

Perceptions of artificial intelligence tools in scientific research among Omani AOU postgraduate students

¹Sami Khatar Mahkoom Al Mazruii, ²Muna Mubarak Saleh Al Qasmi, ²Hamed Alyahmadi, ³Mohammed Mubarak Saleh Al Qasmi, ¹Hajar Mohammed Ahmed Al-Hosni*

¹Educational Technology, College of Education, Arab Open University, Sultanate of Oman

²Educational Leadership, College of Education, Arab Open University, Sultanate of Oman

³Law, College of Law, Arab Open University, Sultanate of Oman

*Corresponding Author

Email: hajar.h@aoou.edu.om

Received:
5 April 2026

Revised:
15 July 2026

Accepted:
31 July 2026

Published:
6 August 2026

Al Mazruii, S. K. M., Al Qasmi, M. B. S., ALYahmadi, H. H. N., Al Qasmi, M. M. S., & Al-Hosni, H. M. A. (2026). Perceptions of artificial intelligence tools in scientific research among Omani AOU postgraduate students. *Indonesian Journal of Education and Pedagogy*, 3(2), 157–171. <https://doi.org/10.61251/ijoep.v3i2.358>

Abstract

The intersection of artificial intelligence and academic writing has become increasingly pronounced, with each contributing to the advancement of the other. This study aimed to explore the students' views at the Arab Open University (AOU) in Oman towards the use of artificial intelligence (AI) tools to conduct scientific research, as well as to identify difficulties associated with their integration. It analyzed the actual level of AI tool usage and the associated challenges. A questionnaire is used; applying a descriptive method, containing 32 items distributed over two dimensions: the reality of AI utilization in enhancing students' research skills, and the obstacles encountered by postgraduate students when utilizing AI. The results indicated a high level of AI tool utilization in developing research skills. The most common uses were for literature search, title suggestion, academic translation, and scientific writing enhancement. However, the study revealed several challenges, including limited institutional and technical support, lack of training, low awareness of usage mechanisms, high costs of some tools, and ethical concerns related to academic integrity. No statistically significant differences were detected depending on gender, indicating a shared awareness among male and female students regarding AI usage in research. Based on the results, recommendations included offering specialized preparation programs focusing on AI tool utilization across research stages, enhancing digital infrastructure at the university, and integrating AI concepts into research-based courses. It also emphasized promoting ethical awareness to ensure responsible and conscious usage.

Keywords: artificial intelligence; scientific research; research challenges

INTRODUCTION

In an era marked by globalization and the knowledge economy, rapid technological transformations are reshaping every sector of society. Among the most disruptive of these technologies is Artificial Intelligence (AI), which has become a foundation of progress, particularly within the field of education. AI's influence extends beyond the creation of smart learning environments; it plays a vital role in enhancing educational quality.



This work is licensed under a [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/).

© 2026 Authors

AI as a field focused on understanding human intelligence by creating specialized computer programs that simulate intelligent human behavior (Jiang & Zhu, 2022). Artificial Intelligence ranges from limited systems designed to perform predefined tasks to strong AI, which exhibits cognitive abilities comparable to human intelligence, with the capacity for learning and autonomous decision-making—potentially advancing toward superintelligence. AI is now present in all aspects of life, from smart sensors to personal assistants. However, recent developments in AI have brought about tremendous changes in the field of education (Elbadawi et al., 2024).

In education, its impact is evident in systems of intelligent teaching, augmented reality applications that personalize and elevate practices in education and platforms that enhance adaptive learning. Effect of AI on the field of education is due to its cognitive capabilities, including reasoning, learning, knowledge accumulation, and adaptive response to complex scenarios. AI's ability to manage symbolic data, process incomplete information, and evolve through multiple stages enhances its educational impact (Karbasi et al., 2023; Jiang & Zhu, 2022).

Scientific research, as a foundation of university excellence, academic standing, quality ranking, competitiveness and it transforms universities from mere teaching institutions into centers of innovation capable of addressing societal challenges. It aimed at investigating facts and addressing problems using precise and organized scientific methods, this process supports knowledge advancement and sustainable development (Arnout, 2020). Research skills represent the capabilities and knowledge that researchers possess to conduct effective and impactful investigations (Kong et al., 2019).

A growing convergence has emerged between artificial intelligence and academic writing in scientific research, as both reinforce and reshape one another. AI, through its adaptive technologies, provides flexible learning environments and personalized experiences, supporting language acquisition and writing skills development, thereby making academic writing practices more efficient and seamless (Xu et al., 2021). The quality of scientific research relies on analytical, summarization, and academic writing skills, supported by accurate data collection, AI enhancing research efficiency in line with modern academic standards (Shahsavar et al., 2024). AI's growing role in advancing scientific research by enhancing access to resources, accelerating data analysis, and improving result accuracy through intelligence (Crompton & Burke, 2023).

Artificial intelligence plays a role in improving efficiency, accelerating data processing, and supporting research through tools that streamline academic writing, critical thinking, innovation and data analysis (Chubb et al., 2022; Jaber, 2022; Eid, 2024). It enables the analysis of vast amounts of data with high accuracy and speed, improving researchers' ability to retrieve and classify studies. AI also supports academic writing by facilitating the formulation of titles and abstracts, improving literature reviews, supports data analysis, extracts findings accurately and accurately managing citations. This enhances academic integrity and helps overcome linguistic and cultural barriers while supporting multicultural scientific communication (Limongi, 2024). AI contributes to scientific research by generating search terms, analyzing topic correlations, formatting references, summarizing literature, outlining research structures, rephrasing content, and organizing information by priority, thereby enhancing writing quality (Khalifa & Albadawy, 2024).

Artificial intelligence supports all phases of scientific research through specialized tools that enhance source retrieval, academic writing, data analysis, and translation. Tools

such as Elicit, Grammarly, scispace, consensus, quillbot and Mendeley significantly improve research quality, efficiency, and scholarly communication.

In response to these shifts, regional initiatives have emerged to harness AI in higher education and research. Examples include conferences in Cairo and Oman that emphasized AI's role in academic advancement. The Arab Open University and Sultan Qaboos University, among others, have launched programs and partnerships aimed at integrating AI with scientific research, in alignment with Oman Vision 2040 ([Alhashmi et al., 2022](#); [Sujee et al., 2024](#)). These efforts aim to foster sustainable innovation and prepare students and faculty for global competitiveness.

Internationally, graduate students increasingly rely on AI tools for research support, particularly in academic writing, language correction, literature reviews, and citation management. Tools such as scispace, consensus, quillbot, gen text, ChatGPT, Grammarly, and Elicit provide real-time assistance, enhancing both the process and product of research. Studies confirm that such tools foster critical thinking, creative expression. A recent 20-country survey of publishing academics reported widespread awareness and adoption of generative AI tools in academia, while identifying inaccurate information, plagiarism, and reduced critical thinking as the most prominent concerns, alongside notable international, disciplinary, role, and gender variations in uptake ([Mohammadi et al., 2026](#)). Academic confidence. Employing AI to enhance scientific research skills in higher education is essential for improving research efficiency and accuracy. These skills contribute to both immediate academic performance and long-term human development through qualified scholarly output.

Despite AI's potential to enhance scientific research, its effective integration faces multiple barriers, including researchers limited technical skills, high tool costs, weak Arabic language support, and insufficient digital infrastructure. Additional challenges include ethical concerns, tool inaccuracy, lack of training, and limited methodological understanding among students ([Eid, 2024](#); [Al-Sayyad & Al-Salem, 2023](#)). Evidence from postgraduate programmes in the region points in the same direction: students employed GenAI tools mainly as learning and writing assistants, yet reported difficulties related to output accuracy, ethical use, and the risk of skill erosion arising from over-reliance ([Aldulaijan & Almalky, 2025](#)). Recent studies confirm growing acceptance of AI in scientific research, highlighting its positive impact on academic writing, data analysis, and research efficiency, particularly among faculty and postgraduate students. However, challenges such as technical limitations, ethical concerns, and low AI responsiveness in some contexts underscore the need for training, infrastructure, and thoughtful integration strategies ([Almazrui et al., 2025](#); [Bista & Bista, 2025](#); [Slimi & Villarejo-Carballido, 2023](#); [Eid, 2024](#); [Alshammari, 2024](#); [Sova et al., 2024](#); [Al-Sayyad & Al-Salem, 2023](#)).

Although the integration of artificial intelligence in higher education is gaining momentum, there is still limited empirical evidence on how AI tools are actually being employed to enhance scientific research abilities among students at the Arab Open University (AOU) in Oman. Existing research highlights the potential of AI in supporting academic writing, data analysis, and research productivity; however, these studies rarely address the specific practices, levels of utilization, and perceived effectiveness within the AOU context. Moreover, the challenges faced by postgraduate students—such as issues related to accuracy, ethical use, digital competence, and access to advanced AI tools—remain insufficiently examined. This lack of context-specific understanding creates a critical gap that necessitates a focused investigation into both the reality of AI use and the obstacles that limit its effective adoption in scientific research at AOU Oman.

Based on the researchers' knowledge, there is a shortage of studies Particularly addressing the reality of AI use in developing scientific research skills within academic and educational fields, particularly in Omani universities. This study is unique in its focus on the academic environment in Oman, offering deeper insights into how AI is currently employed in scientific research at the AOU. This highlights a clear research gap that warrants attention. Therefore. Accordingly, this study investigates the contribution of AI to improvement of scientific research abilities among students at the AOU. It explores both the current usage and challenges of AI integration, aiming to present a forward-looking vision that aligns with the demands of digital innovation, research sustainability, and institutional excellence. By doing so, it contributes to the evolving discourse in AI's transformative role in education and scientific inquiry, providing a framework for policymakers, educators, and academic institutions to support AI-enabled learning and research

METHOD

Study methodology

Given the nature of this study, which investigates the use of AI to enhance the scientific research competencies of postgraduate students in the College of Education at AOU in the Sultanate of Oman, specifically students of the Educational Qualification Diploma and Master's programs, from their perspective, the researchers adopted a quantitative methodology. This approach was considered most appropriate for analysing the phenomenon under study, understanding students' views on advanced technologies, particularly AI in scientific research, and identifying the challenges they face during the research process.

Participants

The study population consists of postgraduate students in the Faculty of Education at the Arab Open University in the Sultanate of Oman, including students enrolled in the Postgraduate Diploma in Educational Qualification and master's programs. This group represents the academic research environment that the study seeks to investigate, particularly in terms of their utilization of artificial intelligence to develop scientific research skills. The sample was purposively selected due to the academic nature of their studies, which necessitates the use of AI tools while preparing studies. The sample is estimated at around 64 students from Educational Qualification Diploma they are students who have completed their bachelor's degree and enrolled in the Higher Diploma in Teacher Qualification program, and also student from Educational Leadership and Educational Technology specializations master's programs, being the most relevant to the study topic and the applications of AI in research contexts. The number of women was 35; the number of men was 29.

Data collection

Instrument development and validation

To collect the required data, a structured questionnaire was developed to measure postgraduate students' perceptions regarding the use of Artificial Intelligence (AI) tools in enhancing scientific research skills and the challenges associated with their use at the Arab Open University (AOU), Sultanate of Oman. The questionnaire was designed in alignment with the study objectives and based on a review of relevant literature addressing AI applications in higher education, digital research competencies, and barriers to technology adoption in academic research.

The questionnaire consisted of 32 items distributed across two main dimensions:

1. **Utilization in Enhancing Research Skills** (14 items):
This dimension measured the extent to which AI tools support students in performing research-related tasks such as searching for academic sources, generating titles, summarizing texts, improving writing quality, analyzing data, developing hypotheses, and detecting plagiarism.
2. **Challenges Facing Postgraduate Students in Using AI Tools** (18 items):
This dimension examined obstacles that may limit effective AI integration in scientific research, including financial constraints, limited institutional support, technical barriers, ethical concerns, lack of Arabic language support, copyright issues, and insufficient training.

The questionnaire items were developed by adapting indicators commonly addressed in prior studies on AI adoption in education and research environments, while also incorporating items specifically relevant to the context of postgraduate students at AOU in Oman. This ensured both contextual relevance and theoretical alignment. The questionnaire items were developed by drawing on previous studies related to AI adoption in education and research, particularly the works of [Kasneci et al. \(2023\)](#) on the educational applications of ChatGPT, [Tlili et al. \(2023\)](#) on opportunities and challenges of generative AI in education, and [Davis \(1989\)](#) through the Technology Acceptance Model (TAM), which is widely used in measuring technology adoption.

A five-point Likert scale was employed for responses, ranging from (1) Strongly Disagree to (5) Strongly Agree. To ensure content validity, the questionnaire was reviewed by a panel of five PhD-holding experts specializing in educational technology, who evaluated its clarity, relevance, linguistic accuracy, and alignment with the study objectives. Based on their feedback, three items were removed and several others were rephrased to enhance their suitability and precision. Furthermore, a pilot study was conducted on a sample outside the main study group to assess item clarity and confirm the overall appropriateness of the instrument prior to its administration in the main study.

To establish content validity, the questionnaire was presented to a panel of five expert reviewers holding PhD degrees and specialized in educational technology. They evaluated the instrument in terms of clarity, relevance, linguistic accuracy, and alignment with the study objectives. Based on their recommendations, three items were deleted and several other items were rephrased to improve their suitability and accuracy. In addition, a pilot study was conducted on a group outside the main study sample to examine item clarity and ensure the appropriateness of the questionnaire before administering it in the main study.

Regarding reliability, Cronbach's Alpha coefficient was calculated and reached 0.89, indicating a high level of internal consistency and confirming the instrument's suitability for the main study.

Table 1

Reliability of the Instrument

Reliability Test	Sample Size	Number of Item	Cronbach's Alph	Interpretatio
Study Instrument	22	32	0.981	High internal consistency and suitable for the main study

Data analysis

The Statistical Package for the Social Sciences (SPSS) was used to analyze the collected data. Descriptive statistics, including frequencies, means, standard deviations, and rankings, were calculated to assess the degree of AI utilization and the challenges encountered by postgraduate students. In addition, inferential statistics such as the independent samples t-test were employed to examine differences in responses according to gender.

Limitations

The study was limited to postgraduate students in Faculty of Education enrolled at one institution in the Sultanate of Oman, with a relatively small sample size. Therefore, caution should be exercised when generalizing the findings to other universities or national contexts. Future studies are encouraged to include larger and more diverse samples across multiple institutions and regions, as well as to employ mixed-methods approaches for deeper insights into AI use in academic research.

RESULTS AND DISCUSSION

Results

The current research aimed at examining the usage of AI tools to enhance student's scientific research skills as well as the challenges facing this implementation by students at the AOU in the Sultanate of Oman. The analysis addressed four primary questions. The study adopted a 95% confidence interval, which is widely used in social science research, indicating that the estimated intervals are expected to contain the true population parameters with a probability of 95%, corresponding to a significance level of $\alpha = 0.05$. To ensure the appropriateness of using parametric statistical tests, the normality of the overall mean scores of the questionnaire was examined using both the Kolmogorov-Smirnov and Shapiro-Wilk tests.

Table 2

Results of Normality Tests for the Overall Mean Score of the Questionnaire

Test	Statistic	df	Sig.	Result
Kolmogorov-Smirnov	0.095	64	0.200	Normally distributed
Shapiro-Wilk	0.962	64	0.052	Normally distributed

The results presented in Table 2 indicate that the significance values (Sig.) for both the Kolmogorov-Smirnov test (0.200) and the Shapiro-Wilk test (0.052) are greater than the standard threshold of 0.05. This suggests that the distribution of the overall mean scores of the questionnaire does not significantly deviate from normality. Accordingly, the assumption of normality is satisfied, which justifies the use of parametric statistical tests in subsequent analyses, such as the independent samples t-test.

RQ 1: *What is the reality of employing AI in enhancing scientific research abilities among students at the AOU in Oman?*

Means, standard deviations, and ranking sample's answers on AI employment scale were calculated, as shown in Table 3. Referring to Table 1, the findings reflect that the degree of AI utilization in developing

Table 3

Descriptive Statistics for AI Utilization in Research Skill Development (N = 64)

Rank	Item No.	Item Description	Sample Size	Mean	Std. Dev.	Level
1	1	I search for academic sources and references	64	4.06	.833	High
2	2	I suggest titles for scientific research	64	4.03	.689	High
3	9	I translate texts and research papers	64	4.02	.934	High
4	4	I develop my research skills and formulate hypotheses	64	4.0	.756	High
5	13	I spend less time completing scientific research	64	3.94	.871	High
6	5	I write the theoretical framework	64	3.89	.737	High
7	14	I produce images and videos that help in my research	64	3.81	.889	High
8	3	I formulate the research problem	64	3.8	.78	High
9	10	I use automatic summarization tools	64	3.78	1.031	High
10	8	I proofread and linguistically enhance my academic writing	64	3.77	1.004	High
11	7	I design tables and graphs	64	3.45	1.097	High
12	6	I statistically analyze my research data	64	3.38	1.215	Mode rate
13	12	I detect similarities with other works	64	3.34	1.042	Mode rate
14	11	I measure the plagiarism percentage	64	3.28	1.133	Mode rate
AI Utilization in Developing Research Skills			64	3.75	0.72	High

Table 3 presents the results of the questionnaire on the respondents' perceptions regarding the development of research skills of AOU students after using artificial in the Sultanate of Oman. The overall mean reached 3.75, and standard deviation 0.72, showing high level of perceived effectiveness. The mean was ranged from 4.06 to 3.75, with standard deviations was between 1.215 and .689. The highest-rated criteria were "I search for academic sources and references" mean= 4.06, standard deviation = 0.833, then "I suggest titles for scientific research" (M = 4.03, SD = 0.689), and "I translate texts and research papers" (M = 4.02, SD = 0.934). The lowest-rated item was "I measure the plagiarism percentage", mean= 3.28 and standard deviation = 1.133.

RQ 2: *What are the main challenges that postgraduate students face when using AI tools in their scientific research?*

Table 4

Descriptive Statistics for the Main Challenges in Using AI Tools in scientific research (N = 64)

Rank	Item No.	Item Description	Sample Size	Mean	Std. Dev.	Level
1	18	Lack of institutional support or funding for the use of AI in scientific research.	64	3.86	0.663	High
2	17	Limited access to technical support or maintenance for AI-powered tools.	64	3.73	0.877	High
3	16	High subscription costs associated with paid artificial intelligence tools.	64	3.67	0.874	High
4	10	vagueness in legal policies controlling the utilize of AI in research.	64	3.66	0.821	High
5	8	Absence of ethical standards and non-compliance with academic integrity and transparency in scientific research.	64	3.55	0.975	High
6	9	Lack of credibility in the information and outputs generated by artificial intelligence tools.	64	3.53	0.796	High
7	7	Limited capability of artificial intelligence tools to accurately analyze complex data.	64	3.48	1.023	High
8	5	Using artificial intelligence tools in scientific research requires advanced technical knowledge.	64	3.44	1.037	High
9	1	lack of AI tools customized to scientific research in my field.	64	3.41	0.830	High
10	11	Conflict between AI tools and intellectual property rights in scientific research.	64	3.39	0.809	Moderate
11	13	Bias in research data utilized by artificial intelligence tools.	64	3.36	0.784	Moderate
12	15	Difficulty in interpreting the results of analyses conducted using artificial intelligence tools.	64	3.34	0.912	Moderate
13	4	Insufficient support for the Arabic language in most artificial intelligence tools.	64	3.34	0.912	Moderate
14	12	Resistance from the academic community toward using artificial intelligence in my research.	64	3.31	0.852	Moderate
15	6	Reduced accuracy of my research findings when using artificial intelligence tools.	64	3.27	0.802	Moderate
16	14	Using artificial intelligence in research limits my autonomy as a researcher in analyzing results.	64	3.23	0.955	Moderate
17	3	It restricts creativity and innovation in scientific research.	64	3.22	1.046	Moderate
18	2	I find it difficult to access AI tools to support my research.	64	3.13	0.951	Moderate
19	19	Challenges met by postgraduate students in Utilizing AI in scientific research	64	3.4401	0.557	High

According to Table 4, the overall mean of the domain reached 3.4401 with a (SD) of 0.557, demonstrating a high degree of perceived challenge. Results show that means varied between 3.86 and 3.13 with standard deviations ranging between 0.663 and 1.046. Item 18, which states "Lack of institutional support or funding for the use of AI in scientific research," ranked first with the highest mean of 3.86, followed by item 17, "Limited access to technical

support or maintenance for AI-powered tools," with a mean of 3.73, and item 16, "High subscription cost for paid AI tools," which came third with a mean of 3.67. Meanwhile, item 2, "I find it difficult to access AI tools to support my research," ranked last with a mean of 3.13.

RQ 3: *What are the statistically significant variations at the level of ($\alpha \leq 0.05$) among AOU students' perceptions on using AI tools to enhance skills of scientific research, attributed to the Academic Level?*

To determine the differences for the components of the AI use scale in developing research skills among postgraduate students in the College of Education at AOU in the Sultanate of Oman, Independent Samples t-test conducted to examine observed statistically significant differences were based on Academic Level.

Table 5

Findings of Independent Samples t-test for variable by Gender for the Overall Use of AI in Developing Research Skills

Academic Level	N	Mean	Standard Deviation	Df	t	Sig	Effect Size (d)
Master's degree	30	4.1048	0.50254	58.165	4.202	0.000	1.10
Bachelor's degree	34	3.4433	0.74600				

The findings demonstrated in Table 5 show differences between responses according to Academic Level regarding the role of AI in enhancing skills of postgraduate students in the College of Education at AOU in Sultanate of Oman in the field of research and studies showed no statistical significance. Upon examining the means and standard deviations, the mean score for the Master's degree group was (4.1048), representing approximately (82.09%) of the total scale score and standard deviation (0.50254). In contrast, with mean for the Educational Qualification Diploma degree group was (3.4433), equivalent to (68.86%) of the total scale score, with a standard deviation of (3.4433). The obtained t-value was (4.202), and the p-value was (0.000), which is lower than the significance level of (0.05), indicating a statistically significant result. This finding demonstrates that there are statistically significant differences in favor of the Master's degree group compared to the Bachelor's degree group on the overall scale.

To examine the practical significance of the differences in perceptions of Omani Arab Open University (AOU) students regarding the implementation of artificial intelligence tools in scientific research, Cohen's d was calculated. The results indicated a large effect size ($d = 1.10$), suggesting that the observed difference between Master's and Bachelor's degree students is not only statistically significant but also meaningful in practical terms. This finding implies that academic level plays a strong role in shaping students' perceptions of AI tool utilization in scientific research, with Master's students reporting more positive perceptions and higher mean scores compared to Bachelor's degree students.

RQ 4: *What are the statistically significant variations at the level of ($\alpha \leq 0.05$) among AOU students' perceptions on using AI tools to enhance skills of scientific research, attributed to the variable of gender?*

To determine the differences for the components of the AI use scale in developing research skills among students at the AOU in Oman, Independent Samples t-test conducted to examine observed statistically significant differences were based on gender.

Table 6

Findings of Independent Samples t-test for variable by Gender for the Overall Use of AI in Developing Research Skills

Gender	N	Mean	Standard Deviation	Df	t	Sig	Effect Size (d)
Male	29	3.6847	0.75412	62	0.691	0.492	0.0076
Female	35	3.8102	0.69640				

The findings demonstrated in Table 6 show differences between responses according to gender regarding the role of AI in enhancing skills of AOU postgraduate students in Sultanate of Oman in the field of research and studies showed no statistical significance. Upon examining the means and standard deviations, the mean score for the male group was (3.6847), representing approximately (73.6%) of the total scale score and standard deviation (0.75412). In contrast, with mean for the female group was (3.8102), equivalent to (76.2%) of the total scale score, with a standard deviation of (0.69640).

The T-value obtained is (0.691), and (p-value) of (0.492), which exceeds the significance starting point of (0.05). This Finding demonstrates that there are no significant statistical differences were found between the mean of the male and female on the overall scale. To assess the practical significance of gender-based differences in perceptions of Omani Arab Open University (AOU) students regarding the use of artificial intelligence tools in scientific research, Cohen's d was calculated. The results indicated a small effect size ($d = 0.0076$), suggesting that the difference between male and female students is statistically negligible and lacks practical significance. This finding implies that gender does not play a meaningful role in shaping students' perceptions of AI tool utilization in scientific research.

Discussion

Referring to Table 3 indicate a high level of AI utilization to enhance skills in scientific research among AOU students in Sultanate of Oman, with mean scores ranging from 3.28 to 4.06. This variation reflects differing usage patterns across research stages. Tasks such as searching for academic sources, suggesting research titles, and translating academic content were most frequently supported by AI tools. These tools appear especially valuable during the initial phases of research, which may be attributed to their accessibility, ease of use, and effectiveness in streamlining early-stage academic processes.

In contrast, activities related to plagiarism detection and similarity checking scored lower, indicating limited AI integration in tasks requiring in-depth ethical judgment or methodological rigor. This underuse could result from a lack of training, limited access, or the marginal presence of such tools in academic instruction. Overall, while students acknowledge AI's significance in enhancing research skills, its application is predominantly limited to foundational research tasks. These results underscore the necessity of equipping

students with training on advanced AI tools for documentation, data analysis, and academic integrity.

These results are consistent with prior studies, which confirm frequent AI usage for research preparation and translation ([Almazruui et al., 2025](#); [Alshammari, 2024](#); [Bista & Bista, 2025](#)). Similarly, some researchers utilize artificial intelligence tools for source retrieval and text paraphrasing in their academic work. [Aldulaijan and Almalky \(2025\)](#) documented widespread use of AI for source retrieval and paraphrasing. Comparable evidence from doctoral education indicates that GenAI tools are valued primarily as a complement to conventional database searching in the literature review process, and that their effectiveness depends on the information literacy and research skills users already possess ([Kumar & Gunn, 2025](#)). However, these results diverge from [Al-Sayyad and Al-Salem \(2023\)](#), who observed limited AI tool use among female students, particularly in early research tasks.

The analysis of Table 4 reveals that students perceived a high level of challenges when using AI in scientific research. Chief among these challenges were institutional challenges mainly lack funds, inadequate technical support, and insufficient training programs. These structural deficiencies significantly impede students' ability to utilize AI tools effectively in their academic work. The findings point to a critical need for universities to enhance their technical infrastructure, establish digital training platforms, offer ongoing workshops, and provide dedicated academic and technical support. Such initiatives would enable broader and more competent AI adoption in research activities.

Notably, concerns related to data credibility and excessive reliance on AI received lower mean scores, indicating that ethical reservations are not the primary impediments. Instead, the core challenges stem from organizational and technical shortcomings. [Eid \(2024\)](#) and [Alshammari \(2024\)](#), who emphasized infrastructural and knowledge-based challenges. However, the results differ from [Al-Sayyad and Al-Salem \(2023\)](#), who highlighted ethical concerns and researcher marginalization as the dominant obstacles.

According to Table 5, statistically significant differences were found based on academic level in students' perceptions of the role of AI in enhancing research skills, in favor of Master's students. This indicates that Master's students hold more positive views toward AI use than diploma students. This may be due to their greater involvement in research tasks such as thesis writing, literature review, and data analysis, which increases their need for AI tools. The large effect size also confirms that academic level has a meaningful influence on AI perceptions and usage. These findings are consistent with comparative evidence from Poland and Egypt, in which study level moderated students' acceptance and use of generative AI, whereas the moderating role of gender was not consistent across the two samples ([Strzelecki & ElArabawy, 2024](#)). Therefore, universities should provide training programs suited to each academic level, with introductory support for diploma students and advanced AI applications for Master's students.

According to Table 6, differences according to gender were non-statistically significant among students' perceptions regarding using AI in scientific research. This uniformity suggests a shared cognitive and behavioral orientation toward AI tools across both male and female students. Equal access to digital resources and educational opportunities at the AOU are likely to contribute to this parity. These results agree with [Alshammari \(2024\)](#) and [Sánchez-Rivas et al. \(2026\)](#), who also reported no gender differences in AI tool utilization, suggesting that digital engagement in academic environments has become inclusive and standardized. A large-scale survey of higher

education students similarly reported no statistically significant gender differences in perceived readiness, benefits, or concerns regarding GenAI, although significant differences did emerge across academic classifications (Maxwell et al., 2025). However, they contrast with the findings of (Al-Sayyad & Al-Salem, 2023), which reported higher AI usage among female students, attributed to deeper research engagement and stronger academic commitment.

CONCLUSION

According to the results of this research, AI tools are highly utilized in enhancing scientific research skills among students at the AOU in Oman. These tools are particularly influential in the stages of information gathering, title formulation, and academic translation. The study also identified significant challenges that limit the effectiveness of this utilization, most notably the lack of institutional support, insufficient technical training, high cost of some tools, and limitations of certain technologies in dealing with qualitative aspects of research. Analysis of variance between male and female responses revealed no statistically significant differences, indicating a similar level of awareness among both genders regarding implementing AI. These findings underscore how important enhancing digital infrastructure, offering systematic training programs, and promoting academic awareness of the ethical use of these tools to ensure their optimal application in developing research capabilities and improving the quality of scientific output within academic institutions.

ACKNOWLEDGEMENT

We would like to express our profound gratitude to AOU- Oman for funding this research.

AUTHOR CONTRIBUTION

Sami Almazrui: Conceptualization; Methodology; Formal analysis; Investigation; Software; Validation; Supervision; Project administration; Writing – original draft.

Muna Al Qasmi: Conceptualization; Investigation; Writing – original draft (literature review and theoretical framework).

Hamed Alyahmadi: Validation; Writing – review & editing; Language editing and proofreading of the final manuscript.

Mohammed Al Qasmi: Resources; Data curation; Investigation (identification, retrieval, and management of sources and references).

Hajar Alhosni: Writing – review & editing; Translation of the manuscript into English; Visualization; Project administration; Corresponding author responsible for manuscript compilation, submission, and correspondence with the journal.

All authors have read and approved the final version of the manuscript and agree to be accountable for all aspects of the work.

REFERENCES

- Aldulaijan, A. T., & Almalky, S. M. (2025). The impact of generative AI tools on postgraduate students' learning experiences: New insights into usage patterns. *Journal of Information Technology Education: Research*, 24, Article 003. <https://doi.org/10.28945/5428>
- Alhashmi, S. F. S., Alshurideh, M., & Al Kurdi, B. (2022). A systematic review of artificial intelligence in the Arab world: Challenges and recommendations. *International Journal of Data and Network Science*, 6(2), 429–438. <https://doi.org/10.5267/ijdns.2021.12.006>
- Almazrui, S. K., Al Hosni, H., & Alyahmadi, H. (2025). The acceptance level of AI-based research technologies among faculty members in private universities: A TAM-based study. *International Journal for Multidisciplinary Research*, 7(3). <https://doi.org/10.36948/ijfmr.2025.v07i03.48312>
- Al-Sayyad, M., & Al-Salem, W. (2023). The role of AI in developing research skills among female students of the College of Education at King Saud University. *Journal of Educational and Qualitative Research*, 19(3), 247–288. <https://doi.org/10.21608/jeor.2023.310066>
- Alshammari, R. T. A. (2024). The contribution of artificial intelligence applications to developing research skills among postgraduate students at the University of Hafr Al-Batin. *Journal of the Faculty of Education, Assiut University*, 40(10), 254–277. HYPERLINK "https://doi.org/10.21608/mfes.2024.407591" \t "_new" <https://doi.org/10.21608/mfes.2024.407591>
- Arnout, B. A. (2020). Investing scientific research outputs in light of crises and disasters: COVID-19 crisis as a model. *Journal of Public Affairs*, Article e2356. <https://doi.org/10.1002/pa.2356>
- Bista, K., & Bista, R. (2025). Leveraging AI tools in academic writing: Insights from doctoral students on benefits and challenges. *American Journal of STEM Education*, 6, 32–47. <https://doi.org/10.32674/9m8dq081>
- Chubb, J., Cowling, P., & Reed, D. (2022). Speeding up to keep up: Exploring the use of AI in the research process. *AI & Society*, 37(4), 1439–1457. <https://doi.org/10.1007/s00146-021-01259-0>
- Crompton, H., & Burke, D. (2023). Artificial intelligence in higher education: The state of the field. *International Journal of Educational Technology in Higher Education*, 20, Article 22. <https://doi.org/10.1186/s41239-023-00392-8>
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319–340. <https://doi.org/10.2307/249008>
- Eid, B. A. A. S. (2024). The role of AI in developing educational and research processes in universities: A field study at Mansoura University. *Journal of the Faculty of Arts*, 29(29), 395–522. <https://doi.org/10.21608/jfpsu.2024.288197.1351>
- Elbadawi, M., Li, H., Basit, A. W., & Gaisford, S. (2024). The role of artificial intelligence in generating original scientific research. *International Journal of Pharmaceutics*, 652, Article 123741. <https://doi.org/10.1016/j.ijpharm.2023.123741>
- Jaber, T. A. (2022). Artificial intelligence in computer networks. *Periodicals of Engineering and Natural Sciences*, 10(1), 309–322. <https://doi.org/10.21533/pen.v10.i1.539>
- Jiang, M., & Zhu, Z. (2022). The role of artificial intelligence algorithms in marine scientific research. *Frontiers in Marine Science*, 9, p. 920994, 2022. <https://doi.org/10.3389/fmars.2022.920994>
- Karbasi, Z., Gohari, S. H., & Sabahi, A. (2023). Bibliometric analysis of the use of artificial intelligence in COVID-19 based on scientific studies. *Health Science Reports*, 6(5), e1244. <https://doi.org/10.1002/hsr2.1244>
- Kasneci, E., Sessler, K., Küchemann, S., Bannert, M., Dementieva, D., Fischer, F., Gasser, U., Groh, G., Günnemann, S., & Hüllermeier, E. (2023). ChatGPT for good? On opportunities and challenges

- hr/>
- of large language models for education. *Learning and Individual Differences*, 103, 102274. <https://doi.org/10.1016/j.lindif.2023.102274>
- Khalifa, M., & Albadawy, M. (2024). Using artificial intelligence in academic writing and research: An essential productivity tool. *Computer Methods and Programs in Biomedicine Update*, 5, Article 100145. <https://doi.org/10.1016/j.cmpbup.2024.100145>
- Kong, X., Liu, L., Yu, S., Yang, A., Bai, X., & Xu, B. (2019). Skill ranking of researchers via hypergraph. *Peerj computer science*, 5, e182. <https://doi.org/10.7717/peerj-cs.182>
- Kumar, S., & Gunn, A. (2025). Doctoral students' reflections on generative artificial intelligence (GenAI) use in the literature review process. *Innovations in Education and Teaching International*, 62(4), 1395–1408. <https://doi.org/10.1080/14703297.2024.2427049>
- Limongi, R. (2024). The use of artificial intelligence in scientific research with integrity and ethics. *Future Studies Research Journal: Trends and Strategies*, 16(1), Article e845. <https://doi.org/10.24023/FutureJournal/2175-5825/2024.v16i1.845>
- Maxwell, D., Oyarzun, B., Kim, S., & Bong, J. Y. (2025). Generative AI in higher education: Demographic differences in student perceived readiness, benefits, and challenges. *TechTrends*, 69(6), 1248–1259. <https://doi.org/10.1007/s11528-025-01109-6>
- Mohammadi, E., Thelwall, M., Cai, Y., Collier, T., Tahamtan, I., & Eftekhari, A. (2026). Is generative AI reshaping academic practices worldwide? A survey of adoption, benefits, and concerns. *Information Processing & Management*, 63(1), Article 104350. <https://doi.org/10.1016/j.ipm.2025.104350>
- Sánchez-Rivas, E., Franco-Caballero, P. D., Sánchez-Rodríguez, J., & Ruiz-Viruel, S. (2026). The use of ChatGPT in university assignments: An analysis based on gender variable. *Frontiers in Education*, 10, Article 1738691. <https://doi.org/10.3389/feduc.2025.1738691>
- Shahsavari, Z., Kafipour, R., Khojasteh, L., & Pakdel, F. (2024). Is artificial intelligence for everyone? Analyzing the role of ChatGPT as a writing assistant for medical students. *Frontiers in Education*, 9, Article 1457744. <https://doi.org/10.3389/feduc.2024.1457744>
- Slimi, Z., & Villarejo-Carballido, B. (2023). Systematic review: AI's impact on higher education — Learning, teaching, and career opportunities. *TEM Journal*, 12(3), 1627–1637. <https://doi.org/10.18421/TEM123-44>
- Sova, R., Tudor, C., Tartavulea, C. V., & Dieaconescu, R. I. (2024). Artificial intelligence tool adoption in higher education: A structural equation modeling approach to understanding impact factors among economics students. *Electronics*, 13(18), 3632. <https://doi.org/10.3390/electronics13183632>
- Strzelecki, A., & ElArabawy, S. (2024). Investigation of the moderation effect of gender and study level on the acceptance and use of generative AI by higher education students: Comparative evidence from Poland and Egypt. *British Journal of Educational Technology*, 55(3), 1209–1230. <https://doi.org/10.1111/bjet.13425>
- Sujee, S., Othmani, S. H., & Dalwai, T. (2024). Toward a knowledge-based economy: Empowering higher education in Oman with AI for Vision 2040 achievement. In N. Mansour & L. M. Bujosa Vadell (Eds.), *Finance and law in the metaverse world* (pp. 133–142). Springer. https://doi.org/10.1007/978-3-031-67547-8_12
- Tlili, A., Shehata, B., Adarkwah, M. A., Bozkurt, A., Hickey, D. T., Huang, R., & Agyemang, B. (2023). What if the devil is my guardian angel: ChatGPT as a case study of using chatbots in education. *Smart Learning Environments*, 10(1), 15. <https://doi.org/10.1186/s40561-023-00237-x>
- Xu, Y., Liu, X., Cao, X., Huang, C., Liu, E., Qian, S., ... & Zhang, J. (2021). Artificial intelligence: A powerful paradigm for scientific research. *The innovation*, 2(4). <https://doi.org/10.1016/j.xinn.2021.100179>
- hr/>

Conflict of Interest Statement: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Copyright © 2026 Author(s). This is an open-access article distributed under the terms of the [Creative Commons Attribution 4.0 International License \(CC BY\)](#). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.