

RESEARCH ETHICS IN THE CONTEXT OF ARTIFICIAL INTELLIGENCE



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Abstract: While AI acts as a catalyst for research, harnessing data analysis and synthesis, it paradoxically lowers boundaries for those lacking scientific integrity, and thus increasing incidents of plagiarism. This underscores the imperative for patching up robust software tools designed to assess textual similarity and citation integrity, templated at safeguarding the pivotal principles of scientific ethics. These principles, deeply encompassed through an academic journey, culminate in a comprehensive understanding for the seasoned researcher. In response, this probe advocates for a variegated approach to boost research ethics in academic circles through heightened awareness, entailing an ethics culture, and upholding rigorous scientific standards. This should be tackled through seminars and forums, aggluinated with stringent legal actions against intellectual property infringements.

Key Words Scientific Research, Scientific Ethics, Artificial Intelligence, Digital Technology, Scientific Integrity.

أخلاقيات البحث العلمي في ظل الذكاء الاصطناعي

ملخص : بالرغم من أنّ الذكاء الاصطناعي يعد عاملا مدعما وخادما للأبحاث والدراسات، غير أنّه سهّل لذوي النفوس العلمية الضعيفة عملهم في الانتحال العلمي، الأمر الذي فرض ضرورة العمل على ايجاد تطبيقات وبرمجيات تقيس نسب التشابه والاختباس لوضع حد لمثل تلك الممارسات التي تضرّ بضوابط البحث العلمي وأخلاقياته، والتي تبقى في نظرنا قضية أخلاق، يتربى عليها ويتعلمها الباحث طيلة مساره العلمي الى أن ترسخ عنده ويصبح ملم بكل حيثياتها. ولهذا أوصت الدراسة ببعض الحلول منها العمل على تدريس وترسيخ أخلاقيات البحث العلمي بالمؤسسات العلمية ونشر الوعي، وثقافة الأخلاق والضوابط العلمية من خلال عقد ندوات وملتقيات حول الموضوع، اضافة الى الردع من خلال التطبيق الصارم للقوانين، والتشهير بمنتهكي حقوق الملكية الفكرية.

الكلمات المفتاحية: بحث علمي، أخلاقيات علمية، ذكاء اصطناعي، تكنولوجيا رقمية، سرقة علمية.



L'éthique de la recherche dans le contexte de l'intelligence artificielle

Résumé:

Si l'IA agit comme un catalyseur pour la recherche, en facilitant l'analyse et la synthèse des données, elle abaisse paradoxalement les barrières pour ceux qui manquent d'intégrité scientifique, augmentant ainsi les cas de plagiat. Cela souligne l'impératif de développer des outils logiciels robustes conçus pour évaluer la similarité textuelle et l'intégrité des citations, afin de sauvegarder les principes fondamentaux de l'éthique scientifique. Ces principes, profondément ancrés dans l'odyssée universitaire, aboutissent à une compréhension globale pour le chercheur chevronné. En réponse, cette étude préconise une approche à multiples facettes pour renforcer l'éthique de la recherche dans les cercles universitaires par une sensibilisation accrue, l'intégration d'une culture de l'éthique et le respect de normes scientifiques rigoureuses. Cette approche devrait être orchestrée par le biais de séminaires et de forums, associés à des actions juridiques rigoureuses contre les violations de la propriété intellectuelle.

Mots Clés: Recherche scientifique, éthique scientifique, intelligence artificielle, technologie numérique, intégrité scientifique.



Introduction:

Academic scientific research is paramount for the advancement of knowledge and expertise, playing a crucial role in bolstering innovation and addressing societal challenges. Recognizing its significance, educational institutions worldwide, involving universities and research centers, have prioritized fostering their research programs to layout a conducive scientific environment. The accelerated pace of technological progress has permeated all aspects of life, transforming research methods and the way information is accessed. This technological transition has redefined the research process, from simple data collection to heedful selection from an expansive digital landscape. In this arena, Artificial Intelligence (AI) not only boosts research efficiency, precision, and modernity but also advocates risks that could compromise research integrity.

Pickford Smith enthuses over scientific honesty as reflecting "the virtues that a scientist and thinker must embody to maintain credibility by properly citing sources in their research." Even when a researcher's contribution is minimal compared to the quoted material, it is better to acknowledge others' work than misappropriate it. The motion toward electronic publishing, replacing traditional paper-based methods, has paved the way to an increase in ethically questionable research practices. This upshot has urged the evolution and diffusion of digital tools designed to detect scientific plagiarism and ensure proper citation practices. This study, therefore, addresses a crucial question: *What is the extent of artificial intelligence's impact on scientific research and its ethics?*

The relevance of this research stems from its highlight on the intersection of AI and research ethics, a pivotal area for academic and research institutions. The objectives of this study are to:

- Clarify AI's role in the scientific domain.
- Identify core scientific ethics and highlight practices that violate these principles.
- Stress the importance of robust research ethics in the digital age.
- Illustrate how AI can support a culture of research ethics.
- Propose strategies to reduce scientific plagiarism in the AI-driven research environment.

To systematically address the research issue, the discussion is divided into three main sections:

- The first section addresses research ethics and unethical practices.
- The second section explores the concept of Artificial Intelligence.



- The third section examines AI's impact on research ethics and ways to mitigate potential issues.

Using a descriptive approach, this study seeks to explain the phenomena and analyze the relationship between its key variables: AI and research ethics, and how they influence each other.

THE FIRST TOPIC:

Research Ethics and Contrary Practices

The culminating stance of knowledge and the development of meaningful scientific insights are considerably critical for societal progress and depend heavily on the integrity of scientific research, which must embody to both scientific and ethical standards. Research conducted using rigorous methodologies produces reliable results that are instrumental in addressing societal stances.

First requirement: Definition of Research Ethics and Their Motivations

The term "**research**" refers to a careful and systematic inquiry within a given subject area, focusing on exploration and profound investigation. It incorporates a constructive approach to figuring out and interpreting phenomena, trends, and issues. On the other hand, "**science**" stands for to a clear understanding of reality, symbolizing a human hurdle that follows a structured method to gain data into the universe, self, and society, which can be implemented to solve problems.¹

As regards *the Oxford Concise Dictionary*, **scientific research** is "a scope of study involving a body of established facts governed by general laws, using reliable methods to discover new facts within the scope of the study."² *Abd al-Basit Muhammad Hasan* defines it as "an organized scientific investigation of a specific phenomenon using the scientific method," while philosopher Karl Jaspers refers to it as "systematic knowledge," and sociologist *Maurice Anders* describes it as "a scientific practice that involves collecting and analyzing data to delineate a specific issue."³

¹ Farid Kamel Abu Zeina, and others, **Scientific Research Methods**, Volume 1, Al-Maisarah Publishing and Distribution House, Jordan, 2005, p18.

² Ahmed Badr, **Fundamentals of Scientific Research and Its Methods**, Academic Library, Cairo , 1996, p 20.

³ Souad Mansouri, **The Evolution of Information Acquisition in Scientific Research. Research Methodology in the Age of Digitization and Artificial Intelligence: A New Challenge (National Symposium)**, Algeria, University of Algeria 01, 30 April, 2023,p 3.



In line with this, scientific research is an organized activity tended at uncovering facts using the scientific method, understanding how these facts are interconnected, and deriving general principles or laws to explain them.¹

Ethics, stemmed from 'khulq,' relates to nature, character, and morality. It involves a set of rules and standards related to behavior, and when implemented to a specific group, it reflects the standards governing that group's actions.² **Research ethics**, therefore, are "a set of rules and standards agreed upon by different stakeholders"³ or "a collection of general and specific principles that researchers must embody, such as honesty, integrity, truthfulness, accurate scientific documentation, objectivity, confidentiality, and patience." These principles aid to maintain the integrity of scientific research."⁴

When ethical values impact all aspects of life, the scientific domain stands out as majorly significant. Research ethics tend to instill these ethical standards among researchers, scholars, and students, ensuring the integrity and structure of scientific inquiry.⁵

What drives the consideration of ethics in scientific research? The primary motivations entail :

One of the most important motivations that prompted interest in the ethics of scientific research is the developments in the philosophy of science and its humanization view science as a fundamentally human endeavor. Thus, the ethics of science and scientific behavioral standards are central to humanistic studies of scientific phenomena, highlighting the nexus between scientific research realities and ethical considerations.

The promulgation of the Universal Declaration of Human Rights in 1948 . Also motivated established ethical rules that researchers must follow when conducting human experiments. These include ethical obligations to accompany the subject, inform them of potential research consequences, ensure social benefits from

¹ Abd El Ghaffar Rashad Al-Qasbi, **Research Methods in Political Science**, Volume 1, Adab Library, Cairo, 2004, p 44

² Amani Saud Khayshan Al-Kurashi, **Ethics of Scientific Research**, Journal of the Faculty of Islamic and Arabic Studies for Girls in Alexandria, 02(38), 2022, p 113.

³ Maysa Ahmad Al-Nayal, Abd El Hamid Medhat, **Scientific Research and Its Ethics**, Volume 1, Halabi Legal Publications, Lebanon, 2011, p 33.

⁴ Muftah Bin Hadiya, **Scientific Citation as a Criterion of Scientific Integrity and Ethics**, Standard Journal, 26(64), pages 1112-4377, 2022, p 1068.

⁵ Mona Tawakol Al-Sayed, **Ethics of Scientific Research**, Saudi Arabia: Majmaah University, College of Education in Az-Zulfi, 2013, p



successful experiments, and engage only qualified scientists for research activities. Researchers must also cease any research found to be harmful.¹

Also, The mid-19th century and the aftermath of World War II witnessed grave ethical and humanitarian violations in scientific research, thus underscoring the need for ethics to regulate scientific practices, particularly highlighted by the devastating effects of scientific exploits like the atomic bombings of Hiroshima and Nagasaki. Finally, rapid scientific and technological advancements have proliferated instances of unethical research, intensifying the focus on cultivating an ethical sensibility to guide scientific conduct and reevaluate the values of scientific practice.

These are the most important motives for interest in the ethics of scientific research, and this interest has increased in the age of digitization, considering that researchers are the primary users of modern technological techniques in the field of scientific research.

Second requirement: Research Ethics

Research ethics are the moral principles based on values that govern the conduct of scientific inquiry. Researchers are obligated to adhere to these ethical guidelines in their dealings with themselves, their subjects, and the wider community that benefits from their research. The foundational elements of these principles are detailed below:²

- *Scientific Honesty*: This principle is fundamental to the researcher's duty and encompasses the adherence to the methodology and controls of scientific research throughout all its phases, from data collection to the presentation and interpretation of results. Scientific honesty requires precision in reporting and crediting sources, whether these are directly quoted or paraphrased. An old adage supports this ethos: "The blessing of work is attributing the statement to its rightful owner":³
- *Objectivity*: This requires scientists to avoid fabricating, concealing, or misrepresenting data or results. They must remain objective, unbiased, and truthful throughout the research process. Alteration or suppression of data for non-scientific reasons is tantamount to dishonesty and forgery, thereby compromising the study's integrity due to the researcher's lack of neutrality.

¹ Maysa Ahmad Al-Nayal, Abdul Hamid Medhat, op.cit, p34.

² Morris Euan & others, **The practice of AI and ethics in energy transition futures**, 1 May 2022, Retrieved from https://www.energyrev.org.uk/media/1985/energyrev_aiandethics_final_202207.pdf

³ Amani Saud Khayshan Al-Kurashi, po.cit, p120.



- *Scientific Caution*: Researchers are expected to minimize human, experimental, and methodological errors as much as possible, emphasizing meticulous scrutiny and critical analysis of results. This ethical mandate is a natural extension of honesty, without caution, there can be no true honesty. Adherence to both principles ensures that research achieves its intended objectives.
- *Openness*: Researchers should be open to peer review and receptive to criticism and new ideas. This quality is predicated on collaboration and cooperation, rather than isolation or exclusivity.¹
- *Scientific Competence*: Ethically and scientifically, researchers are expected to ensure that their conduct in research reflects their level of scientific expertise, experience, and training, and to consult experts in their field as necessary. Active participation in the scientific community entails responsibilities towards the wider scientific sphere, field specialists, the society at large, and to science itself as an abstract concept.
- *Humility*: "Researchers should avoid boastful language, such as 'I discovered...' or 'when I contacted...,' as it reflects arrogance and undermines the collaborative nature of scientific discovery.
- *Credibility*: Researchers must consistently report information truthfully and accurately, crediting it to its original sources, and should not fill gaps with assumptions.²
- *Safety*: It is imperative that researchers do not expose themselves or their subjects to danger, ensuring the safety of all parties involved.
- *Trust*: Building a trustworthy relationship with collaborators is crucial for fostering greater cooperation and achieving more precise results. Researchers must not exploit this trust but use it solely to advance research objectives.
- *Consent*: Researchers must obtain consent from subjects before involving them in the study. This includes prohibitions against recording conversations, taking photos, or filming subjects without their explicit consent. Seeking consent after the fact is considered unethical.
- *Respect*: Respecting a participant's decision to withdraw from a study at any time is essential, acknowledging that they are volunteers whose decisions to disengage must be honored without question.

¹ Maysa Ahmad Al-Nayal, Abdul Hamid Medhat, op.cit, p40 - 41.

² Amani Saud Khayshan Al-Kurashi, po.cit, p121.



- *Culture of Feedback*: Where feasible, researchers should provide feedback to the groups targeted in their studies, such as summaries, recommendations, and suggestions, and should secure their consent before publication.
- *Animal Rights*: If research involves animals, ethical considerations must include their humane treatment, comfort, and the minimization of any pain or discomfort they might experience.¹
- *Confidentiality*: Researchers are duty-bound to safeguard the true identities of participants, using personal data solely for scientific purposes and ensuring the destruction of all related data upon completion of the study. Thus, protecting confidentiality and privacy, and respecting the autonomy of subjects, is paramount.²

Third requirement :Practices Contrary to Research Ethics

During the course of research, researchers may engage in practices that undermine the integrity of scientific inquiry, particularly when interacting with the sample or target group. Notable unethical practices entail :

- *Unethical Practices During the Research Planning Stage*: When planning research problem and devising a research design, researchers should consider two main aspects. First, the research plan should not simply replicate a previous study. While conducting the study in a different setting is acceptable, it is imperative that the original study be explicitly acknowledged, underscoring the scientific value of repeating the research in a different context.

Second, the proposed study should not present a significant or likely risk of harm to participants. If such risks are identified, the researcher must weigh the potential benefits of the research against these risks and seek advice from knowledgeable and impartial experts who can provide clear insights and judgments about the situation.³

¹ Maysa Ahmad Al-Nayal, Abdul Hamid Medhat, op.cit, pp:45 - 48.

² Council of Higher Education, **Ethics guide of generative artificial intelligence use in the scientific research and publication process of higher education institutions**, Republic of Turkiye, Council of Higher Education. Retrieved from, 2024, p 2.

<https://www.yok.gov.tr/en/Documents/2024/ethics-guide-of-generative-ai-use-in-the-scientific-research-and-publication-process.pdf>

³ Maysa Ahmad Al-Nayal, Abdul Hamid Medhat, op.cit, p57.



- Examples of unethical practices when dealing with the target group: These include:
 - Coercion: Forcing participants to take part in the study instead of allowing them the freedom to choose.
 - Manipulation: Making fundamental changes to the behavior of participants, which violates the principle of self-determination.
 - Endangerment: This refers to deliberately exposing participants to physical or psychological harm, such as placing them in embarrassing or stressful situations or inducing them to compromise their self-respect. This might force them to engage in unethical behaviors like lying, stealing, or deceit—actions that can cause subjects to feel ashamed of violating their ethical norms.
 - Deception: Concealing the true purpose of the research or misleading participants about the procedures involved.
 - Insensitivity: Failing to consider the feelings of vulnerable groups such as the elderly, the ill, or those with limited understanding or expression.
 - Exploitation: Taking advantage of information observed or overheard from participants to benefit the research.
 - False Promises: Creating false hope by misleading participants about the potential outcomes of the research.
 - participants privacy: Asking direct questions that invade personal privacy, even if it might serve the research outcomes. Researchers must strike a balance in such cases.
- *Scientific Plagiarism*: Defined as the unauthorized citation of ideas from others, regardless of the source, including the researcher's own previous works. Failure to properly credit sources constitutes plagiarism.
- *Concealing Research Flaws*: Researchers should disclose any known deficiencies in their studies, as they are most familiar with them. This transparency can actually strengthen the research, especially in the social sciences.
- *Ignoring negative results*: Some researchers may overlook negative results, believing them to be less worthy of mention compared to positive results. However, the absence of a relationship between variables is scientifically as significant as the presence of one, making both types of outcomes valuable to the scientific community.



- *Denying Chance Results*: Some researchers might obtain results purely by chance but fail to report this. Research ethics dictate that hypotheses should be formulated before data collection and analysis begin, not after the research is completed.¹

Given the importance of scientific research in advancing society and solving its problems, researchers may sometimes feel compelled to engage in unethical behaviors, such as misrepresenting or obscuring data. In such cases, it is essential that researchers balance the public interest in the research outcomes with the potential harm to participants. Additionally, researchers must be willing to acknowledge and apologize for any unethical practices that may have occurred in their pursuit of advancing the research.

THE SECOND TOPIC: Concept of Artificial Intelligence

We are currently in an era delineated by a rapid expansion of information and communication technologies, which have become integral to nearly all aspects of life, including the scientific domain, where artificial intelligence (AI) is playing a crucial role in academic research.

Artificial intelligence (AI) has emerged as a ground-breaking technological development in the wake of the global digital revolution, with computers now widespread in virtually every sector. the creation of computer programs, such as those designed to play chess, initially developed by Claude Shannon. He created an algorithm that enabled computers to play chess and anticipate their opponent's moves. From these beginnings, we delve into the meaning of artificial intelligence and its defining spectrums.

First requirement:Definition of Artificial Intelligence

The term 'artificial intelligence' is made up of two parts: 'intelligence' and 'artificial.' According to Webster's Dictionary, *intelligence* refers to the ability to perceive, comprehend, and learn from experiences, capturing the essence of intelligence, perception, understanding, and learning. The word '**artificial**' comes from the verb "to make" or "to fabricate."²

¹ Maysa Ahmad Al-Nayal, Abdul Hamid Medhat,op.cit, p25 -55.

² Linda Dahani, Souhaila Simood, **Artificial Intelligence as a Digital Technology Leading to the Innovation of an Emerging Educational Experience in Algeria - Incidia Company as a Model**, Journal of Media and Communication Studies, 2(2), October 2022, pages 87-97, p 90.



John McCarthy, who first coined the term in 1955, defined **artificial intelligence** as "the science and engineering of creating intelligent machines." This definition has evolved with the AI Now Institute describes artificial intelligence as "a diverse assembly of modern technologies that emulate human capabilities".¹ Grewal interprets AI as "a mechanical simulation a system that collects knowledge and information from various domains globally, processing and disseminating it for practical intelligence applications."

Ocana Fernandez, Valenzuela Fernandez, and Garro Aburto define it as "a branch of computer science focused on developing various methods, techniques, and tools to create models and solutions to problems by simulating human behaviors".² It is also seen as "a technical and scientific field dedicated to engineering systems that emerge outputs like content, predictions, recommendations, or decisions aimed at achieving human-defined goals".³ Additionally, it is described as " the simulation of human intelligence processes through computer programs capable of emulating intelligent human behavior".⁴

These definitions make it clear that artificial intelligence is a broad field within computer science that blends hardware, software, applications, and systems designed to replicate human cognitive functions and perform specific tasks across different areas of life.

Second requirement: Characteristics of Artificial Intelligence

Artificial intelligence is delineated by a plethora of abilities that span technological and cognitive functions:

- *Intelligence*: AI systems can learn from and adapt to new situations, allowing them to perform tasks that were once exclusively human..
- *Self-learning*: AI systems can improve their performance on their own by learning from data, continuously adapting to new information.⁵

¹ Fatima Baha, **Artificial Intelligence Systems and the Challenges of Legal Personalization**, Journal of Research in Law and Political Sciences, 9(1), 2023, pages 412–427. P 415.

² Noura Mohammed Abdullah Al-Azzam, **The Role of Artificial Intelligence in Enhancing the Efficiency of Administrative Systems for Managing Human Resources at Tabuk University**, Part 1. Educational Magazine, Sohag University, College of Education(84), 2021, p 478.

³ David B Resnik, Mohammad Hosseini, **The ethics of using artificial intelligence in scientific research: new guidance needed for a new tool**, AI and Ethics, 7 May, 2024, p 2, Retrieved from <https://doi.org/10.1007/s43681-024-00493-8>

⁴ Research Center and Studies, op.cit, p 6.

⁵ David B Resnik, Mohammad Hosseini ,op.cit, p 2.



- *Perception*: AI is equipped to perceive its surroundings, interpret various inputs, and respond using a range of sensors.¹
- *Autonomy*: AI systems can carry out complex tasks independently, without the need for direct human oversight, marking a significant leap from mechanical functions to autonomous intelligence.
- *Prediction*: AI's predictive capabilities present significant challenges and implications for legal systems as they can forecast outcomes based on data analysis.
- *Creativity*: Many AI systems exhibit innovative and creative capabilities or engage in processes characterized by creativity, demonstrating a form of artificial cognition.
- *Automatic Thinking*: AI systems can autonomously explore numerous possibilities within set time constraints, processing multiple scenarios simultaneously.
- *Problem Solving*: AI can address and resolve issues that may not be immediately apparent to human cognition, often surpassing the cognitive limitations inherent in human intelligence.
- *Machine Learning*: AI has the ability to aggregate and analyze data, associating it with relationships that facilitate the dissemination of vast volumes of information beyond human capacity. AI systems adapt to their environments, learning autonomously and forming rules for using the accumulated data and information.
- *Knowledge Representation*: AI maintains vast databases and integrates extensive information repositories to provide alternative solutions and approaches to various challenges and problems.²

Third requirement: Importance of Employing Artificial Intelligence in the Preparation of Scientific Research and Its Ethics

The integration of information technology, especially artificial intelligence, into the academic and scientific fields has brought numerous positive effects and benefits to educational and research systems. Key advantages include:

¹ Al-Najah, **Artificial Intelligence: Definition, Importance, Types, and Major Applications**, 2024, Retrieved June 6, 2024, from Al-Najah, <https://www.annajah.net>.

² ibidem, <https://www.annajah.net>.



- Transforming many concepts and methodologies that were once prevalent in the academic and scientific environment, such as the notions of time and space, which no longer present obstacles for researchers.
- The emergence of new types of research and modern communication methods among researchers, such as global research networks, virtual and remote conferences, research products, and email communication, which allow access to information of any kind.
- Utilizing the global scientific output that is now published and accessible to all, which can be used to advance scientific research and studies .
- The ability to communicate and exchange consultations among researchers across different scientific and knowledge disciplines.
- The ease of editing and managing scientific research and studies using information technology, in line with internationally recognized scientific standards .
- Development of technical and technological skills for handling electronic information.
- AI creates an interactive educational and research environment through various electronic programs and media, facilitating research, investigation, and discovery.
- Facilitates the classification and indexing of scientific references.
- Enabling collaborative institutional scientific research among multiple researchers, who can access and use the same information sources and research simultaneously in the same library.
- The ability to update information in the digital library, as AI allows publishers to make modifications automatically and continuously.
- Reducing the costs associated with obtaining information from various scientific sources and references.
- Digital technology plays a key role in fostering the principles of scientific honesty. While it has contributed to the spread of scientific theft, it also serves as a vital tool to contain and reduce its prevalence by tracking and holding accountable those responsible for such acts. This is achieved through advanced digital software used to detect instances of scientific theft in research, aiming to limit the spread



and preserve the credibility of scientific research based on the spirit of honesty and scientific reliability.¹

- Impact on the Quality of Scientific Research: Digital technology has transformed traditional research practices, leading to a rapid growth in scientific and technological knowledge. The shift from printed materials to electronic resources accessed via the internet has become dominant, allowing researchers to obtain a wide range of information anytime and from anywhere. This shift has significantly boosted scientific research, enhancing accuracy, speed, and modernity.

This transformation enables researchers to access diverse information anytime and from anywhere, significantly supporting scientific research and enhancing its accuracy, speed, and modernity.

- The notable advancement in electronic devices and intelligent systems has ushered in a digital transformation that is crucial for achieving greater efficiency in the production process. This change fosters initiatives and promotes the exchange of data, experiences, as well as research results and studies, enhancing the overall dynamism within the scientific community.¹
- AI plays an essential role in scientific research by ensuring the availability of reliable, timely information, aiding in the documentation and proper attribution of sources, and guaranteeing precision in research results. AI tools greatly enhance the publication auditing process, enabling the swift identification of publications most relevant to a specific field of study. They also provide accurate summaries and facilitate interactions, saving considerable time and ensuring researchers stay informed of the latest and most relevant developments in their fields. AI also helps reduce subjectivity, especially in the social and human sciences, where bias can heavily influence results. By employing AI in research, the objectivity of outcomes is greatly improved, minimizing the effects of researcher bias.²
- A notable benefit of AI in research is its ability to reduce subjectivity, especially in social and human sciences, where bias can greatly influence outcomes. The use of AI and its systems in scientific research greatly contributes to enhancing objectivity and minimizing the impact of researcher bias on results.
- AI provides researchers with a variety of programs, systems, and applications that allow them to audit and review their research meticulously. This helps prevent

¹ Abd El Halim ben Mechri, and Husseina Chroun, **Scientific Research in the Age of Digitization: Challenges and Obstacles**, Research Methodology in the Age of Digitization and Artificial Intelligence: A New Challenge (National Symposium), Algeria: University of Algeria 01, 2023, p 2.

¹ Najwa Al-Hawari, **Promoting Scientific Research in the Age of Digital Technology**, Research Methodology in the Age of Digitization and Artificial Intelligence: A New Challenge (National Symposium). Algeria: University of Algeria 01,2023,

² Ricardo Limongi, po.cit, p 5.



errors that could compromise the quality of their research and studies. Additionally, AI and its various systems enable researchers to effectively present the key findings and recommendations of their work to targeted groups and gather their opinions on the publication of these results.

In summary, digital technology has significantly eased the tasks of scientific researchers in many respects and enabled the conduct of high-quality and exemplary research. However, it is crucial to note that the misuse of this technology can negate all these benefits, potentially transforming the researcher and their work into the antithesis of the positive attributes and distinctions typically associated with their efforts.

THE THIRD TOPIC:

Impact of Misuse of Digital Technology on the Credibility of Scientific Research and how to mitigate it.

The integration of artificial intelligence in the scientific realm has become crucial, revolutionizing the way research is conducted. AI's role spans from straightforward automation to complex data analysis and predictive modeling. Such capabilities significantly enhance the ability to process and analyze vast quantities of data with unprecedented precision and speed, thus accelerating scientific discoveries and improving the quality and efficiency of research outcomes.¹

Nevertheless, the application of AI in scientific endeavors is not without ethical dilemmas. The potential for misuse of these technologies can adversely impact the ethical foundations and controls of scientific research, necessitating a careful and considered approach to ensure that AI is used responsibly within the scientific community. This calls for stringent guidelines and ethical standards to govern the use of AI in research, ensuring that its benefits are realized while minimizing any negative consequences to the integrity of scientific inquiry.

First requirement: Impact of Misuse of Digital Technology on the Credibility of Scientific Research

One of the most detrimental outcomes of misusing digital technology in scientific research is commonly recognized in academic circles as "scientific plagiarism," also referred to as "*scientific theft*".

¹ Ricardo Limongi, **The Use of Artificial Intelligence in Scientific Research with Integrity and Ethics**, Review of Artificial Intelligence in Education, 05, 31 January 2024, p 4. <https://future.emnuvens.com.br/FSRJ/article/view/845>



Sami Abdel Aziz describes scientific plagiarism as: "the act by a writer, author, or researcher of using the words, ideas, visions, or expressions of another person without attributing them to that person, or acknowledging of their contribution...,Scientific plagiarism also encompasses claiming credit for contributions not made by the individual, and presenting ideas as one's own original thoughts when they are not." Similarly, *Merriam-Webster's Dictionary* defines it as: "the act of using another's work or ideas and passing them off as one's own without crediting the source, to commit literary theft to present a new and novel idea or a derivative product from an existing source".¹ Simply put, scientific theft involves the unrecognized use of other researchers' work and ideas, whether done intentionally or unintentionally, and attributing it to oneself.²

This act, whether occurring digitally or otherwise, represents serious legal, scientific, and ethical violations, including the infringement of intellectual property rights and a breach of the ethics of scientific honesty, which require proper attribution of ideas and accurate sourcing. It also includes taking credit for the effort and work of others without feeling the slightest scientific or ethical remorse.

Detecting digital scientific theft can often be straightforward due to indicators like inconsistent idea coordination, lack of stylistic coherence, and variations in the final presentation format. For instance, the editing style might not match the level of the person who prepared the scientific research, or stolen paragraphs may appear in a different font from the rest of the document, or utilize terminology that is foreign to the research field.

Alarmingly, some entities have created websites that offer services to complete research, studies, and reports. These services use advanced search engines to plagiarize relevant paragraphs and then format and sell them as ready-made documents to clients.

The rampant phenomenon of scientific theft epitomizes all the negative consequences arising from the misuse of digital technology on the credibility of scientific research. This major challenge confronts the scientific community, as it violates all norms, ethics, research, literary, and legal principles.³ This unethical behavior constitutes an ethical violation that leaves a lasting mark on the researcher's record and the reputation of the institution, emphasizing the importance of ethics in science .Scientific theft manifests in various forms:

¹ Abd El Halim ben Mechri, and Husseina Chroun, op.cit. p 9.

² Adnan Al-Jadri, **Scientific Research and the Issue of Integrity and Scientific Honesty in Researchers**, from Amman Arab University, 11 March 2019, Retrieved: 11 December 2023. <https://www.aau.edu.jo/ar/news/albht-th-allmy-washkalyt-alnzah-t-walamant-allmyt-ldy-albahth>.

³ Abd El Halim ben Mechri, and Husseina Chroun,op.cit.



- Complete theft of ideas, where a researcher commandeers another's ideas and falsely claims them as their own.
- Partial theft, where a researcher stealthily uses phrases and ideas without mentioning their originator.
- Theft through translation, which has become widespread due to factors such as ease of travel abroad for education, mastery of foreign languages, lack of ethical restraint, and a prevalent disinterest in reading or ongoing cultural engagement. Ethical science mandates respect for intellectual property rights. Imam Nawawi has stated, "It is advisable to attribute an unusual benefit to its speaker, for those who do so are blessed in their work and state. Those who pretend otherwise in taking from others' words and make it seem their own are deserving neither to benefit from their knowledge nor to be blessed in their state." The best of creation, if he imparted something to someone, did not regard it as a favor, and if he benefited from someone, he made it seem that he had benefited from them. Umar ibn al-Khattab advised not to be impressed by a person's outward show of greatness but to judge them by their honesty in action, saying, 'Do not be impressed by a man's thunderous presence but judge him by his honesty in action'.¹

In the abundance of information provided by the digital environment, a researcher might unintentionally fall into scientific theft, amid the chaos of electronic information where source confusion might occur, forgetting to credit some information, or misattributing some details to another author.²

This dangerous phenomenon in the scientific field encompasses a spectrum of negative effects that significantly impact both individuals and institutions. Here, we outline the most prominent ones:

1. Disruption of the Value System in Society: Scientific theft elevates individuals to positions they do not deserve, such as professors who ascend to academic heights beyond their merit or researchers who occupy roles for which they are ill-suited. This misplacement of individuals lacking in scientific integrity into roles that require specialized qualifications leads to a fundamental disruption in the community's value system. Consequently, this erosion of ethical standards results in diminished motivation among students and researchers towards diligence and sincerity in their work. The foundational values of patience and honesty, among other ethical virtues, are thus compromised.

¹ Amani Saud Khayshan Al-Kurashi, op.cit, pp: 133 -135.

² Ramadan Al-Khamisa, Mariam Al-Ayeb, **Scientific Theft in the Digital Environment**, Bibliophilia Journal of Library and Information Studies, 05(13), 1 March 2023, p 105 -106.



2. Hindrance to Serious Scientific Research: Scientific plagiarism shifts the focus of academic effort from innovative and complementary research to mere copying, repetition, or plagiarism. This shift stymies the advancement of knowledge, halting progress and curtailing the development of new insights that could benefit various knowledge domains.
3. Unaddressed Societal Problems Due to Stalled Scientific Research: The cessation of serious scientific research leaves numerous societal issues unexplored and untreated. This stagnation worsens conditions across all sectors of the state that rely on rigorous scientific research to devise solutions for prevailing problems.
4. Scientific Theft Indicative of a Lack of Competent Researchers: The prevalence of scientific theft hinders the participation of local researchers in global scientific advancements, contributing to a delay in keeping pace with the rapid explosion of knowledge in various scientific and knowledge branches.
5. Absence of a Significant Role for Scientific Institutions in Society's Advancement: Scientific institutions bear the responsibility of nurturing a generation of researchers equipped to address their community's realities, solve its problems, and enhance its systems. When these institutions fail to function effectively due to rampant unethical practices, their role in societal advancement is significantly diminished.

Furthermore, scientific theft, along with plagiarism, deceit, and misrepresentation in the conduct and presentation of scientific research, constitutes a blatant violation of intellectual property rights. These unethical methods not only undermine the integrity of science and its practitioners but also damage the community and the academic institutions associated with the research. Most critically, these practices tarnish the personal and professional reputations of the individuals involved, leaving an indelible stain on their careers and the broader academic community.

Second requirement: How to Mitigate Scientific Plagiarism in the Age of Artificial Intelligence

In the age of artificial intelligence, combating scientific theft requires a comprehensive approach, including the following solutions:

- » *Educational and Learning Solution:* It's essential to integrate and emphasize research ethics within educational programs. Expanding the number of seminars and conferences that address this topic is crucial to disseminate the



culture of scientific ethics and enhance awareness of the importance of adhering to academic scientific research rules.

- » *Developing a Mature Scientific Conscience:* Researchers should cultivate a deep sense of scientific responsibility towards themselves, their field, and society as a whole. This involves a commitment to ethical standards and a recognition of the broader implications of their work.
- » *Legal Solution:* This involves the creation and enforcement of systems and laws designed to combat scientific theft,¹ Effective measures may include establishing binding and transparent rules for imposing penalties appropriate to the offenses committed by plagiarists and violators of intellectual property rights. These penalties can extend to the revocation of academic titles and degrees obtained through dishonest means.
- » *Technical Solution:* Utilizing software that determines the extent of quotation and employs scientific methods to detect plagiarism and scientific theft, regardless of its magnitude, is vital. Such tools are vital for upholding research ethics, preventing misuse, and preserving the integrity and reliability of academic work.
- » *Linking Academic and Community Institutions:* Ensuring that postgraduate studies are realistic, impactful, and practically oriented can prevent researchers from resorting to copying and repetition. This encourages originality and creativity in scientific production and aligns academic efforts with societal needs.
- » *Religious Solution:* Revitalizing the religious conscience can provide individuals with a set of values that heighten awareness of their responsibilities during research. This includes promoting the ethical mandate to attribute work to its rightful creators and maintaining a sense of personal and divine accountability.
- » *Developing creative capabilities and supporting salented researchers:* It is essential to establish specialized programs focused on advancing the academic scientific pathway for faculty members. These programs should train them on utilizing advanced technological tools to make education more effective. Such initiatives are vital for elevating researchers' skills and preventing them from

¹ Adnan Al-Jadri, op.cit. <https://www.aau.edu.jo/ar/news/albhth-allmy-washkalyt-alnzaht-walamant-allmyt-ldy-albahth>



resorting to methods that contradict scientific ethics in their research and studies.²

- » *Research Charters in Various Scientific Institutions*: Establishing and enforcing research charters in various scientific institutions is crucial, as they serve as effective tools to limit practices that violate honesty and scientific ethics.

Conclusion:

The analysis above sheds a light upon the stance that artificial intelligence is not inherently responsible for unethical practices in scientific research. Instead, AI is a powerful tool that enhances research by offering remarkable precision, speed, and access to vast amounts of data, thus significantly reducing effort, time, and costs. The core issue lies in the ethical conduct of researchers. Ethical violations in scientific research are fundamentally moral concerns, not merely legal, scientific, or technical issues..

Key findings from the study encompass:

- Artificial intelligence represents a modern science that has emerged due to technological advancements and the integration of software and computers into all societal fields, including the scientific domain.
- Researchers' commitment to the ethics and decorum of scientific research plays a significant role in producing distinguished scientific works that contribute to the development of knowledge and achieve objectives that enhance the strength and stature of societies.
- Integrity and scientific honesty are among the most crucial ethics of scientific research.
- Plagiarism and scientific theft are the greatest threats to the ethics of scientific research in the era of digitization and artificial intelligence.
- A lack of ethical restraint among researchers is the main driver for violating the norms and ethics of scientific research amid technological development.
- Artificial intelligence, through software and technical methods, contributes to reducing unethical practices in scientific research, primarily scientific theft.

² Jihan Ali Al-Damardash, **The Issue of Scientific Theft from the Perspective of Researcher Ethics and Training Programs**, 11 February 2021, Retrieved: 8 December 2023, from Gil Research Center : <https://jilrc.com/archives/13325>.



- Teaching proper research methodology to researchers is the first step in preventing scientific theft, which involves researchers committing to mention the sources of the information used, attributing them to their rightful owners, and properly documenting this.

Recommendations:

This study proposes several recommendations to reduce the misuse of artificial intelligence in the preparation of scientific research:

- Offer continuous education on the ethics of scientific honesty to reinforce and instill its principles in researchers.
- Publicly condemn scientific plagiarism and take strong actions against those guilty of scientific theft, such as revoking academic degrees, barring them from promotions, and prohibiting their participation in academic events. Legal measures should also be pursued to deter future violations. At the same time, an incentive system should be established to reward researchers who exhibit creativity and innovation, motivating them to continue enhancing their contributions for the betterment of society.

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