MAPAN-JOURNAL ,
Publisher: METROLOGY SOC INDIA , NPL PREMISES,
Address: DR K S KRISHNAN MARG, NEW DELHI, INDIA,
ISSN / eISSN:0970-3950 / 0974-9853
Volume 25-Issue 1-(2025)
https://doi-001.org/1025/17630169979057

Ethical Framework for the Use of Artificial Intelligence in University Scientific Research

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Received : 12/06/2025 ; Accepted : 22/10/2025

Abstract

This study explores the use of artificial intelligence (AI) tools in scientific research by analyzing university students' practices and identifying ethical guidelines that promote safe and effective usage. It addresses challenges such as unintentional plagiarism, poor documentation, reliance on AI-generated content, and diminished critical thinking.

The study also highlights recommended practices to ensure research quality. The findings emphasize the need to integrate AI into the university environment through a clear ethical and educational framework, including its incorporation into academic curricula to foster a responsible research culture and uphold scientific integrity.

Keywords: scientific research, artificial intelligence, university students, research ethics, quality of education

Introduction:

In light of digital globalization, artificial intelligence has become an enabling tool for university students, allowing them to quickly access knowledge, improve the quality of academic writing, organize references and analyze data efficiently, but this empowerment requires an educational and ethical framework that ensures that the student remains active in the production of knowledge, not just a future for it.

This is what Algeria sought as a positive step towards keeping pace with the digital transformations in Algeria, as most Algerian universities have taken the initiative to include artificial intelligence as an exploratory subject within educational programs in their various disciplines, with the aim of introducing students to the basics of this technology, and despite the importance of this initiative, the mere definition is not enough to ensure safe academic use, especially in light of the absence of an educational and ethical framework that regulates the employment of artificial intelligence in scientific research.

Despite the recent introduction of artificial intelligence in some Algerian universities, the actual use of this technology by students in the preparation of research still lacks ethical and methodological controls, which opens the way for unethical practices such as: plagiarism, total reliance on text generation tools, and the absence of critical thinking. However, it does not replace the need to integrate the concepts of academic integrity, documentation, and verification of sources into the content of the article itself, as technical knowledge without an ethical framework can be counterproductive. The research problem can be formulated as follows:

1. **How the unethical use of AI tools in scientific research affects the quality of academic research among students, What are the positive controls and practices that ensure the effective use of these tools?**

Objectives of the study:

The present study aims to shed light on the ethical and pedagogical challenges associated with the use of artificial intelligence in research by students, and to propose controls that ensure the effective and meaningful use of these technologies within the Algerian university.

Importance of the study:

- The importance of the study lies in the urgent need to control the use of artificial intelligence in light of the widespread spread of its tools in higher education
- Enhancing students' ethical and educational awareness about the limits of the use of artificial intelligence in scientific research.
- Supporting the quality of scientific production by proposing controls that ensure the originality of the research work, and reduce the excessive use of its tools without critical understanding or self-analysis.
- Responding to contemporary digital challenges facing students and researchers, such as the difficulty of distinguishing between original and automated content, or the absence of ethical standards for some applications such as storing user data.

Theoretical framework of the study:

First: Previous Studies

1- **Kabadani, Sidi Ahmed and Baden, Abdelkader. (2021) entitled "The Importance of Using Artificial Intelligence Applications in Algerian Higher Education Institutions to Ensure the Quality of Education - A Field Study",** which aimed to determine the importance of using artificial intelligence tools in higher education institutions and its effective role in the quality of education in relation to recognized international standards (Kabadani, Baden, 2021, 153)

2- **A study conducted by García-Peñalvo, 2023,** entitled "Visualizing AI in Educational Contexts after the Launch of ChatGPT: Disruption or Panic? ", the issue at hand is not the quality of the responses generated by ChatGPT, but the potential feedback on the acquisition of the skills needed to produce scientific texts and articles without the traditional human effort required to learn and write. This study also sought to examine the impact of this form of technology on education, particularly within academia, and to measure its ability to compose scientific texts while taking into account its impact on creativity, with a particular focus on concerns in academia regarding the transformation of this tool into a destructive scientific innovation. Knowledge, therefore, the investigation emphasizes the importance of familiarity with contemporary pedagogical methodologies to identify them and address the potential harmful repercussions. One of the study's most important findings is that despite the vast amount of text that Chat GPTE has, "it is being produced. However, this tool lacks scientific and reference evidence, and omits the sources that rely on it in its responses, and all attribution of the original author to the information it provides, which in itself constitutes

a violation of the intellectual property rights of the authors, which calls for an examination of the risks and consequences that AI tools pose to human creativity.

3- The aim of the research conducted by Aljanabi (2023) was to investigate the upcoming trends and scalable capabilities of ChatGPT, produced by AI Open, the latest form of real-world language model that possesses the remarkable ability to create written content and respond to complex queries across a wide range of scientific machines. This technology, along with other language models developed by specialized AI companies, is expected to undergo further advancements in the future. Accordingly, the research endeavor sought to ascertain the possible path of technological progress and the use of artificial intelligence in various areas of human existence. Artificial intelligence systems, which include intelligent dialogues, are expected to revolutionize many aspects of daily life, including local environments, professional environments, educational institutions, and scientific investigations. Furthermore, it is necessary to emphasize the importance of mechanisms to ensure the ethical and responsible use of these methods. The researcher recommends the future of these technologies holds many promising prospects and has the potential to profoundly influence our interactions with technology. However, it is essential that we evaluate and address the ethical and social views of using these technologies in a clear conscience, while also acknowledging its ability to improve our lives in meaningful and beneficial ways. (Lahol, Breiki, 2023, p. 76) .

4- **Mahboubi, Rafik (2024) entitled "The Tendencies of Higher Education Professors in Algeria Towards the Use of Artificial Intelligence Applications to Achieve Educational Quality Standards – A Field Study at the University of 08 May 1945 Guelma " .**The study sample consisted of 140 professors from the University of 08 May 1945 in Guelma using the questionnaire as a study tool. The study found that there are positive tendencies towards employing technology in higher education, and the study pointed to the obstacles and difficulties represented in the lack of qualification and training of students and professors, and problems related to information security and intellectual property. (Mahboobi, 2024, p. 762)

5- **-Lahoul, Ben Ali and Breiki, Khaled. (2024) titled "Artificial Intelligence in Scientific Research between Determinism in Application and Risks in Production"** The aim of the current study is to clarify the importance of artificial intelligence (AI) applications in promoting scientific research, focusing on many criteria such as quality, timeliness, and scientific integrity in the outputs of artificial intelligence applications, also the study addressed the advantages and risks of using various artificial intelligence programs, especially ChatGPT Despite the different opinions on the use of AI programs and the rationale behind these views,

the research was conducted through a comprehensive review of previous studies conducted locally and internationally, with a focus on extracting the most important findings related to the use of ChatGPT, and the risks of AI applications. Lahol, Breiki, 2024, p. 67)

6- **Bushlagham, Hanan. (2025) entitled "The Impact of Artificial Intelligence Applications on the Quality of Higher Education: A Field Study at Jijel University"** The descriptive approach was used, and the study was applied to 1282 professors of higher education, and the study concluded that the applications of artificial intelligence have a positive impact on the quality of higher education, and the study recommended the need to take advantage of the power of artificial intelligence to create more effective and quality education, taking into account the balance between artificial intelligence and human experience to maintain the human touch in education, with the necessity of Investing in training and professional development to equip faculty and staff with AI skills (Bushlagm, 2025, p. 105)

7- **Al-Aimat, Muhammad Ali (2025). "The Ethical Risks of Using Artificial Intelligence by Children from the Perspective of Parents"**, which aimed to explore the ethical risks associated with children's use of artificial intelligence technologies from the perspective of parents in Jordan. The researcher used the quantitative descriptive-analytical method, through a questionnaire consisting of 11 variables according to the five-point Likert scale, and the data were analyzed using SPSS The study sample included 100 parents (35 fathers and 65 mothers) who were intentionally selected from children's clinics in Amman, and the results showed that parents are aware of the existence of high ethical risks affecting children, most notably: Negative impact on social and emotional development, impaired decision-making ability, impact on mental health, and bias in algorithms. They also expressed moderate concern about privacy breaches, exposure to inappropriate content, and poor critical thinking, and the researcher recommended conducting future studies on the impact of artificial intelligence applications on adolescents in Jordan, enhancing community awareness about the ethical use of technologies, and developing clear policies to protect children in the digital environment **(Al-Aleimat, 2025, 1142).**

By reviewing previous studies on the uses of artificial intelligence in scientific research, and its positive impact in terms of speed and accuracy, ethical controls are required for its use to ensure the quality of scientific research.

Second: Artificial Intelligence and Scientific Research:

Artificial intelligence is one of the most important technologies that have a great impact on the educational system, it aims to develop systems and programs capable of simulating the mental abilities of humans, and contributes significantly to the development of scientific research, shortening time and effort, and increasing the efficiency and effectiveness of the educational process. Here, the conceptual framework of both artificial intelligence and scientific research will be addressed, and the importance of each of them will be highlighted by the presentation of artificial intelligence tools that help in developing and improving the quality of scientific research.

1- Definition of Artificial Intelligence:

Artificial intelligence is defined as man-made and innovative intelligence, which is obtained by giving the computer the programmed ability to perform certain tasks that are often compared to the concept of human intelligence, such as the ability to learn and make decisions.

It is also defined as a science based on a set of mathematical rules, devices, and software, which are assembled into computers that in turn perform many tasks and operations that mimic the style of human intelligence, but differ from it in terms of speed and accuracy in finding solutions to complex problems. **(Haida Wadi, 2019, pp. 7-8)**

It is also known as the various fields of knowledge that interact together in order to program machines in a technical way that allows them to mimic human thought (**Al-Kurdi & Ibrahim, 2003, p. 364).**

According to **(Al-Musallam, 2023, p. 241):** Artificial intelligence applications in the educational process mean the use of devices, programs, machines, or systems capable of simulating human intelligence to carry out specific processes and tasks, with the aim of benefiting from them and employing them in education in order to achieve the required educational goals such as: instant chat programs, augmented reality applications, virtual reality applications, virtual laboratories for science experiments, robotics.... **(Mahboobi, 2024, p. 765)**

2- The importance of artificial intelligence:

The importance of artificial intelligence in the field of scientific research is as follows:

1. Improving productivity and efficiency in AI gets work done better, faster, more accurately, and at a lower cost.
2. Understand and analyze data accurately because human brains are not equipped to analyze vast amounts of structured and unstructured data, and AI applications can make connections and identify relationships and patterns across the sum of this data.
3. Objectivity in data analysis without any bias.

4. Improve customer experiences faster and more accurately in as many languages as required.

3- Characteristics of Artificial Intelligence:

Artificial intelligence is characterized by many characteristics and advantages, most notably the following:

1. Ability to think and perceive.
2. Ability to acquire knowledge.
3. Ability to learn and understand from past experiences.
4. Ability to use old experiences and reuse them.
5. It processes digital symbolic data through logical analysis and comparison processes.
6. It aims to simulate human thought and style.
7. It works at a fixed scientific level without fluctuation.
8. Reduces fatigue and boredom.

Third: Scientific Research and Ethics of Scientific Research:

1. Definition of Scientific Research:

Scientific research is defined as the method or method followed by the researcher to discover the truth and relies mainly on critical analytical thinking by identifying and formulating problems, making hypotheses, collecting and organizing information, and then drawing conclusions **(Mohammed, 1986, p. 22).**

It is also defined as an organized scientific research and investigation based on a database to research a specific problem with the aim of reaching answers and solutions to the problem of the research topic**. (Al-Dahrawi, 2002, p. 8)**

Scientific research can be defined as the method or means by which a solution to a particular problem, or the discovery of new facts, can be reached through a complete and accurate investigation using accurate information gathered using specific scientific methods.

It is also defined as the sum of the investigations, thoughtful and organized observations of phenomena, determining the relationships that govern them, identifying the causes and factors leading or influencing their paths, arriving at hypotheses and general rules, verifying and testing these assumptions, and reaching the laws that govern them **(Farhati, 2011, p. 17).**

2- The importance of scientific research:

Scientific research is of great importance in detecting various phenomena and in interpreting and analyzing them, and this importance can be summarized in the following points:

1. It opens up wide horizons for the researcher to discover various phenomena in various fields by relying on primary and secondary sources of information and data.
2. It is considered a means on which different societies rely to overcome obstacles, avoid mistakes, and plan for the future, based on laws and relationships that explain phenomena that can predict their future behavior.
3. It helps in solving community issues and achieving an objective and correct understanding of various issues.
4. It is considered an important means of producing scientific knowledge.
5. It is considered an essential means of development and a tool for the progress of societies, achieving well-being, and increasing the ability of man to exploit nature and control its phenomena based on discovering the aspects and outlets of how to exploit it.

3- Scientific Research Steps:

The process of understanding, interpreting, and analyzing various phenomena goes through many steps that can be summarized as follows:

1. Identifying the research problem: It is the first step in scientific research, as it is the identification of the research problem necessary to understand the phenomenon under study, where the researcher can crystallize his problem in the form of a question and formulate appropriate hypotheses for him, and this step requires the intensity of attention and the strength of observation from the researcher.
2. Formulation of hypotheses: This stage comes after determining the research problem, where the initial answers to the research problem are usually composed of two or more variables and are divided into positive hypotheses, negative hypotheses, and null hypotheses.
3. Selection of Research Methodology: The method selection stage is one of the most important stages in scientific research because it has an impact on the validity, accuracy and objectivity of the results reached. There are many approaches in scientific research, most notably the descriptive method, the historical method, the statistical method, the comparative method, and the case study method, the method is chosen according to the subject under study.
4. Identifying the data, methods of collecting and classifying it: This step requires technical skills and intellectual efforts on the part of the researcher, and the researcher must choose the appropriate data and the appropriate methods that enable him to collect it, and it must be characterized by the following:

- Clarity in scientific research.
- Seriousness and modernity in the researches carried out.
- Integration of information.
- Truthful, accurate and documented information.
- Objectivity and impartiality.
- Analysis and interpretation of data After collecting and classifying data, the researcher must work on analyzing and interpreting it by relying on the methods and tools of logical analysis and deduction, because the process of collecting data alone is not enough, and the researcher must interpret and analyze that data to understand and interpret the studied phenomenon .
- Hypothesis Testing: In this step, the validity of the hypotheses is tested and based on this, the hypotheses are either proven or denied.
- Reaching specific results and generalizations: Based on the hypothesis test, the researcher can formulate results and laws that explain the studied phenomenon and generalize them to all similar cases so that those laws and judgments reached can understand the phenomenon and predict its future behavior.

4- Plagiarism in Scientific Research:

It is considered one of the biggest challenges facing scientific research, as it is a form of illegal transfer, and it means taking someone else's work and claiming that it is your work, which is a wrong act and bad behavior, whether intentional or unintentional, and this phenomenon is among the biggest obstacles that stand in the way of scientific progress in academia. After the technological revolution that the world has witnessed in our current era and the increasing trend to exploit the applications of artificial intelligence in the development of scientific research. As it plays a great role in facilitating the flow of information and gaining time and effort, it has had many negative repercussions on scientific honesty, most notably: inaccurate information and its lack of clear reference attribution, because it depends on the quality of the data on which it has been trained.

1. Fraud by compromising the integrity and accuracy of data, misrepresentation and falsification.
2. Deception and misinformation, and this is done by violating the rules of scientific research and not referring to marginalization, referrals, citations, and others.
3. Infringement of intellectual property rights.
4. Copying from the Internet, where artificial intelligence applications provide this feature, which is negatively exploited by some researchers who attribute that information to them.

5. Plagiarism by translating content into other languages and using it without reference to the original work **(Khorom, 2019, p. 344)**

Through the aforementioned violations, they have a negative impact on the quality of scientific research and education.

Fourth: The Concept of Quality of Education:

The International Education Organization (EI), a Belgium-based organization, defines quality of education as "education that focuses on the social, emotional, mental, physical, and cognitive development of every student regardless of gender, race, social status, economic status, or geographical location. It prepares the child for life, not just for the test."

UNESCO (2005) has emphasized the importance of the quality of education provided in schools as its goal is important, but increasing access to quality education services should be the primary goal of any education system. The main objectives of education systems should be to develop and encourage the creative and emotional development of students These goals are dealt with in different ways in different education systems**. (Bushlagham, 2025, p. 109)**

Therefore, the quality of education is represented in providing students with the necessary skills and knowledge that enable them to achieve their goals and increase scientific production.

Fifth: Academic Uses of Artificial Intelligence

1. Data analysis: by extracting patterns from questionnaires and articles
2. Academic Writing: Using Artificial Intelligence in Language Improvement
3. Specialized Translation: Ability to translate correctly and accurately between languages
4. Reference Management: Organizing Sources and References Used in Scientific Research
5. Plagiarism Detection: Comparing Scientific Texts with Databases to Detect Plagiarism
6. Searching Texts: Extracting Scientific Concepts and Terms from Articles Available in Databases

Sixth: Failure to observe ethical controls for the use of artificial intelligence:

- Plagiarism resulting from copying entire content without documentation or understanding
- Poor quality of research due to complete reliance on text generators without critical analysis
- Using AI to generate inaccurate fake references
- Inserting false or misleading data into analytics tools
- Sensitive Data Privacy Violation in AI Applications
- Lack of transparency in disclosing the use of AI as a research assistant

Despite unethical practices, the responsible use of artificial intelligence can improve the quality of scientific research when adhering to scientific research controls.

Seventh: Maintaining the Quality of Scientific Research and Maintaining Scientific Honesty

Among the most important roles that technological development plays in the use of artificial intelligence on scientific research are the following:

Improve efficiency: AI helps improve efficiency in scientific research by automating routine tasks, such as statistical analysis and data sorting.

Increased accuracy: AI helps increase the accuracy of scientific research by analyzing data in large quantities more efficiently and accurately than humans.

Speed of Research: AI helps accelerate scientific research by automating tasks and analyzing data in large quantities faster than humans.

Breaking new ground for scientific discoveries: AI is helping to break new ground for scientific discoveries by analyzing data in new ways and discovering patterns that humans may not notice.

Data and information analysis: AI can process large amounts of data and information quickly and accurately. This can be useful in using the available data to analyze complex scientific phenomena and discover relationships between different variables.

Research Orientation: AI can be used to generate suggestions for potential research topics based on analysis of the scientific literature and current research interests. This can help researchers direct their efforts towards the areas that matter most.

Modeling and simulating scientific phenomena: AI can be used to create models and simulations of complex scientific phenomena, helping to better understand these phenomena and test theoretical hypotheses.

Accelerate searches: AI can speed up searches by automating many time-consuming processes manually, such as analyzing images and text and classifying data.

Improve research action orientation: AI can be used to improve research action orientation, including suggesting the most effective ways to experiment and optimizing timelines for long-form research.

Improve scientific discoveries: AI can help researchers detect new patterns and trends in data, thereby guiding them toward exciting new scientific discoveries.

Overall, AI can play a vital role in providing tools and technologies that enhance the possibility of conducting scientific research more efficiently and improve our understanding of the world around us.

Examples of how AI can be used in scientific research include:

- The technological development of the use of artificial intelligence is expected to continue to have a significant impact on scientific research, as it will lead to improved efficiency, accuracy, and speed of research, and open new horizons for scientific discoveries.

- The technological development of the use of artificial intelligence has a significant impact on scientific research, as it contributes to improving the efficiency, accuracy, and speed of research, and opening new horizons for scientific discoveries.

The following things should be taken into account during the student's scientific research:

1. Documentation of tools used in the methodology or references section
2. Review the outputs of manually using AI to ensure accuracy and debugging.
3. Using AI as an aid in language improvement, not an essential resource
4. Integrating AI into the analysis stage, not scientific production
5. Respect for integrity in the preparation of scientific research

Eighth: Proposals for the Ethical Use of Artificial Intelligence in Scientific Research

1. Awareness of the appropriate tools according to the stage of research

- Use tools like Zotero or Mendeley to manage references.

- Rely on ChatGPT or Quill Bot to improve language formulation and not to generate full content.

- Use Google Scholar or Semantic Scholar to search for reliable scholarly sources.

2. Training on use following the rules of scientific research

- Include training modules in the "Scientific Research Methodology" courses on the responsible use of artificial intelligence.

- Organizing university workshops on "Academic Integrity in the Digital Age".

3. Explicit documentation of the tools used

- The student must mention any AI tool they used in the methodology or acknowledgments section, ChatGPT was used to improve language formulation without generating scientific content.

4. Manually check the output

- It does not rely on artificial intelligence as a final source.

- Each information, reference, or statistical analysis should be reviewed for accuracy and relevance.

5. Use plagiarism detection tools

- Before submitting your research, it is advisable to use tools such as Turnitin or Plag Scan to ensure authenticity. This protects the student from falling into unintentional plagiarism.

Thus, the optimal use of AI tools maintains the quality of the research.

Conclusion

Artificial intelligence is a powerful tool, but it cannot be a substitute for human critical thinking, but rather it is a supportive tool for the conscious researcher, and the student who has the ability to use it within the ethical and methodological framework, is the one who is able to produce high-quality scientific research, with the least effort and time, and with the highest degrees of scientific honesty, and it is the duty of academic institutions to provide an educational environment that guides students to these responsible uses, and integrates these skills into educational curricula and active

Study and Recommendations

The study recommends the need to develop the subject of artificial intelligence from a mere technical exploration to an integrated educational unit, in which the concepts of scientific honesty, research ethics, and critical evaluation skills are integrated, in order to ensure the safe and effective use of these technologies in scientific research. And not just learning to use.

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