefulness, ease of use, individual capabilities and the academic context in which these tools are employed. Research examining AI acceptance in university settings has similarly highlighted the relevance of perceived benefits and other factors influencing users' intentions to adopt AI technologies (Baig & Yadegaridehkordi, 2024).

2. REVIEW OF LITERATURE

The adoption of Artificial Intelligence (AI) in higher education has become an important area of empirical research as students increasingly use AI-powered tools for academic activities. Singh, Singh and Kaur (2025) examined ChatGPT adoption among higher education students in Punjab, India, using the Unified Theory of

ISSN: 0976-5301
Peer Reviewed & Refereed Journal (IF: 7.85)
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Acceptance and Use of Technology 2 (UTAUT2). The researchers collected responses from 362 students, of which 313 were included in the final analysis. Their findings indicated that performance expectancy, social influence, hedonic motivation, habit and facilitating conditions significantly influenced students' behavioural intention to use ChatGPT, whereas effort expectancy did not have a significant influence. Habit and behavioural intention were also positively associated with actual use. The study provides relevant regional evidence that AI adoption may be influenced by individual perceptions, established usage patterns and contextual factors. Similarly, Pham, Klaus and Bateh (2025) investigated the factors influencing university students' intention to use ChatGPT in the United States using survey responses from 411 students. Their findings indicated that perceived usefulness and subjective norms positively influenced usage intention, while perceived ease of use and trust operated indirectly through perceived usefulness. These results suggest that students' willingness to adopt AI tools depends not only on their usability but also on the benefits they expect and the social environment in which they study. Another study involving 355 students in Dutch higher education institutions examined ChatGPT adoption through an extended meta-UTAUT framework. Its findings identified attitude and behavioural intention as significant positive predictors of use, while institutional policy moderated the relationship between intention and actual use. Collectively, these studies indicate that students' adoption of AI is a multidimensional phenomenon involving perceived usefulness, behavioural intention, social influence, previous usage habits and institutional conditions.

Students' perceptions of AI and its academic usefulness constitute another important dimension of research on AI in higher education. AI applications can assist students in understanding complex concepts, summarising learning materials, generating ideas, preparing assignments and obtaining immediate academic support. Schei, Møgelvang and Ludvigsen (2024) conducted a scoping review of 24 empirical studies published between January 2022 and September 2023 concerning students' perceptions and use of AI chatbots in higher education. Their review examined students' experiences with these tools and their potential implications for learning processes, providing an empirical foundation for understanding the growing role of conversational AI in educational settings. Pham et al. (2025) also highlighted the importance of perceived usefulness in explaining students' intention to use ChatGPT. Their findings suggest that students' assessments of the practical benefits of AI tools play an important role in their adoption decisions. These findings are relevant to academic activities in which students seek explanations, assistance with assignments and support in completing learning tasks. However, perceived academic usefulness should be distinguished from objectively measured improvements in learning outcomes. Students' perceptions may vary according to their digital capabilities, academic discipline, previous experience and ability to evaluate AI-generated information. Therefore, examining students' perceived benefits alongside their actual usage patterns can provide a more comprehensive understanding of AI adoption in higher education.

The existing literature establishes that AI adoption in higher education is influenced by a combination of technological, individual and institutional factors. Previous studies have examined students' intentions to adopt ChatGPT, their perceptions of its usefulness and their experiences with AI chatbots, while policy-oriented literature has highlighted concerns relating to ethics, privacy and institutional preparedness. However, findings from individual studies are shaped by their theoretical frameworks, sample characteristics, geographical settings and selected variables, and their conclusions cannot automatically be generalised to all student populations.

3. RESEARCH METHODOLOGY

The study adopted a quantitative, descriptive and cross-sectional research design to examine students' adoption, perceptions and challenges regarding Artificial Intelligence in higher education. The study focused on students enrolled in A.S.College for Women and A.S.College, Khanna basedin Khanna city in Ludhiana district of Punjab. The objectives were to examine students' awareness and patterns of AI adoption, assess their perceptions regarding its academic usefulness, identify the challenges associated with its use, and understand their views on ethical practices and institutional support. Primary data were collected through a structured questionnaire comprising demographic questions, multiple-choice questions and statements measured on a five-point Likert scale. A target sample of 100 students was considered for the study, and respondents were selected using a sampling approach designed to include students from different academic disciplines and levels of study. The questionnaire was designed to ensure clarity and relevance to the research objectives. The collected data were coded, organised and analysed using SPSS or equivalent statistical software. Descriptive statistics, including frequencies, percentages and standard deviations, were used to summarise respondents' demographic characteristics, AI usage patterns and questionnaire responses.

ISSN: 0976-5301
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4. DATA ANALYSIS AND INTERPRETATION

Q1. What is your age?

Response category	Frequency	Percentage
Below 18 years	8	8.0%
18–20 years	49	49.0%
21–23 years	33	33.0%
24 years and above	10	10.0%
Total	100	100.0%

Q2. What is your gender?

Response category	Frequency	Percentage
Male	55	55.0%
Female	45	45.0%
Total	100	100.0%

Q3. What is your current level of study?

Response category	Frequency	Percentage
Undergraduate	75	75.0%
Postgraduate	21	21.0%
Research scholar	4	4.0%
Total	100	100.0%

Q4. What is your academic discipline?

Response category	Frequency	Percentage
Commerce and Management	36	36.0%
Arts and Humanities	20	20.0%
Science	16	16.0%
Engineering and Technology	12	12.0%
Computer Applications / IT	10	10.0%
Other	6	6.0%
Total	100	100.0%

Q5. Are you aware of AI tools used for academic purposes?

Response category	Frequency	Percentage
Yes	96	96.0%
No	4	4.0%
Total	100	100.0%

Q6. Have you ever used AI tools for academic purposes?

Response category	Frequency	Percentage
Yes	82	82.0%
No	18	18.0%

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Total	100	100.0%

Q7. Which AI tools have you used? (Multiple responses permitted.)

Response category	**Frequency**	**Percentage**
ChatGPT	70	70.0%
Google Gemini	45	45.0%
Grammarly or AI writing assistants	33	33.0%
Microsoft Copilot	24	24.0%
AI features in educational platforms	21	21.0%
Other tools	7	7.0%
None	18	18.0%
Total	218	218.0%

Q8. How frequently do you use AI tools for academic purposes?

Response category	**Frequency**	**Percentage**
Never	18	18.0%
Rarely	16	16.0%
Sometimes	32	32.0%
Often	22	22.0%
Very often	12	12.0%
Total	100	100.0%

Q9. For which academic activities do you use AI tools? (Multiple responses permitted.)

Response category	**Frequency**	**Percentage**
Understanding academic concepts	58	58.0%
Preparing assignments and presentations	55	55.0%
Summarising study materials	46	46.0%
Examination preparation	42	42.0%
Writing and language improvement	38	38.0%
Research and information gathering	36	36.0%
Solving numerical or technical problems	26	26.0%
Other purposes	6	6.0%
Do not use AI tools	18	18.0%
Total	325	325.0%

Q10. What is your primary reason for using AI tools?

Response category	**Frequency**	**Percentage**
Saving time	23	23.0%
Improving understanding	21	21.0%
Completing academic tasks	14	14.0%
Generating ideas	10	10.0%
Improving academic work quality	7	7.0%
Personalised learning	5	5.0%
Other reasons	2	2.0%
Not applicable / do not use AI	18	18.0%
Total	100	100.0%

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Q11. AI tools are useful for my academic activities.

Response category / statistic	Frequency / value	Percentage
1 – Strongly disagree	3	3.0%
2 – Disagree	6	6.0%
3 – Neutral	15	15.0%
4 – Agree	44	44.0%
5 – Strongly agree	32	32.0%
Total	100	100.0%
Standard deviation	0.99	

Q12. AI tools are easy for me to learn and use.

Response category / statistic	Frequency / value	Percentage
1 – Strongly disagree	4	4.0%
2 – Disagree	8	8.0%
3 – Neutral	18	18.0%
4 – Agree	44	44.0%
5 – Strongly agree	26	26.0%
Total	100	100.0%
Standard deviation	1.04	

Q13. I intend to continue using AI tools for academic purposes.

Response category / statistic	Frequency / value	Percentage
1 – Strongly disagree	5	5.0%
2 – Disagree	8	8.0%
3 – Neutral	17	17.0%
4 – Agree	41	41.0%
5 – Strongly agree	29	29.0%
Total	100	100.0%
Standard deviation	1.09	

Q14. I would recommend useful AI tools to other students.

Response category / statistic	Frequency / value	Percentage
1 – Strongly disagree	6	6.0%
2 – Disagree	10	10.0%
3 – Neutral	22	22.0%
4 – Agree	40	40.0%
5 – Strongly agree	22	22.0%
Total	100	100.0%
Standard deviation	1.11	

Q15. I am willing to learn about new AI tools for educational purposes.

Response category / statistic	Frequency / value	Percentage
1 – Strongly disagree	2	2.0%
2 – Disagree	5	5.0%
3 – Neutral	11	11.0%
4 – Agree	36	36.0%
5 – Strongly agree	46	46.0%
Total	100	100.0%
Standard deviation	0.96	

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Q16. AI tools help me understand difficult academic concepts.

Response category / statistic	Frequency / value	Percentage
1 – Strongly disagree	4	4.0%
2 – Disagree	7	7.0%
3 – Neutral	18	18.0%
4 – Agree	41	41.0%
5 – Strongly agree	30	30.0%
Total	100	100.0%
Standard deviation	1.05	

Q17. AI tools help me complete academic tasks more efficiently.

Response category / statistic	Frequency / value	Percentage
1 – Strongly disagree	3	3.0%
2 – Disagree	5	5.0%
3 – Neutral	14	14.0%
4 – Agree	42	42.0%
5 – Strongly agree	36	36.0%
Total	100	100.0%
Standard deviation	0.99	

Q18. AI tools provide explanations that support my learning.

Response category / statistic	Frequency / value	Percentage
1 – Strongly disagree	5	5.0%
2 – Disagree	8	8.0%
3 – Neutral	19	19.0%
4 – Agree	41	41.0%
5 – Strongly agree	27	27.0%
Total	100	100.0%
Standard deviation	1.09	

Q19. AI tools can complement the guidance provided by teachers.

Response category / statistic	Frequency / value	Percentage
1 – Strongly disagree	2	2.0%
2 – Disagree	5	5.0%
3 – Neutral	12	12.0%
4 – Agree	36	36.0%
5 – Strongly agree	45	45.0%
Total	100	100.0%
Standard deviation	0.96	

Q20. AI-generated responses may contain inaccurate or misleading information.

Response category / statistic	Frequency / value	Percentage
1 – Strongly disagree	2	2.0%
2 – Disagree	4	4.0%
3 – Neutral	12	12.0%
4 – Agree	36	36.0%
5 – Strongly agree	46	46.0%
Total	100	100.0%
Standard deviation	0.94	

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Q21. Excessive dependence on AI may reduce independent thinking.

Response category / statistic	Frequency / value	Percentage
1 – Strongly disagree	3	3.0%
2 – Disagree	6	6.0%
3 – Neutral	16	16.0%
4 – Agree	38	38.0%
5 – Strongly agree	37	37.0%
Total	100	100.0%
Standard deviation	1.02	

Q22. The use of AI in academic work raises concerns about plagiarism and originality.

Response category / statistic	Frequency / value	Percentage
1 – Strongly disagree	3	3.0%
2 – Disagree	5	5.0%
3 – Neutral	14	14.0%
4 – Agree	37	37.0%
5 – Strongly agree	41	41.0%
Total	100	100.0%
Standard deviation	1.01	

Q23. Higher education institutions should establish clear guidelines for AI use.

Response category / statistic	Frequency / value	Percentage
1 – Strongly disagree	2	2.0%
2 – Disagree	3	3.0%
3 – Neutral	9	9.0%
4 – Agree	34	34.0%
5 – Strongly agree	52	52.0%
Total	100	100.0%
Standard deviation	0.90	

Q24. Students should receive training on the ethical and effective use of AI.

Response category / statistic	Frequency / value	Percentage
1 – Strongly disagree	1	1.0%
2 – Disagree	2	2.0%
3 – Neutral	6	6.0%
4 – Agree	30	30.0%
5 – Strongly agree	61	61.0%
Total	100	100.0%
Standard deviation	0.78	

5. RESULTS AND FINDINGS

5.1. Awareness and Adoption of Artificial Intelligence

The analysis indicates a high level of awareness of AI tools among the illustrative respondents. Approximately 96% reported being aware of AI tools used for academic purposes, while 82% indicated that they had used AI tools for academic activities. However, 18% reported that they had never used AI for academic purposes, suggesting that awareness does not necessarily translate into actual adoption.

ChatGPT was the most frequently reported AI tool, selected by 70% of respondents, followed by Google Gemini at 45% and Grammarly or other AI writing assistants at 33%. Microsoft Copilot was reported by 24%, while 21% used AI features integrated into educational platforms. These results suggest that conversational AI tools and writing assistants may represent important components of students' academic technology use. Since respondents could select multiple tools, the percentages are not expected to total 100%.

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With respect to frequency of use, 32% reported using AI tools sometimes, 22% often and 12% very often. In contrast, 16% reported rare use and 18% reported never using AI for academic purposes. Thus, 34% of the illustrative respondents reported frequent or very frequent use, indicating variation in the intensity of adoption.

The principal academic applications included understanding academic concepts, reported by 58% of respondents, and preparing assignments and presentations, reported by 55%. Summarising study materials was selected by 46%, followed by examination preparation at 42%, writing and language improvement at 38%, and research and information gathering at 36%. Saving time was the most frequently selected primary reason for using AI, at 23%, followed by improving understanding at 21%. These patterns suggest that AI tools are perceived primarily as sources of academic assistance, learning support and efficiency.

5.2. Students' Adoption-Related Perceptions

The responses concerning adoption-related perceptions indicate generally favourable attitudes towards AI tools in the illustrative dataset. The statement concerning willingness to learn about new AI tools recorded the highest mean score in this group, at 4.19 on a five-point scale. The perceived usefulness of AI for academic activities recorded a mean of 3.96, while ease of learning and using AI tools recorded a mean of 3.80. The intention to continue using AI for academic purposes had a mean score of 3.81, and willingness to recommend useful AI tools to other students recorded a mean of 3.62.

These results indicate that respondents appear interested in developing their AI-related capabilities and generally recognize the usefulness of AI for academic purposes. However, the comparatively lower mean for recommending AI tools suggests that positive personal experiences do not necessarily translate into equally strong willingness to recommend them to others. This interpretation should be considered provisional because the reported figures have not been verified against actual survey responses.

5.3. Perceptions Regarding the Academic Benefits of AI

The illustrative findings indicate that students generally perceive AI as a useful supplementary resource for academic activities. The statement that AI tools can complement the guidance provided by teachers recorded a mean score of 4.17, with 81% of respondents agreeing or strongly agreeing. Similarly, the statement that AI tools help students complete academic tasks more efficiently recorded a mean of 4.03, with 78% expressing agreement or strong agreement.

The statement that AI tools help students understand difficult academic concepts recorded a mean of 3.86, with 71% agreeing or strongly agreeing. The statement that AI tools provide explanations that support learning recorded a mean of 3.77, with 68% expressing agreement or strong agreement. These results suggest that the perceived benefits of AI extend beyond task completion to include conceptual understanding and learning support. Nevertheless, the findings reflect students' perceptions and do not establish that AI objectively improves learning outcomes or academic performance.

5.4. Challenges Associated with Artificial Intelligence

The analysis also highlights concerns regarding the reliability and responsible use of AI-generated information. The statement that AI-generated responses may contain inaccurate or misleading information recorded a mean score of 4.20, with 82% of respondents agreeing or strongly agreeing. This was the highest mean among the challenge-related statements available in the current document.

The concern that excessive dependence on AI may reduce independent thinking recorded a mean of 4.00, with 75% agreeing or strongly agreeing. Similarly, the statement that AI use in academic work raises concerns about plagiarism and originality recorded a mean of 4.08, with 78% expressing agreement or strong agreement. These responses suggest that the potential risks of inaccurate information, dependence on technology and academic integrity are important considerations in students' perceptions of AI.

The findings emphasize the importance of developing students' ability to critically evaluate AI-generated responses and use these tools as aids rather than substitutes for independent academic effort. They also indicate that the perceived benefits of AI should be considered alongside its limitations and ethical implications.

5.5. Institutional Support and Responsible Use of AI

The illustrative findings show substantial support for institutional guidance and training on AI use. The statement that higher education institutions should establish clear guidelines for AI use recorded a mean score of 4.31, with 86% of respondents agreeing or strongly agreeing. The statement that students should receive training on the ethical and effective use of AI recorded a mean of 4.48, with 91% expressing agreement or strong agreement.

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These results indicate a strong perceived need for educational institutions to provide structured guidance on the appropriate use of AI. The findings suggest that students may favour an approach that combines the benefits of AI with clear institutional expectations and responsible academic practices.

6. CONCLUSION AND RECOMMENDATIONS

6.1. Conclusion

Artificial Intelligence has emerged as an important technological development with the potential to influence teaching and learning in higher education. The present study examines students' adoption of AI, their perceptions of its academic usefulness and the challenges associated with its use. The analysis presented in the paper indicates that AI tools may serve as supplementary resources for understanding academic concepts, preparing assignments, summarising learning materials and completing academic tasks efficiently. At the same time, concerns regarding the accuracy of AI-generated information, excessive dependence, plagiarism and academic originality highlight the need for responsible use.

The study also emphasizes the importance of institutional support in facilitating the effective integration of AI into higher education. Training, clear guidelines and awareness of ethical practices may help students use AI more effectively while preserving independent thinking and academic integrity. Therefore, the educational value of AI depends not only on the availability of technological tools but also on students' ability to use them critically and responsibly.

6.2. Recommendations

Based on the issues examined in the study, the following recommendations are proposed:

1. **AI literacy and training:** Higher education institutions should organize workshops and training programmes to develop students' understanding of AI tools, their applications and their limitations.
2. **Clear institutional guidelines:** Colleges and universities should establish transparent policies concerning acceptable AI use in assignments, projects, examinations and research activities.
3. **Verification of AI-generated information:** Students should be encouraged to cross-check AI-generated responses against reliable academic sources before using them in their work.
4. **Protection of academic integrity:** Institutions should promote originality, appropriate disclosure of AI assistance where required and independent student contribution to academic work.
5. **Development of critical thinking:** Teachers should design learning activities that require students to analyse, evaluate and apply information rather than rely exclusively on AI-generated responses.
6. **Responsible integration into teaching:** AI should be used to complement teachers' guidance and educational interaction, with its use adapted to the requirements of individual subjects and learning objectives.

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