

Applications of Artificial Intelligence and Their Role in Enhancing the Quality of Scientific Research -A Field Study of Algerian University Students-

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Abstract:

In this study, we addressed an important topic primarily linked to the issue of improving the quality of scientific research through the reliance on artificial intelligence technology. We based our study on a research sample of 180 individuals, which we subjected to study and analysis using the questionnaire tool, and we also relied on the five-point Likert scale to study the respondents' attitudes toward the research topic. This scientific paper aims to discuss the aforementioned issue and cover its details and particulars, and highlight the most significant application of artificial intelligence in the field of scientific research. We divided our research into a theoretical chapter related to the study's concepts, then directly addressed the practical aspect to avoid any form of redundancy and verbosity. Finally, we arrived at several results, the most prominent of which is that artificial intelligence contributes to increasing the quality of scientific research through the advantages that its applications offer.

Keywords: Artificial Intelligence, Artificial Intelligence Applications, Scientific Research.

تطبيقات الذكاء الاصطناعي ودورها في تحسين جودة البحوث العلمية
دراسة ميدانية لعينة من الطلبة الجامعيين الجزائريين-
المخلص:

تناولنا في هذه الدراسة موضوعا مهما مرتبطا أساسا بإشكالية تحسين جودة البحث العلمي من خلال الاعتماد على تكنولوجيا الذكاء الاصطناعي، وقد اعتمدنا في دراستنا على عينة بحثية قوامها 180 مفردة أخصناها للدراسة والتحليل باستخدام أداة الاستبيان وبالاعتماد أيضا على مقياس ليكرت الخماسي لدراسة اتجاهات المبحوثين إزاء موضوع البحث، وتهدف هذه الورقة العلمية إلى مناقشة الإشكالية المشار إليها سابقا والاحاطة بتفاصيلها وجزئياتها، كما تهدف أيضا إلى تسليط الضوء على أهم تطبيقات الذكاء الاصطناعي المستخدمة في مجال البحث العلمي، وقد قمنا بتقسيم بحثنا إلى فصل نظري مرتبط بمفاهيم الدراسة ثم تطرقنا مباشرة إلى الجانب التطبيقي حتى نبتعد تماما عن كل مظاهر الحشو والاطناب، وتوصلنا في الأخير إلى عدة نتائج أبرزها أنّ الذكاء الاصطناعي يساهم في زيادة جودة البحوث العلمية وذلك من خلال المزايا التي تتوفر عليها تطبيقاته.

الكلمات المفتاحية: الذكاء الاصطناعي، تطبيقات الذكاء الاصطناعي، البحث العلمي.

Introduction:

Today, governments and institutions are moving toward upgrading the level of education by various means and methods, striving to achieve this noble goal that would develop nations and societies, creating universities and institutions capable of keeping pace with modern technological developments and facing the current challenges imposed by the present era, with its various political, economic, social, and cultural dimensions. One of the most important methods relied upon to achieve this is the use of Artificial Intelligence (AI) technology, as it is one of the most prominent features of the new era or one of its early signs. Therefore, major universities around the world have sought to align and exploit this technology in their performance. Algeria, represented by the Ministry of Higher Education and Scientific Research, is one of the countries that have taken on the responsibility of developing higher education and scientific research, moving directly toward digitizing this sector and abolishing some traditional practices that weaken the process and negatively impact the pace of scientific progress and development.

Scientific research is the cornerstone of societal development and advancement, as it contributes to diagnosing problems, interpreting phenomena, finding suitable scientific solutions, and offering suggestions that ultimately lead to solving these problems and eliminating or reducing their negative effects. From this

perspective, there is a need to integrate artificial intelligence and utilize its features and applications in the scientific research process, thereby enhancing the quality and efficiency of scientific output.

However, given the drawbacks of relying on artificial intelligence in scientific research, which may lead researchers to fall into plagiarism, privacy violations, or bias resulting from biased artificial intelligence algorithms, it is crucial to explore the topic of artificial intelligence and its relationship to the advancement of education in light of the challenges posed by the ethical, legal, and moral aspects of using artificial intelligence in scientific research. Therefore, this study aims to examine the role of artificial intelligence in advancing and developing scientific research in Algeria, especially considering that the AI revolution has cast its shadow over Algerian academic circles, with its use becoming noticeable among university students in preparing their scientific research. This is evident in our educational activities at the university, where the negative aspects of artificial intelligence should not overshadow its positive features and benefits for students, which can contribute to the development of scientific research. The importance of this study stems from the need for researchers, academics, students, experts, specialists, and both official and non-official bodies to understand the impacts of artificial intelligence on scientific research in the context of ongoing scientific and technological developments, as well as the rapid advancements in this field. Therefore, we can pose the following main question: What is the role of artificial intelligence in advancing and developing scientific research among Algerian university students?

And under this main question, several sub-questions arise, the most important of which are:

- Does artificial intelligence help improve the quality of scientific research?
- Does reliance on artificial intelligence contribute to increasing the productivity efficiency of scientific research?
- Does artificial intelligence contribute to providing new insights in the field of scientific research?
- What are the challenges of advancing education in light of using artificial intelligence in scientific research?

Objectives of the Study:

This study aims to explore the role of artificial intelligence in advancing and developing scientific research and its ability to provide the necessary contributions to this field. Additionally, it seeks to understand how students benefit from its advantages, as well as to assess its impact on the quality and efficiency of scientific research. Furthermore, this study also aims to explore the challenges facing the use of artificial intelligence in scientific research and ultimately provide a set of recommendations on this subject.

Previous Studies:

- **Michael Baker Study (2007), "The Role of Models in Artificial Intelligence and Education Research: A Prospective View":**

In this study, the researcher attempts to speculate on the near future of research in the field of Artificial Intelligence and Education (AIED) based on three uses of educational process models: models as scientific tools, models as components of educational artifacts, and models as design bases. The study emphasized regarding the first role that the recent shift towards studying collaborative learning situations should be accompanied by a development in the types of theories and models used beyond computational models of individual cognition. Regarding the second role, the researcher suggests that to integrate computer-based learning systems into schools, there is a need to open educational curricula to educational technology, open educational technologies to educational system actors, and open these actors to technology by training them. Concerning the third role, the researcher proposes that models can serve as design bases for educational technologies by providing design methodologies and system components or by restricting the set of tools available to learners.

At the end of the study, the researcher believes that the hallmark of AIED research is that it should be or is concerned with all three roles of models to a greater or lesser degree in each case.

- **Gwo-Jen Hwang Study (2020), "Vision, Challenges, Roles, and Research Issues of Artificial Intelligence in Education":**

This study highlighted the rapid advancement in computer technologies that have facilitated the implementation of Artificial Intelligence in Education (AIED) applications. AIED refers to the use of artificial intelligence applications or software in educational environments to facilitate teaching, learning, or decision-making. With the help of AI technologies that mimic human intelligence to reach conclusions, judgments, or predictions, computer systems can provide personalized guidance, support, or feedback to students, as well as assist teachers or policymakers in making decisions.

The researcher in this study believes that although AIED has been identified as a primary research focus in the field of computers and education, the multidisciplinary nature of AIED poses a unique challenge for

researchers with different disciplinary backgrounds. The study also provided a definition and roles of AIED studies from the perspective of evolving educational needs and proposed a framework to demonstrate considerations for implementing AIED in different learning environments.

Study Sample and Research Tools:

In this study, we relied on a purposive sample of 180 university students, selected intentionally because this group serves our research and aligns with our topic, as they use artificial intelligence applications in preparing scientific research. Our sample consisted of students from the following universities: (University of Khemis Miliana, University of Blida, University of Oran, University of Setif, University of Constantine, University of Biskra, University of Algiers, University of Tipaza, University of Tlemcen).

We also relied on the questionnaire as the primary tool in this research, in addition to using the Likert five-point scale to study the attitudes of the sample regarding the study topic. We then processed the data using the SPSS statistical program for social data analysis, followed by statistical analysis, calculating percentages and values, and interpreting the quantitative results qualitatively.

Concepts of the Study:

Artificial Intelligence:

Mike Tamir, Chief ML Scientist and Head of ML/AI in the USA, defines artificial intelligence (AI) as the ability to get a machine to complete complex tasks, with a particular focus on enabling the machine to solve tasks that cannot be easily accomplished using a fixed set of instructions. This is achieved through machine learning (ML), where the machine is taught how to solve more complex problems (Mike, 2022, p. 10). This concept emphasizes the role of machines in solving complex tasks by training them through an AI system capable of finding solutions to problems according to an algorithmic pattern that is established.

Tirthajyoti Sarkar, Sr. Director at Rhumbus Power, USA, states that artificial intelligence is a powerful and transformative technology for the modern world, asserting that much of the human progress witnessed by society in the 21st century will be linked to the development of these technologies (Sarkar, 2022, p. 10). AI is also defined as the science and engineering of replicating, extending, and augmenting human intelligence through artificial means and techniques to create intelligent machines (Zhongzhi, p. 1). This term is often applied to systems that exhibit the intellectual processes characteristic of humans, such as the ability to think, discover meaning, generalize, and learn from past experiences (Copeland, 2019, p. 12). Therefore, based on the previous definitions, artificial intelligence can be described as a highly advanced technology based on the operation of machines and computer systems that simulate human intelligence and perform complex tasks quickly and easily.

Scientific Research:

The word "research" comes from the Latin word "research," which refers to the scientific and systematic search for information relevant to a specific topic. It is a form of art that falls under the umbrella of scientific investigation, involving a careful examination or inquiry, particularly through the search for new information on any academic subject (Kadasah, 2022, p. 1). Scientific research enriches our culture and drives the technology that has led to the improved living conditions that humans experience today, making it one of the noblest endeavors. Scientific research is universal, and the pursuit of knowledge should not be constrained by local boundaries (McRitchie, 2011, p. 1). Scientific research is a product of human civilization and a testament to it; the human knowledge derived from scientific research ultimately leads to shaping a better human life and developing it by addressing its related problems. It is an art based on creative intellectual work that reflects the image of a refined human being.

The Practical Aspect of the Study:

Table 1: Gender of Respondents

| Gebder | Frequency | Perscentage |
|--------|-----------|-------------|
| Male | 93 | 51.66% |
| Female | 87 | 48.33% |
| Total | 120 | 100% |

The table above represents the gender distribution of the respondents. The percentages of males and females are nearly equal, with 51.66% of the respondents being male and 48.33% female.

Table 2: Educational Level of Respondents

| Educational Level | Frequency | Percentage |
|-------------------|-----------|------------|
| Bachelor's | 24 | 13.33% |
| Master's | 84 | 46.66% |

| | | |
|-----------|-----|------|
| Doctorate | 72 | 40% |
| Total | 180 | 100% |

From the table above, which represents the educational level of the respondents, we observe that the largest group holds a Master's degree (46.66%), followed by those with a Doctorate (40%), and the smallest group holds a Bachelor's degree (13.33%).

Table 3: Features of Artificial Intelligence in Scientific Research

| Feature | Frequency | Percentage |
|---|-----------|------------|
| Ease of Access to Information | 84 | 46.66% |
| Data Classification and Organization | 9 | 5% |
| Summarizing Scientific Information Accurately | 30 | 16.66% |
| Providing Scientific Information Quickly | 57 | 31.66% |
| Total | 180 | 100 |

According to the table above, the most significant feature that artificial intelligence has provided in scientific research is the ease of access to information, accounting for 46.66%, followed by the rapid provision of scientific information at 31.66%. The lowest percentage, 5%, is attributed to data classification and organization.

These results can be attributed to the fact that the primary advantage of using artificial intelligence in scientific research is the ease of accessing various information and data. Previously, obtaining scientific information was challenging compared to using AI applications. For example, searching for any information on internet search engines often leads to multiple links to websites, which might overwhelm the researcher with the vast amount of information available online or direct them to unreliable websites, such as forums or pirated sites. However, AI applications provide information accurately and easily, without the complexities of websites or leading the researcher into a state of information overload.

Moreover, AI has a remarkable ability to understand what the researcher is looking for in response to their questions, allowing it to focus directly on the goal that the researcher aims to achieve. AI closely mimics human intelligence, as it is a branch of computer science that involves creating an "artificial intelligent brain" in the form of machines that work and interact like the human brain. (Padmaker, 2022, p. 48)

Table 04: Enhancing the Quality of Scientific Research Through the Use of Artificial Intelligence

| Statement | Frequency | Percentage |
|-----------|-----------|------------|
| Yes | 150 | 83.33% |
| No | 30 | 16.66% |
| Total | 180 | 100% |

From the table above, which represents the enhancement of scientific research quality through the use of artificial intelligence, it is observed that 83.33% of the sample believes that the use of AI contributes to improving the quality of scientific research, while 16.66% believe otherwise.

This indicates that the use of AI in scientific research is likely to contribute to the enhancement of research quality through the advantages it provides, such as access to vast amounts of data and information, as well as its ability to process data and refine the research and studies conducted by researchers. There are many applications relied upon in the field of scientific research that ultimately improve research quality. Among these applications are DeepMind, which focuses on advanced AI research and its applications in health sciences and biology; Scite, which helps analyze scientific references and provides citations and sources; Semantic Scholar, an AI-powered search engine for scientific papers; and BioBERT, a language model specialized in biological and medical texts.

Interestingly, AI applications differ from well-known internet websites in how they search for information and reach the desired outcome for the researcher. For instance, Stephen Wolfram, in his book titled "What is ChatGPT Doing and Why Does It Work?", provides an example where he imagines a person scanning billions of pages of text on the internet and in printed books to determine the word that comes after the following sentence: "The best thing about artificial intelligence is its ability to...". ChatGPT effectively does this—scanning a vast amount of data in a short time—except it doesn't look at the literal text but searches for things with a specific meaning. (Wolfram, 2023, p. 10)

Table No. (05) represents the reason for the contribution of artificial intelligence in improving the quality of scientific research

| Statement | Frequency | Percentage |
|--|-----------|------------|
| Ability to analyze large datasets | 63 | 35% |
| Summarizing large amounts of information | 68 | 36.66% |
| Contribution to editing and proofreading | 18 | 10% |
| Contribution to education and training | 21 | 11.66% |
| Its ability to predict and forecast | 12 | 6.66% |
| Total | 180 | 100% |

We observe from the above table that 36.66% of the respondents believe that the use of artificial intelligence contributes to improving the quality of scientific research by summarizing large amounts of information, while 35% believe that the reason is due to its ability to analyze large datasets. In contrast, 6.66% of the sample believe that the reason is due to its ability to predict and forecast.

In addition to its ability to analyze large datasets, artificial intelligence (AI) examines and analyzes a vast and complex set of data to extract useful information. For example, IBM Watson is an application used to analyze big data and provide accurate insights and outcomes in various scientific fields.

AI can also contribute to improving the quality of scientific research by assisting in academic writing. There are many applications that help researchers enhance their academic writing and improve their scientific skills in this area. For instance, there are several applications specializing in academic writing, such as Consensus, Scinapse, Lumina, The Literature, and Openread. Some applications specialize in reviewing various literature, like “Research Rabbit, Litmaps, Connected Papers, and Impactful Dimensions”. There are also applications that assist with reading, such as “Scholarcy and SciSpace Copilot”, and others specifically designed for intelligent citations, like “Scite, Lateral, Clivis, and My Ra”. Additionally, some applications are related to source and reference management, such as “Zotero, Mendeley, Endnote, and PaperPile” (Mustaq, 2024, pp. 3-4).

Table No. (06) represents the extent of the impact of artificial intelligence on discovering new methods and results in research.

| Statement | Frequency | Percentage |
|--------------------|-----------|------------|
| No impact | 15 | 8.33% |
| Slight impact | 33 | 18.33% |
| Moderate impact | 96 | 53.33% |
| Significant impact | 36 | 20% |
| Total | 180 | 100% |

We observe from the above table that 53.33% of the sample believes that the impact of artificial intelligence on discovering new methods and results in research is moderate, while 20% believe that its impact is significant. In contrast, 8.33% believe that AI has no impact on discovering new methods and results in research.

It appears that AI has a moderate impact on discovering new methods and results in research. This could be attributed to the fact that AI plays an assisting role in the preparation of scientific research rather than a fundamental one, considering the crucial role that human researchers play in conducting their studies independently of machine work. Therefore, AI's impact is seen as moderate in discovering new methods and results in research. Additionally, AI applications are still in their early stages and are likely to undergo significant development and improvement, which may result in a greater impact on scientific research in the future.

Even if AI is not yet capable of generating entirely new ideas, it can still help organize and develop researchers' thoughts. For example, in the field of literary research, applications like ChatGPT can assist researchers in the review process by finding academic papers and summarizing their conclusions. During the writing process, AI can help create an initial draft of a scientific paper and even suggest titles by providing preliminary information (Salvango, 2023, p. 2).

Table No. (07) represents the impact of artificial intelligence on the value of scientific research

| Statement | Frequency | Percentage |
|-----------|-----------|------------|
| Yes | 171 | 95% |
| No | 9 | 5% |
| Total | 180 | 100% |

We observe from the above table, which represents the impact of artificial intelligence on the value of scientific research, that 95% of the sample believes that AI affects the value of scientific research, while 5% believe otherwise.

The value of scientific research is somewhat tied to the tools, sources, and methods used in its preparation. Relying on AI technology may influence the value of scientific research. Similar concerns were raised in previous studies when the internet became widespread and began being used in scientific research. The value of scientific research tends to be affected when new and advanced technologies emerge that simplify the research process, but at the same time, these technologies, including AI, raise questions about the value of the research produced using them.

Jiahui Huang argues that AI plays a significant role in enhancing learning and personalized education. AI has changed how teachers teach and how students learn. It can create customized educational plans based on students' needs and learning conditions, helping them improve their learning ability and increase their efficiency (Huang, 2021, p. 211).

Table No. (08) represents the nature of the impact of artificial intelligence on the value of scientific research

| Statement | Frequency | Percentage |
|-----------------|-----------|------------|
| Positive impact | 123 | 68.33% |
| Negative impact | 57 | 31.66% |
| Total | 180 | 100% |

We observe from the above table, which represents the nature of the impact of artificial intelligence on scientific research, that 68.33% believe that the impact of AI on scientific research is positive, while 31.66% believe otherwise.

It appears that the use of AI in scientific research enhances the value of research and has a positive impact. This is because utilizing this technology and benefiting from its advantages improves the quality of scientific research, thereby adding greater value to it. Moreover, AI is an advanced technology that, when used in adherence to proper methodological and scientific procedures while avoiding any forms of fraud or deception in research preparation, offers significant benefits. AI today can even conduct a large number of scientific research projects independently of the researcher's direct involvement. For example, the Japanese company Sakana.ai, in collaboration with other universities such as Oxford University, developed the first AI scientist specialized in scientific research and writing scientific articles. This AI scientist is capable of conducting scientific papers independently, generating new ideas, and summarizing research findings. The company has published examples of the research papers created by this "AI scientist" on its website (Sakana.ai).

Table No. (09) represents the areas of contribution of artificial intelligence to scientific research

| Statement | Frequency | Percentage |
|---|-----------|------------|
| Increasing the number of research papers | 60 | 33.33% |
| Increasing the number of citations and references | 51 | 28.33% |
| Publishing in prestigious journals | 24 | 13.33% |
| Obtaining grants and awards | 3 | 1.66% |
| Increasing collaborative scientific work | 42 | 23.33% |
| Total | 180 | 100% |

We observe from the above table that 33.33% of the sample believes that AI contributes to scientific research by increasing the number of research papers, while 28.33% believe it contributes to increasing the number of

citations and references. The lowest percentage, 1.66%, believes that AI contributes to obtaining grants and awards.

It appears that reliance on AI in scientific research significantly contributes to increasing the number of research papers. This is due to AI's speed, accuracy, ability to condense information, process large datasets, generate ideas and texts, and facilitate the publication of scientific papers, all of which clearly contribute to an increase in the number of research papers and scientific output by simplifying the research process and completion.

AI also contributes to increasing the number of citations and references as it refers to information sources and helps in utilizing sources and references in research. Some AI applications specialize in providing and organizing sources and references in research. However, it should be noted that an increase in the number of research papers does not necessarily indicate their quality. This raises concerns about the credibility of research conducted with the aid of AI. Many studies address this issue, including one titled "Impact of Artificial Intelligence News Source Credibility Identification System on the Effectiveness of Media Literacy Education." This study developed a high-efficiency method for distinguishing messages using new AI technologies and big data processing (Chiang, 2022, p. 1).

Table No. (10) represents the contribution of artificial intelligence to increasing the rate of scientific research

| Statement | Frequency | Percentage |
|--------------|------------|-------------|
| Yes | 129 | 71.66% |
| No | 48 | 26.66% |
| Total | 180 | 100% |

From the above table, it is observed that 71.66% believe that artificial intelligence increases the rate of scientific research, while 26.66% think otherwise.

It appears that artificial intelligence contributes to increasing the rate of scientific research. The ease provided by AI helps researchers complete their work in a relatively shorter time compared to conducting research without AI. Therefore, AI saves time and effort for researchers, allowing them to conduct multiple studies. This is somewhat similar to the impact of SPSS software, which has facilitated and accelerated data analysis compared to traditional methods. AI possesses extraordinary capabilities in analyzing vast amounts of scientific and educational data required by researchers, learners, and educators by examining patterns and trends in student performance, identifying learning gaps, measuring the effectiveness of teaching strategies, and improving curricula (Swargiary, 2023, p. 20).

Table No. (11) represents the extent of the increase in the rate of scientific research through reliance on AI

| Statement | Frequency | Percentage |
|----------------------|------------|-------------|
| Minor increase | 102 | 56.66% |
| Significant increase | 78 | 43.33% |
| Total | 180 | 100% |

From the above table, it is observed that 56.66% of the sample believe the increase is minor, while 43.33% think it is significant.

It appears that the increase in the rate of scientific research through reliance on artificial intelligence is considered minor. While AI may contribute to the increase, other factors such as the researcher's motivation, academic level, competence, and various conditions affect the rate. Thus, AI helps in increasing the rate of scientific research, but the increase is relative.

Table No. (12) represents the main challenges researchers face when using AI in scientific research

| Statement | Frequency | Percentage |
|-----------------------------|-----------|------------|
| Lack of technical knowledge | 63 | 35% |
| Privacy violations | 3 | 1.66% |
| Lack of credibility | 72 | 40% |
| Violation of values and | 9 | 5% |

| Statement | Frequency | Percentage |
|---------------------------------|------------|-------------|
| ethics | | |
| Legal and regulatory challenges | 33 | 18.33% |
| Total | 180 | 100% |

From the above table, it is observed that 40% of the sample believes that the lack of credibility is the most significant challenge faced by researchers when using artificial intelligence for scientific research, while 35% think that lack of technical knowledge is the main challenge, and only 1.66% consider privacy violations as the most significant challenge.

It appears that lack of credibility is a major challenge when researchers prepare scientific research using AI because AI relies on data that may be inaccurate, biased, or incomplete, which can lead to misleading results. Additionally, AI relies on complex algorithms or data not available to others or hidden sources that are difficult to verify, ultimately affecting the credibility of AI-prepared research.

Conversely, maintaining credibility in AI research contributes to trust in AI technology, which is important in the current era. According to the Tencent Research Institute, user trust in AI systems is essential for these systems to achieve social benefits. This requires a practice system that guides security and ethical management of AI systems, including coordinating social norms and values, algorithmic accountability, legal compliance, and ensuring the safety of algorithms and data systems while protecting personal privacy (Tencent, 2021, p. 8).

Furthermore, challenges related to lack of technical knowledge arise because some researchers may not effectively use modern technologies, including AI. This limits their ability to fully benefit from various AI applications in scientific research. Therefore, it is crucial to learn how to use AI effectively, either through personal effort or through university and research center initiatives that offer training workshops on AI technology.

Table No. (13) Represents the Relationship Between Using AI and Enhancing and Developing Scientific Research

| Statement | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
|--|----------------|-------|---------|----------|-------------------|
| 1. I believe that using AI in scientific research has improved the accuracy of my research results | 18 | 42 | 57 | 39 | 24 |
| 2. I believe that using AI has made my scientific research more efficient | 21 | 42 | 60 | 33 | 24 |
| 3. I believe that using AI has increased my desire to conduct scientific research | 36 | 39 | 57 | 27 | 21 |
| 4. I believe that the development of scientific research is dependent on the use of AI | 45 | 36 | 36 | 21 | 42 |
| 5. My use of AI has enhanced the quality of the research papers I publish | 33 | 33 | 45 | 36 | 33 |
| 6. My use of AI has made my scientific research more innovative and creative | 30 | 36 | 54 | 33 | 27 |
| 7. I consider the research conducted using AI to be more effective and skillful | 30 | 36 | 60 | 21 | 33 |
| 8. I believe that using AI has significantly reduced my occurrence | 36 | 42 | 60 | 21 | 21 |

| Statement | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
|---|----------------|-------|---------|----------|-------------------|
| of errors | | | | | |
| 9. The advancement and development of scientific research is fundamentally related to appropriate and sufficient reliance on AI | 36 | 30 | 66 | 20 | 28 |
| 10. I believe that using AI in scientific research is a barrier to the development of scientific research | 36 | 18 | 45 | 30 | 51 |

Table No. (14) Represents the Statistical Analysis of Likert Scale Results for Studying Respondents' Attitudes

| Statement | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree | Mean | Standard Deviation | Percentage | T-test | Sample Direction | Question Rank |
|-----------|----------------|-------|---------|----------|-------------------|------|--------------------|------------|--------|------------------|---------------|
| 1 | 18 | 42 | 57 | 39 | 24 | 2.95 | 1.18 | 59 | -0.56 | Neutral | 9 |
| 2 | 21 | 42 | 60 | 33 | 24 | 3.02 | 1.19 | 60.4 | 0.22 | Neutral | 7 |
| 3 | 36 | 39 | 57 | 27 | 21 | 3.23 | 1.26 | 64.6 | 2.44 | Neutral | 2 |
| 4 | 45 | 36 | 36 | 21 | 42 | 3.12 | 1.5 | 62.4 | 1.07 | Neutral | 4 |
| 5 | 33 | 33 | 45 | 36 | 33 | 2.98 | 1.36 | 59.6 | -0.19 | Neutral | 8 |
| 6 | 30 | 36 | 54 | 33 | 27 | 3.05 | 1.28 | 61 | 0.52 | Neutral | 6 |
| 7 | 30 | 36 | 60 | 21 | 33 | 3.05 | 1.31 | 61 | 0.51 | Neutral | 5 |
| 8 | 36 | 42 | 60 | 21 | 21 | 3.28 | 1.24 | 65.6 | 3.02 | Neutral | 1 |
| 9 | 36 | 30 | 66 | 20 | 28 | 3.14 | 1.3 | 62.8 | 1.44 | Neutral | 3 |
| 10 | 36 | 18 | 45 | 30 | 51 | 2.77 | 1.46 | 55.4 | -2.11 | Neutral | 10 |

From the table, it is evident that statement No. 8, which states "My use of AI has significantly reduced my occurrence of errors," has 65.6% of respondents indicating neutrality. This suggests that AI does not completely eliminate the risk of scientific and methodological errors. The researcher's scientific and methodological competence, ability to handle various research tools, and methodological accuracy play a crucial role in minimizing errors. While AI can complement the researcher's efforts, it may not entirely prevent errors, especially in complex and precise scientific fields. For instance, AI can reduce errors in language learning applications and translation tools. However, in other areas like social sciences, AI might still have limitations.

Statement No. 3, "My use of AI has increased my desire to conduct scientific research," shows 64.6% neutrality. This indicates that AI might enhance researchers' interest in scientific research due to its efficiency and speed, but it may also lead to research laziness. According to Ahmed Sayed Fayez's study on "Impact of artificial intelligence on human loss in decision making, laziness, and safety in education," overreliance on AI may reduce human cognitive effort and lead to laziness (Sayed, 2023). Hence, AI may sometimes have a counterproductive effect on researchers' motivation.

Statement No. 9, "Advancement and development of scientific research is fundamentally related to appropriate and sufficient reliance on AI," shows 62.8% neutrality. This reflects that while AI is a powerful technology that can enhance various aspects of research, its role in scientific advancement is dependent on its effective and sufficient use. AI offers numerous benefits in research, from topic selection to referencing.

Fatima Roumate's book, "Artificial Intelligence in Higher Education and Scientific Research," explains the interaction between AI and higher education and how AI technologies support research advancement (Roumate, 2023).

Statement No. 2, "My use of AI has made my scientific research more efficient," has 60.4% of respondents indicating neutrality. This suggests that while AI can improve efficiency by automating data collection, classification, and processing, the overall efficiency of scientific research depends on the researcher's expertise. AI can make research more efficient and creative by offering virtual assistance, facilitating global collaboration, and enhancing data analysis (Henner Gimpel, 2023, p. 18).

Partial Study Results:

1. Easy Access to Information: The study revealed that 46.66% of the sample believe that easy access to information is one of the most important features provided by artificial intelligence in scientific research.
2. Improvement in Research Quality: 83.33% of the sample believe that AI contributes to improving the quality of scientific research.
3. Summarization of Information: 36.66% of the sample believe that AI's ability to summarize large amounts of information is the reason behind its contribution to improving research quality.
4. Discovery of New Methods and Results: 53.33% of the sample believe that AI has a moderate impact on the discovery of new methods and results in research.
5. Impact on the Value of Scientific Research: 95% of the sample believe that AI affects the value of scientific research, with 68.33% describing this impact as positive.
6. Increase in the Number of Research Papers: 33.33% of the sample believe that AI increases the number of research papers.
7. Increase in the Rate of Research Preparation: 71.66% of the sample believe that AI contributes to increasing the rate of scientific research preparation.
8. Slight Increase in Research Preparation Rate: 56.66% of the sample believe that the increase in the rate of scientific research preparation through AI is slight.
9. Challenges Related to Credibility: 40% of the sample believe that the most significant challenge facing researchers when using AI in preparing scientific research is the lack of credibility.

General Study Results:

1. Improvement in Research Quality: The study indicates that AI contributes to enhancing the quality of scientific research by processing large amounts of data quickly and accurately, summarizing information, and correcting errors that researchers might make.
2. Increased Productivity: AI helps increase the rate of scientific research preparation by saving time and encouraging researchers to complete more studies.
3. Providing New Insights: AI contributes to offering new insights in scientific research by developing the field and opening up new horizons that can help solve problems and explain various phenomena.
4. Ethical Challenges: The study highlights that the most significant challenges in using AI for scientific research are ethical, particularly regarding the lack of credibility, as AI can generate scientific research independently, which could lead to biases and double standards.

Conclusion:

This study emphasizes that AI plays a vital role in advancing and developing scientific research by improving research quality, increasing researcher efficiency, and raising the rate of research completion. Despite some academic concerns regarding bias and credibility, integrating AI into educational curricula and scientific research is essential for enhancing students' research capabilities and providing them with innovative and effective tools to address academic and scientific challenges.

References:

- 1- B. J Copeland, "artificial intelligence how does AI work", independently published, 2019
- 2- Chris lu, Cong lu, Robert tjarko lange, Jakob forester, Jeff clune, David ha; "the AI scientist: towards fully automated open-ended scientific discovery" <https://sakana.ai/ai-scientist/> august 13, 2024.
- 3- Fatima roumate, "artificial intelligence in higher education and scientific research", springer nature Singapore, 2023.
- 4- George krasadakis, " AI artificial intelligence 60 thought leaders answer 17questions about artificial intelligence " Coy Chen, Dublin, Ireland, 2022.
- 5- Gwo-Jen Hwang, Haoran xie, Benjamin W. Wah, Dragan Gasevic " Vision, challenges, roles and research issues of artificial intelligence in education", Elsevier, sciencedirect, vol 1, 2020.
- 6- Henner Gimpel, kristina Hall, Stefan Decker, Torsten Eymann, Caroline Ruiner, Mareike Schoop, Steffen Vandirck, Nils Urbach "Unlocking the power of generative AI models and systems such as

- GPT-4 and ChatGPT for higher education” , a guide for students and lecturers, Frankfurt University of applied sciences, 2023.
- 7- Jiahui huang, Salmiza saleh, Yufei liu, “a review on artificial intelligence in education”, academic journal of interdisciplinary studies, vol10, N03, Malaysia, 2021
 - 8- Kadasah Sultan, “Scientific research methodology principles, methods, and techniques” , Buddha publication , Mumbai, 2022.
 - 9- Khritish swargiary, “ artificial intelligence in education: transforming learning for the future” Scholars’ Press, London, United Kingdom, 2023.
 - 10- Mcritchie finlay,” Scientific research as a career”, CRC Press, New York, 2011.
 - 11- Michael J. Baker “ The roles of models in artificial intelligence and edducation research ; a prospective view” , international journal of artificial intelligence in education ,vol11, hal open sciences .
 - 12- Michele Salvango, Fabio Silvio Taccone, Alberto Giovanni Gerli ,“Can artificial intelligence help for scientific writing” , BMC, Bruxelles, Belgium, 2023.
 - 13- Mustaq Bilal, “ A list of AI apps for academic writing” ,2024
 - 14- Prathamesh padmaker, Shubham joshi, Mohamed elhoseny, Amina omran, “ artificial intelligence in higher education; a practical approach “ , CRC PRESS, 2022.
 - 15- Sayed Fayaz Ahmad , Heesup Han, Muhammad Mansoor Alam, Mohd Khairul Rehmat, Muhammad Irshad, Marcelo Arraño-Muñoz , Antonio Ariza-Montes “Impact of artificial intelligence on human loss in decision making, laziness and safety in education” , national library of medicine , national center for biotechnology information, humanities and social sciences communications ,USA, 2023.
 - 16- Stephen Wolfram, “What is ChatGPT Doing and why does it works” , Wolfram Media, 2023
 - 17- Tencent research institute, “artificial intelligence ; a national strategic initiative” Palgrave Macmillan, Beijing, China, 2021.
 - 18- Tosti h. c chiang, chih –shan liao and wei-ching wang ,“impact of artificial intelligence news source credibility identification system on effectiveness of media literacy education”, sustainability, MDPI, national Taiwan university, Taipei 106, Taiwan .
 - 19- Zhongzhi SHI, “Advanced artificial intelligence”, World Scientific, Singapore,2011.