

Challenges of Using Artificial Intelligence Applications in Academic Research among Saudi University Students

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ABSTRACT

This study examines the challenges Saudi university students face when using artificial intelligence applications in academic research, with particular attention to academic, cognitive-skill, and ethical dimensions. Adopting a quantitative descriptive survey design, the study collected data through an electronic questionnaire administered to 54 students at Imam Abdulrahman Bin Faisal University during November and December 2025. The findings reveal substantial challenges across all three dimensions. Academic challenges recorded an overall agreement rate of 73.9%, indicating concerns about weakened academic writing, reduced reliance on original sources, and limited independent problem-solving. Cognitive and skill-related challenges reached 67.6%, reflecting difficulties in selecting appropriate tools, distinguishing accurate from inaccurate outputs, and sustaining critical thinking. Ethical challenges were the most pronounced, with an agreement rate of 75.1%, especially regarding information accuracy, bias, proper citation, and responsibility for AI-generated errors. The study concludes that the growing use of AI in academic research requires structured training, clearer ethical guidelines, and balanced integration strategies that preserve students' intellectual independence and research integrity within Saudi higher education.

KEYWORDS: Artificial Intelligence; Academic Research; Research Ethics; Academic Integrity; Critical Thinking; Saudi Higher Education.

THEORETICAL FRAMEWORK

In the era of rapid digital transformation, artificial intelligence has become an essential component of the scientific research ecosystem. It has provided researchers and academics with innovative tools that facilitate various stages of the research process, from identifying sources and collecting references to writing, analysis, and publication. These tools not only save time and effort but also improve the efficiency, speed, and precision of academic work.

AI Tools for Searching Scientific References

AI-based tools for literature searching represent one of the most important supports available to researchers at the beginning of the research process. They help users locate

credible sources and relevant references by searching academic databases and scholarly websites. Among the most widely used tools are **Google Scholar**, which is one of the most popular academic search engines, and **Publish or Perish**, which provides citation-based analysis and helps researchers evaluate scholarly impact. More recently, tools such as **Elicit** have emerged, using artificial intelligence to generate smart research suggestions and assist in identifying relevant studies (Al-Kumayshi, 2025).

AI Tools for Academic Writing and Text Generation

Academic writing is often one of the most demanding tasks in the research process. For this reason, AI applications have become increasingly useful in supporting researchers in composing sentences, organizing ideas, and improving language quality. Tools such as **ChatGPT-4** and **QuillBot** provide linguistic suggestions, help improve academic style, and support the correction of spelling and phrasing errors. These tools are also valuable because they can support writing in multiple languages, including Arabic, which is especially relevant in Arab academic contexts (Al-Kumayshi, 2025).

AI Tools for Mind Mapping and Presentation Design

The organization and visual representation of ideas are important in scientific research, especially when researchers need to conceptualize complex topics or present findings clearly. AI-supported applications such as **Context Minds** help users create mind maps and organize conceptual relationships among ideas. Similarly, presentation tools such as **Microsoft PowerPoint** and **SlidesAI** enable the transformation of written text into structured and visually appealing presentations, which can support academic communication and dissemination of research outcomes (Shaltout, 2023).

AI Tools for Proofreading and Language Editing

One of the important stages in academic writing is ensuring linguistic accuracy and clarity. Researchers increasingly depend on AI-based proofreading tools to detect spelling, grammar, and stylistic errors. Applications such as **Hemingway**, in addition to built-in tools in writing software such as **Microsoft Word**, assist researchers in refining academic texts and improving readability. This contributes to the production of clearer and more professional scholarly writing (Shaltout, 2023).

AI Tools for Reference Management

Reference organization and citation formatting are essential requirements in scientific research. AI-supported reference management tools such as **Mendeley**, **Zotero**, and **EndNote** enable researchers to collect, organize, store, and cite sources according to recognized academic styles. These tools reduce formatting errors, save time, and enhance consistency in documentation, which strengthens the overall quality of research outputs (Ramadan, 2024).

Advantages of Using AI Applications in Scientific Research

Several studies have shown that artificial intelligence has brought major changes to scientific research and has provided many advantages for researchers (Al-Kabir & Hijazi, 2023; Sabti & Abbas, 2024; Qais, 2025; Saad, 2023). One of its major benefits is the ability to process and analyze massive amounts of data in a short time compared with traditional methods, which increases efficiency and reduces human error. AI can also support the prediction of future outcomes through intelligent models that rely on previous data, thereby opening new possibilities for discovery in fields such as medicine, engineering, and environmental science.

In addition, AI applications can offer innovative solutions to complex problems that are difficult to address through conventional approaches. They also enable rapid access to accurate information by searching across vast scientific resources within seconds, thus helping researchers build stronger and more comprehensive studies. Moreover, AI has

demonstrated practical usefulness in areas such as genetic data analysis, drug development, climate prediction, and medical image analysis, all of which reflect its growing importance in improving quality of life and advancing scientific knowledge.

Challenges of Using AI Applications in Scientific Research

Despite these benefits, students and researchers face a number of challenges when using AI applications in scientific research (Ramadan, 2024; Hadou, 2024; Othman, 2024). One key challenge is **limited familiarity with modern technologies**. Many students do not possess sufficient knowledge of how to use AI tools effectively in research, which restricts their ability to benefit from them in an optimal way.

Another challenge involves **ethical considerations and algorithmic bias**. The use of AI raises concerns related to biased outputs, violations of privacy, and intellectual property issues, especially when researchers rely on content-generation tools. A further challenge is **weak technical infrastructure and limited institutional support**. Some universities may not provide an integrated digital environment or sufficient training opportunities, which reduces the effectiveness of AI applications in academic research.

Researchers also encounter **difficulty in verifying the scientific credibility of AI-generated outputs**. AI systems may produce inaccurate, incomplete, or unreliable information, which requires users to exercise strong verification and critical evaluation skills. In addition, the **absence of clear legal and regulatory frameworks** governing AI use in scientific research creates uncertainty regarding acceptable and responsible use.

Negative Implications of Overreliance on AI in Research

A number of scholars have also highlighted the disadvantages associated with AI use in scientific research (Abdel Ghani, 2024; Taha مفتاح et al., 2024; Abdel Razek, 2024; Ahmed, 2024). Excessive dependence on AI may weaken traditional research skills such as critical analysis, idea formulation, and academic writing, which can negatively affect the quality of scholarly output and limit the researcher's capacity for creativity and innovation.

Another major concern is the difficulty of assessing the quality of information generated by AI tools. Because these systems rely on algorithms that may produce inaccurate or unverified content, researchers must exert additional effort to confirm the validity of the information before integrating it into their work. This concern becomes even more serious in studies that require highly precise data.

AI may also contribute to **data and algorithmic bias**, which can lead to distorted or non-objective research findings. Likewise, overuse of AI can reduce critical thinking and originality by making researchers less likely to formulate independent ideas or solve research problems on their own. Other concerns include **privacy and cybersecurity risks**, since sharing research data on AI platforms may expose it to misuse or breaches, as well as **ethical risks related to academic integrity**, including plagiarism, poor attribution, and the reproduction of content without proper documentation.

Conceptual Relevance to the Present Study

Based on the preceding discussion, the theoretical foundation of the present study is built on the assumption that AI applications in scientific research are dual in nature: they offer significant functional support while simultaneously creating serious academic, cognitive-skill, and ethical challenges. This dual perspective is central to understanding the experiences of Saudi university students. The current study therefore examines these challenges through three interrelated dimensions: the **academic dimension**, which concerns writing quality, use of original sources, and independent problem-solving; the

cognitive-skill dimension, which includes selecting appropriate tools, distinguishing accurate from inaccurate outputs, and maintaining critical thinking; and the **ethical dimension**, which includes accuracy, bias, citation, responsibility, and academic integrity. This framework provides a basis for interpreting students' responses and for understanding how the increasing use of AI tools in higher education may influence research practices in Saudi universities within the broader context of digital transformation and Vision 2030.

Literature Review

The growing integration of artificial intelligence into academic and research environments has generated a substantial body of literature addressing both its opportunities and its challenges. Prior studies, whether Arabic or international, generally agree that AI applications can enhance research efficiency, support writing and data analysis, and facilitate access to knowledge. At the same time, they consistently warn against risks related to academic integrity, weak critical thinking, bias, and the absence of clear regulatory frameworks. The following review presents the most relevant studies related to the present research topic.

Arabic Studies

Abbas (2024) examined the impact of artificial intelligence applications on the production of scientific research in universities. The study clarified the tools used by researchers across different stages of the research process, beginning with topic selection and problem formulation and extending to data collection, analysis, writing, and referencing. It also highlighted the role of AI in the social sciences and humanities and showed how these tools can improve research quality and accelerate completion. However, the study emphasized that AI remains an assistive tool and cannot replace the researcher's expertise and critical judgment. Thus, responsible use is necessary to preserve academic integrity and adherence to scientific and ethical standards.

Naeem (2024) focused on the ethics of using AI applications in scientific research. The study discussed the importance of AI in developing knowledge and analyzing data, while also drawing attention to ethical concerns such as privacy violations, bias, and the misuse of information. It concluded that although AI has become an important tool in improving research quality and speeding up scholarly work, especially in the humanities and social sciences, it still requires human oversight and critical reasoning. The study stressed the need for ethical and scientific standards, the development of regulatory charters, and the establishment of specialized research centers to examine associated risks.

Fadl (2024) addressed the relationship between artificial intelligence and digital learning from both theoretical and practical perspectives. The study showed that AI has become a central instrument in reshaping education and improving learning quality through personalization, adaptive content, and data-driven recommendations. It also discussed cognitive, pedagogical, technical, and ethical challenges, including weakened critical thinking, inadequate infrastructure, and the spread of inaccurate information. The study recommended a shift toward educational models that prioritize creativity, critical thinking, practical application, ethical values, and teacher preparation for the responsible use of AI technologies.

International Studies

Strzelecki (2023) investigated university students' acceptance of generative AI applications in academic and research tasks through the UTAUT2 model. The study found that technological anxiety and incomplete trust in AI-generated outputs constitute major barriers to adoption. It also identified a digital-skills gap, especially in formulating prompts

effectively. The findings suggested that successful integration of AI in higher education depends on strengthening students' technical skills and updating educational policies to reflect ongoing technological developments.

Cotton et al. (2024) explored the ethical and legal challenges posed by AI applications in relation to scientific research, particularly regarding originality and academic honesty. One of the central problems identified was AI hallucination, including the generation of false or fabricated references, which directly threatens the quality and credibility of research outputs. The study emphasized the need for clear university regulations that balance the benefits of AI as a research assistant with the protection of academic integrity and intellectual property.

AlAfnan et al. (2023) examined both the opportunities and challenges faced by postgraduate students who use AI as a support tool in writing and research. The study found that informational bias and the limited ability of AI tools to perform deep critical analysis represent serious concerns. Overreliance on such tools may lead to a decline in creative thinking and analytical independence. The authors therefore recommended training students to distinguish between reliable and unreliable sources and to treat AI as a support mechanism rather than a substitute for human interpretation and scholarly judgment.

Sullivan et al. (2023) addressed institutional and policy-related challenges surrounding the use of AI tools in higher education. The study showed that many universities still suffer from regulatory ambiguity, which leaves students uncertain about the ethical boundaries of acceptable AI use. It concluded that one of the greatest institutional difficulties is detecting AI-generated content. Accordingly, the study called for a shift toward educational practices that embed digital ethics and responsible AI use within the core of academic learning and assessment.

Dwivedi et al. (2023) presented a multidisciplinary perspective on the challenges of generative AI in research. The study highlighted several major concerns, including the digital divide in access to advanced tools, intellectual property issues related to shared human-machine outputs, and the risk of cultural stereotyping in AI-generated responses. It recommended the development of broader international ethical frameworks to protect cultural diversity and promote fairness in the use of AI in scientific and academic research.

Synthesis of Previous Studies

A review of previous Arabic and international studies reveals several important points of convergence. First, most studies agree that AI is a powerful support tool in education and research, but it simultaneously introduces complex academic, technical, and ethical challenges. Second, academic integrity appears as the most recurring concern across the literature, especially in relation to plagiarism, originality, fabricated references, and improper attribution. Third, many studies point to the absence of clear institutional policies and legislative frameworks governing the responsible use of AI in academic work. Finally, most of these studies relied on descriptive or analytical approaches to explore emerging realities and anticipate potential risks.

Despite these similarities, important differences also appear. International studies tend to emphasize broader global concerns such as intellectual property, cultural bias, and the digital divide, whereas Arabic studies focus more on local educational reform, curriculum development, and institutional readiness. In terms of thematic focus, some studies concentrate on technological acceptance and digital skills, while others foreground writing quality, critical thinking, or ethical accountability. There is also variation in sample types,

as previous studies have examined faculty members, postgraduate students, researchers, and experts, producing diverse perspectives on AI use in higher education and research.

Research Gap

The current study is positioned to address a clear research gap. Although prior Arabic studies have discussed artificial intelligence in education and research more generally, there remains a shortage of field-based studies that focus specifically on **Saudi university students** and the challenges they experience in using AI applications for **scientific research** within the context of rapid digital transformation and Saudi Vision 2030. In addition, much of the earlier literature discusses AI in education at a broad level, while the present study focuses more specifically on AI tools used in the research process itself, such as literature support, summarization, analysis, and referencing. Moreover, given the rapid development of generative AI tools and the emergence of newer platforms such as ChatGPT, Perplexity, and Elicit, earlier studies may not fully capture the most recent challenges associated with these evolving applications.

Relevance of the Present Study

In light of the reviewed literature, the current study contributes by examining the issue through three integrated dimensions: **academic challenges**, **cognitive-skill challenges**, and **ethical challenges**. This integrated approach is particularly important because many previous studies addressed these issues separately, while the present research seeks to analyze them together from the perspective of Saudi university students themselves. In doing so, the study aims to provide a more context-specific understanding that may help universities develop training programs, ethical guidelines, and practical policies for the responsible use of AI in academic research.

METHODOLOGY

Research Design

This study adopted a **quantitative approach** using a **descriptive survey design**. This design was considered appropriate because the study aims to identify and describe the challenges faced by Saudi university students when using artificial intelligence applications in scientific research. The descriptive survey method allows the researchers to examine participants' perceptions and measure the extent of academic, cognitive-skill, and ethical challenges associated with the use of AI tools in research contexts.

Study Population

The study population consisted of students from **Imam Abdulrahman Bin Faisal University** across different academic majors and levels. This population was selected because university students represent one of the groups most actively engaged in the use of artificial intelligence applications for academic and research purposes.

Sample of the Study

A **convenience sample** was used in this study. The final sample included **54 male and female students**, and data were collected during a specified period through an electronic questionnaire. The use of a non-random convenience sample was appropriate for the exploratory nature of the study and the accessibility of participants within the university setting.

Research Instrument

The primary instrument for data collection was an **electronic questionnaire** developed by the researchers. The questionnaire was designed to measure the challenges associated with the use of artificial intelligence applications in scientific research among university students. It was structured around **three main dimensions**:

1. **Academic dimension**, which examines the impact of AI applications on students' academic and research practices, such as writing, summarizing, evaluating information, and using original academic sources.
2. **Cognitive-skill dimension**, which measures students' knowledge and practical skills related to using AI tools effectively in scientific research.
3. **Ethical dimension**, which addresses the ethical issues associated with using AI applications, including accuracy, bias, citation, responsibility, and academic integrity.

Data Collection Procedures

Data were collected using the electronic questionnaire during the period from **November to December 2025**. The questionnaire link was distributed to the target participants, and responses were gathered electronically. This method was suitable because it allowed the researchers to reach students efficiently and collect the required data within the specified timeframe.

Study Boundaries

The study was conducted within specific boundaries that define its scope:

- **Human boundaries:** The study was limited to students of Imam Abdulrahman Bin Faisal University.
- **Spatial boundaries:** The study focused on universities within the Kingdom of Saudi Arabia, while the actual data collection was conducted at Imam Abdulrahman Bin Faisal University.
- **Temporal boundaries:** The questionnaire was developed and administered during **November and December 2025**.
- **Topical boundaries:** The study focused on three major domains of challenges: **academic**, **cognitive-skill**, and **ethical** challenges related to the use of artificial intelligence applications in scientific research.

Operationalization of the Study Variables

The methodology of the current study is grounded in examining the challenges of using artificial intelligence applications in scientific research through three core dimensions:

- **Academic challenges:** difficulties related to academic writing, summarizing, using original sources, evaluating information quality, and independent problem-solving.
- **Cognitive-skill challenges:** difficulties related to selecting appropriate AI tools, distinguishing accurate from inaccurate outputs, and effectively using tools such as ChatGPT, Gemini, and Elicit in the research process.
- **Ethical challenges:** difficulties related to verifying the accuracy and neutrality of AI-generated information, documenting AI-supported content properly, maintaining academic honesty, and assuming responsibility for errors resulting from AI use.

Significance of the Methodological Approach

The selected methodology is suitable for the objectives of the study because it enables the researchers to quantify students' perceptions of AI-related challenges and identify the most prominent issues across the three dimensions. It also provides empirical evidence that may support the development of training programs, institutional guidelines, and ethical frameworks for the responsible use of artificial intelligence in scientific research within Saudi higher education.

Ethical Considerations

This study was conducted in accordance with the ethical principles governing educational and social research involving human participants. Because the study relied on an electronic questionnaire administered to university students, careful attention was given to voluntary participation, confidentiality, and the responsible handling of data.

Participation in the study was entirely voluntary. The purpose of the study was clearly explained to the participants before they completed the questionnaire, and their responses were collected only after they agreed to participate. Participants were informed that their involvement was optional and that they could choose not to respond at any stage without any penalty or negative consequences.

To protect participants' privacy, no personally identifying information was required beyond what was necessary for the study. The questionnaire responses were treated with strict confidentiality, and the collected data were used solely for academic research purposes. In addition, the findings were reported in aggregate form to ensure that no individual participant could be identified directly or indirectly.

The researchers also took into account the principle of non-maleficence by ensuring that the study posed no physical, psychological, or social harm to participants. Since the study focused on students' perceptions of the challenges of using artificial intelligence applications in scientific research, the instrument was designed to collect opinions and experiences in a respectful and academically appropriate manner.

Furthermore, the study was guided by the principles of academic integrity and responsible research practice. The researchers were committed to presenting the data accurately, analyzing the responses objectively, and using the findings only for scholarly purposes. These procedures helped ensure the credibility of the study and the ethical treatment of all participants throughout the research process.

RESULTS

This section presents the findings of the study based on the responses of students at Imam Abdulrahman Bin Faisal University regarding the challenges of using artificial intelligence applications in scientific research. The findings are organized into three main dimensions: **academic challenges**, **cognitive-skill challenges**, and **ethical challenges**.

Academic Challenges

Table 1 presents the distribution of participants' responses regarding the academic challenges associated with the use of artificial intelligence applications in scientific research. The results indicate a high level of agreement across all statements in this dimension, reflecting substantial academic concerns among students.

Table 1. Distribution of participants' responses on academic challenges associated with the use of AI applications in scientific research

Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Level of Agreement
My reliance on AI slows the development of my academic skills.	52.8%	24.5%	17.0%	5.7%	0.0%	High
My participation in coursework decreases because	50.9%	13.2%	22.6%	11.3%	1.9%	High

of my reliance on AI.						
Generative AI reduces my practice of writing and summarizing skills.	58.5%	20.8%	11.3%	9.4%	0.0%	High
The use of AI reduces my search for original academic sources.	60.4%	18.9%	13.2%	7.5%	0.0%	High
I find it difficult to evaluate the quality of academic information when relying on AI.	58.5%	9.4%	22.6%	9.4%	0.0%	High
Frequent use of AI affects my ability to solve problems independently.	67.9%	7.5%	17.0%	5.7%	1.9%	High
Reliance on AI weakens my ability to connect academic concepts and apply them in new situations.	57.7%	5.8%	17.3%	15.4%	3.8%	High

The findings show that the overall agreement rate for the academic dimension reached **73.9%**, indicating that students experience considerable academic challenges when using AI applications in scientific research. This high percentage suggests that excessive reliance on such applications may weaken essential academic skills, including academic writing, summarizing, evaluating information quality, and searching for original sources. The results also indicate that repeated use of AI may reduce students' ability to solve problems independently, which may in turn limit the development of critical thinking. These findings directly address the first objective of the study, which is to identify the academic challenges faced by Saudi university students when using AI applications in scientific research.

Cognitive-Skill Challenges

Table 2 presents the responses related to the cognitive and skill-based challenges associated with the use of AI applications in scientific research. The results demonstrate that students face noticeable difficulties in this area, although the degree of challenge varies across statements.

Table 2. Distribution of participants' responses on cognitive-skill challenges associated with the use of AI applications in scientific research

Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Level of Agreement
Excessive reliance on AI reduces my practice of critical thinking.	67.3%	11.5%	11.5%	3.8%	5.8%	High

I face difficulty in selecting the appropriate tool for my research.	44.2%	15.4%	23.1%	15.4%	1.9%	Moderate
I find it difficult to distinguish between accurate and inaccurate data provided by some AI tools during scientific research.	53.8%	9.6%	23.1%	9.6%	3.8%	High
I face difficulty using ChatGPT to analyze and summarize studies.	51.9%	5.8%	17.3%	15.4%	9.6%	Moderate
I face difficulty using Gemini in scientific research.	57.7%	0.0%	15.4%	17.3%	9.6%	Moderate
I have difficulty applying Elicit to obtain references.	53.8%	9.6%	25.0%	7.7%	3.8%	High

The results reveal that the overall agreement rate for the cognitive-skill dimension was **67.6%**, indicating that students experience clear challenges in the knowledge and skill aspects of using AI in scientific research. These challenges include difficulty selecting appropriate tools, distinguishing accurate from inaccurate outputs, and maintaining critical thinking when relying heavily on AI applications. The results further show that students face difficulties in using specific tools such as **ChatGPT**, **Gemini**, and **Elicit**, which confirms the need for practical training on how to use these technologies effectively in academic research. These findings correspond directly to the second objective of the study, which is to identify the cognitive and skill-related challenges associated with employing AI applications in scientific research.

Ethical Challenges

Table 3 presents the findings related to ethical challenges associated with the use of AI applications in scientific research. The results indicate that this dimension recorded the highest level of concern among the three dimensions examined in the study.

Table 3. Distribution of participants' responses on ethical challenges associated with the use of AI applications in scientific research

Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Level of Agreement
I face difficulty in verifying the accuracy of the information provided by AI for my scientific research.	61.5%	15.4%	19.2%	3.8%	0.0%	High

I face difficulty in ensuring that the data I use through AI are unbiased.	59.6%	11.5%	19.2%	5.8%	3.8%	High
I face difficulty in documenting information extracted from AI correctly.	55.8%	21.2%	17.3%	1.9%	3.8%	High
I face difficulty in taking responsibility for errors resulting from the use of AI in my research.	58.8%	15.7%	23.5%	2.0%	0.0%	High
I face difficulty in using AI to write scientific research while maintaining academic integrity.	57.7%	19.2%	13.5%	7.7%	1.9%	High

The findings indicate that the overall agreement rate for the ethical dimension reached **75.1%**, making it the most prominent challenge dimension in the study. These results show that students encounter serious ethical difficulties when using AI in scientific research, particularly in verifying the accuracy of AI-generated information, ensuring the neutrality of data, documenting information correctly, and maintaining academic honesty. The results also suggest that heavy dependence on AI may place students in ethically sensitive situations in which they remain responsible for errors generated by these applications. These findings directly address the third objective of the study, which is to identify the ethical challenges faced by students when relying on AI applications in scientific research.

Overall Interpretation of the Results

Taken together, the findings demonstrate that students at Imam Abdulrahman Bin Faisal University face substantial challenges in using artificial intelligence applications in scientific research across all three dimensions. Although AI tools may support research efficiency and speed, the results indicate that their use is accompanied by significant academic, cognitive-skill, and ethical concerns. Among these dimensions, **ethical challenges ranked first (75.1%)**, followed by **academic challenges (73.9%)**, and then **cognitive-skill challenges (67.6%)**. This pattern suggests that the use of AI in scientific research is not merely a technical issue, but also an academic and ethical issue that requires institutional guidance, student training, and clear regulatory frameworks to ensure responsible and effective use.

DISCUSSION

The findings of the present study reveal that Saudi university students experience substantial challenges when using artificial intelligence applications in scientific research. These challenges extend across three interrelated dimensions: academic, cognitive-skill, and ethical. Overall, the results suggest that although AI tools offer practical support in completing research-related tasks, their use also introduces serious concerns that may affect

the quality, integrity, and independence of students' academic work. Among the three dimensions, ethical challenges recorded the highest level of agreement, followed by academic challenges and then cognitive-skill challenges. This pattern indicates that the growing use of AI in research settings is not only a matter of technical efficiency, but also a matter of academic responsibility and ethical awareness.

The first major finding concerns the academic challenges associated with AI use in scientific research. The high agreement rate in this dimension shows that students perceive a clear negative effect of overreliance on AI on core academic skills such as writing, summarizing, evaluating information, consulting original sources, and solving problems independently. This result suggests that while AI may simplify research tasks, excessive dependence on it may reduce students' engagement in the intellectual processes that are central to academic development. Such a pattern is especially important in higher education, where the purpose of research is not merely to produce a final written product, but also to develop analytical reasoning, synthesis, and scholarly independence. These findings are consistent with previous studies that warned against the weakening of traditional research skills and the decline of critical academic engagement when AI is used as a substitute rather than a support tool. In this respect, the findings support the view that AI should be integrated cautiously into academic practice so that efficiency does not come at the expense of genuine learning and intellectual growth.

The second finding relates to cognitive-skill challenges. Although this dimension recorded a slightly lower percentage than the other two, it still reflects a considerable level of difficulty. Students reported problems in selecting appropriate AI tools, distinguishing accurate from inaccurate outputs, and using specific applications such as ChatGPT, Gemini, and Elicit effectively in research tasks. This result indicates that the challenge is not only whether students use AI, but how they use it. The findings imply that access to AI tools alone does not guarantee meaningful or competent use. Instead, students need specific digital and research-oriented skills to evaluate outputs, formulate effective prompts, identify tool limitations, and integrate AI assistance appropriately into the research process. This interpretation aligns with studies such as Strzelecki (2023), which emphasized the importance of digital readiness and technical confidence, as well as Alafnan et al. (2023), who highlighted the risks of weak analytical judgment when students rely heavily on AI without sufficient critical skills. Thus, the present findings underscore the need to view AI literacy as part of research literacy in contemporary higher education. The ethical dimension emerged as the most prominent challenge in the study, which gives this result particular significance. Students expressed strong concern regarding the accuracy of AI-generated information, the possibility of biased outputs, the difficulty of documenting AI-assisted content correctly, and the problem of maintaining academic integrity while using AI in research writing. They also reported uncertainty about responsibility for errors generated by AI tools. This finding reflects the sensitive nature of AI use in scientific research, where the reliability of information, originality of work, and transparency of authorship are fundamental principles. The fact that ethical concerns ranked first suggests that students are aware, at least to some extent, that AI use can create serious tensions between convenience and scholarly responsibility. This result strongly agrees with the literature reviewed in the study, particularly Naeem (2024), Cotton et al. (2024), and Sullivan et al. (2023), all of whom emphasized that academic integrity and regulatory ambiguity represent central concerns in the age of generative AI. Therefore, the present study reinforces the argument that ethical guidance should be treated as a core requirement, not a secondary consideration, in any university strategy for AI integration.

Another important aspect of the findings is the relationship among the three dimensions. The academic, cognitive-skill, and ethical challenges do not appear to operate in isolation; rather, they seem to reinforce one another. For example, weak skill in evaluating AI outputs may lead to ethical problems such as citing inaccurate content or relying on fabricated references. Similarly, excessive academic dependence on AI may reduce independent thinking, which in turn weakens students' ability to identify bias or question the quality of generated material. This interconnectedness suggests that the problem is systemic rather than fragmented. Universities therefore need integrated responses that combine skill development, academic support, and ethical regulation rather than treating each area separately.

The results are particularly relevant in the Saudi higher education context, where digital transformation and innovation are strongly encouraged under Vision 2030. While this national direction creates important opportunities for integrating advanced technologies into education and research, the findings of the current study show that technological adoption must be accompanied by proper guidance, institutional readiness, and ethical oversight. AI can undoubtedly contribute to improving efficiency and expanding access to knowledge, but without a balanced framework, it may also undermine the development of authentic research competence. In this sense, the findings do not reject AI use; rather, they argue for a more structured and responsible model of adoption that protects students' academic growth and research integrity.

The discussion also highlights the practical importance of training. Since students reported challenges in tool selection, output evaluation, citation, and responsible use, the findings suggest that universities should offer targeted workshops and guidance materials on AI use in academic research. These programs should move beyond technical introductions and focus on research-specific applications, such as how to verify AI-generated claims, how to trace original sources, how to cite appropriately when AI is used, and how to maintain one's own analytical contribution. Such support would help students use AI as a research assistant rather than as a replacement for intellectual effort.

In conclusion, the discussion of the findings confirms that the use of artificial intelligence applications in scientific research among Saudi university students is accompanied by serious and multidimensional challenges. The dominance of ethical concerns, followed by academic and cognitive-skill difficulties, demonstrates that the issue is broader than simple technological adoption. It is closely tied to the future of academic writing, research authenticity, student independence, and the moral responsibilities of higher education institutions. The present study therefore contributes to the growing literature by showing that successful integration of AI into university research requires a careful balance between innovation and integrity, efficiency and critical thought, and technological opportunity and academic responsibility.

CONCLUSION

This study examined the challenges of using artificial intelligence applications in scientific research among Saudi university students, with particular attention to the academic, cognitive-skill, and ethical dimensions. The findings showed that students experience substantial challenges across all three dimensions, confirming that the use of AI in academic research is a complex issue that extends beyond technical convenience. While AI applications can support students in performing research tasks more quickly and efficiently, their use also raises serious concerns related to academic skill development, critical thinking, research accuracy, and academic integrity.

The results demonstrated that **ethical challenges** were the most prominent, followed by **academic challenges**, and then **cognitive-skill challenges**. This pattern suggests that students are especially concerned about the reliability of AI-generated information, the possibility of bias, proper citation, and responsibility for errors resulting from AI use. At the same time, the findings indicate that excessive dependence on AI may weaken key academic skills such as writing, summarizing, evaluating information, and solving problems independently. Students also face practical difficulties in selecting suitable AI tools and distinguishing accurate from inaccurate outputs, which confirms that effective use of AI requires more than simple access to technology.

Based on these findings, the study concludes that the growing use of artificial intelligence in scientific research should be accompanied by structured institutional support. Universities need to provide students with practical training on the appropriate use of AI tools, strengthen their critical and analytical skills, and establish clear ethical guidelines for responsible use in research contexts. Such measures are essential to ensure that AI serves as a supportive academic tool rather than a substitute for intellectual effort and scholarly originality.

In the context of Saudi higher education and the broader goals of digital transformation under Vision 2030, the study highlights the importance of balancing technological innovation with academic responsibility. The successful integration of AI into university research depends not only on the availability of advanced tools, but also on the ability of students and institutions to use them critically, ethically, and effectively. Therefore, the study emphasizes that responsible AI use in scientific research requires a balanced framework that protects academic integrity, promotes students' independent thinking, and enhances the quality of research outputs.

Recommendations

Based on the findings of the study, several recommendations can be proposed to support the effective and responsible use of artificial intelligence applications in scientific research among students at Imam Abdulrahman Bin Faisal University.

First, universities should work to **strengthen students' analytical and academic writing skills**, since excessive reliance on artificial intelligence may weaken these essential abilities. This can be achieved by integrating training activities into university courses and organizing practical workshops that help students develop idea formulation, critical analysis, and independent academic writing skills. Such efforts would contribute to producing original research that genuinely reflects students' intellectual abilities.

Second, it is important to **provide specialized training programs on how to select and use AI tools accurately in scientific research**. Uncritical or uninformed use of these tools may lead to inaccurate results and lower research quality. These programs should include practical demonstrations, guidance materials, and real examples that help students understand the functions, strengths, and limitations of different AI applications, thereby enabling them to benefit from these technologies without compromising academic quality.

Third, universities should **develop clear ethical guidelines and standards to regulate the use of artificial intelligence in academic research**. These guidelines are necessary to ensure academic integrity, accuracy, transparency, and the protection of intellectual property. They should form part of institutional policy so that all students and faculty members understand the acceptable boundaries of AI use in research and academic writing.

Fourth, academic institutions should seek to **maintain a balance between benefiting from modern technologies and preserving the researcher's fundamental skills**. Artificial intelligence should be used as a supportive tool rather than a replacement for

critical thinking, originality, and scholarly responsibility. Achieving this balance would improve the quality of scientific research and strengthen the position of Saudi universities in the fields of innovation and academic excellence.

Finally, the study recommends that universities consider establishing **specialized committees or support units** to monitor the responsible use of AI applications in research and to provide students with ongoing guidance when ethical or practical challenges arise. This would help ensure that the use of AI remains aligned with academic values and with the goals of digital transformation in Saudi higher education.

REFERENCES

1. Ahmed, M. A. (2024). The impact of artificial intelligence on creativity and critical thinking in scientific research. *Journal of Educational and Psychological Sciences, University of Bahrain*, 22(4), 112–140.
2. Al-Kabir, A., & Hijazi, Y. (2023). The use of artificial intelligence tools in scientific research: An analytical study. *International Arab Journal of Information Technology and Data*, 3(4). <https://doi.org/10.21608/aijtid.2023.208908.1056>
3. Al-Kumayshi, L. A. (2025). The role of artificial intelligence applications in supporting scientific research. *International Arab Journal of Library and Information Studies*, 4(4), 128–146. <http://search.mandumah.com/Record/1610883>
4. Arab League Educational, Cultural and Scientific Organization (ALECSO). (2025). ALECSO charter of artificial intelligence ethics
5. Al-Shahrani, R. (2024). The reality of using generative artificial intelligence applications in developing scientific research skills. *Saudi Journal of Educational Sciences*, (18), 72–73. <https://doi.org/10.33948/sjes-ksu-2-18-4>
6. Hadou, E. (2024). The use of artificial intelligence in scientific research: Humanities and social sciences as a model toward sustainable and responsible integration. *Jeel Journal of Humanities and Social Sciences*, 108, 43. <https://doi.org/10.33685/1316-000-108-002>
7. Ramadan, S. (2024). Artificial intelligence applications in scientific research: Opportunities and challenges. *Journal of Artificial Intelligence and Information Security*, 2(5), 202–225. <http://search.mandumah.com/Record/1540281>
8. Sabti, S., & Abbas, M. (2024). The use of artificial intelligence in scientific research and its contribution to achieving sustainable development. *Annales de l'université d'Alger*, 38.
9. Saad, Y. (2023). Principles of using artificial intelligence in scientific research. *Dirasat*.
10. Samaan, W., & Al-Sharif, I. (2025). Challenges of using artificial intelligence applications in scientific research from the perspective of researchers in some Saudi universities. *Journal of Arts, Literature, Humanities and Sociology*, (126), 136–153. <https://doi.org/10.33193/JALHSS.126.2025.1560>
11. Shaltout, M. (2023). *Artificial intelligence applications in education* (1st ed.). Cairo.
12. Taha Muftah Abu Ali, et al. (2024). Analyzing the risks of using artificial intelligence in scientific publishing: Methodologies and guidelines for ensuring integrity and quality. *Al-Zaytoonah International University Journal for Scientific Publishing*, 8(2), 101–120. Abbas, Y. (2024).
13. The impact of artificial intelligence applications on research production in universities. *Journal of the Higher Institute for Qualitative Studies*, 4(11), 244. <https://doi.org/10.21608/hiss.2024.292718.1349>
14. Abdel Razek, A. K. A. (2024). The ethical risks of artificial intelligence applications: An analytical study. *Journal of the Faculty of Education, Benha University*, 35(137), 329–376. <https://doi.org/10.21608/jfeb.2023.248537.1784>

15. Abdel Ghani, S. M. (2024). The risks of researchers' use of artificial intelligence applications in scientific research. *Journal of the Humanities Studies Sector, Al-Azhar University*, 12(3), 45–67. <https://doi.org/10.21608/jsh.2024.360553>
16. Qais, J. M. (2025). The role of artificial intelligence in developing scientific research. *Arsco*.
17. Naeem, A. (2024). Ethics of using artificial intelligence applications in scientific research. *Journal of Education*, 2(204), 635–647. <https://doi.org/10.21608/JSREP.2024.447035>
18. AlAfnan, M. A., Dishari, S., Jabeen, I., & Ahmed, S. T. (2023). ChatGPT as an educational tool: Opportunities and challenges. *International Journal of Contemporary Education*, 6(1), 29–41. <https://doi.org/10.11114/ijce.v6i1.5952>
19. Almansour, S. M., Samil, S. A., Elshnawe, A. A., Maali, S. M., & Mustafa, J. H. H. (2025). The reality of using artificial intelligence applications in scientific research from the point of view of faculty members at the University of Ha'il. *Journal of Ecohumanism*, 4(4). <https://ecohumanism.co.uk/joe/ecohumanism/article/view/6978>
20. Belmir, S., & Daira, A. (2024). Challenges of adhering to scientific research ethics in the artificial intelligence applications: A study on a sample of Algerian researchers. *South Florida Journal of Development*, 5(10), 1–19. <https://doi.org/10.46932/sfjdv5n10-052>
21. Cotton, D. R., Cotton, P. A., & Shipway, J. R. (2024). Chatting and cheating? Ensuring academic integrity in the era of ChatGPT. *Higher Education*, 87(6), 1120–1135. <https://doi.org/10.1007/s10734-023-01031-1>
22. Dwivedi, Y. K., Kshetri, N., Hughes, L., Slade, E. L., & Jeyaraj, A. (2023). Opinion paper: “So what if ChatGPT wrote it?” Multidisciplinary perspectives on opportunities, challenges and implications of generative AI. *International Journal of Information Management*, 71, 102642. <https://doi.org/10.1016/j.ijinfomgt.2023.102642>
23. Limongi, R. (2024). The use of artificial intelligence in scientific research with integrity and ethics. *Future Studies Research Journal: Trends and Strategies*, 16(1), e845. <https://doi.org/10.24023/FutureJournal/2175-5825/2024.v16i1.845>
24. Mohammed, A., Velandar, J., & Milrad, M. (2024). A retrospective analysis of artificial intelligence in education (AIEd) studies: Perspectives, learning theories, challenges, and emerging opportunities. In *Radical solutions for artificial intelligence and digital transformation in education* (pp. 77–98). Springer. https://doi.org/10.1007/978-981-97-8638-1_9
25. Özdemir, D., Durak, G., & Çankaya, S. (2024). Artificial intelligence in education: A bibliometric study on its role in transforming teaching and learning. *The International Review of Research in Open and Distributed Learning*, 25(3), 219–244. <https://doi.org/10.19173/irrodl.v25i3.7757>
26. Strzelecki, A. (2023). Students' acceptance of ChatGPT in higher education: An extended unified theory of acceptance and use of technology. *International Journal of Educational Technology in Higher Education*, 20(1), 58–75. <https://doi.org/10.1186/s41239-023-00427-0>
27. Sullivan, M., Kelly, A., & McLaughlan, P. (2023). ChatGPT in higher education: Considerations for academic integrity and student learning. *Journal of Applied Learning and Teaching*, 6(1), 31–40. <https://doi.org/10.37074/jalt.2023.6.1.7>