

Scientific Plagiarism and the Requirements for Reducing Academic Misconduct: Towards Enhancing Scientific Integrity in Educational Institutions

الانتحال العلمي ومتطلبات الحد من السلوك الأكاديمي غير السليم: نحو تعزيز النزاهة العلمية في المؤسسات التعليمية

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ملخص: تسعى هذه الدراسة إلى تقديم فهم معمق وتشخيص دقيق لأبرز القضايا التي نتجت عن التحولات التكنولوجية المتسارعة في البيئة الأكاديمية، ألا وهي ظاهرة الانتحال العلمي. فقد أصبحت هذه الظاهرة تهديدًا حقيقيًا لجودة ومصداقية البحث العلمي، وتؤثر سلبًا على مكانة الجامعات وتصنيفها العالمي. وتمثل أشكال الانتحال المختلفة انتهاكًا لأخلاقيات البحث العلمي، لا سيما مع توافر المعلومات وسهولة الوصول إليها وسرعة تداولها. وقد أدت هذه العوامل إلى وقوع الطلاب والباحثين، بوعي أو بغير وعي، في فخ الانتحال، لا سيما في ظل ضعف ثقافة النزاهة الأكاديمية. ويؤدي هذا في نهاية المطاف إلى انتشار السلوكيات العلمية غير الأخلاقية والممارسات البحثية غير المسؤولة التي تتطلب تدخلًا جادًا ووضع آليات فعالة للحد منها.

الكلمات المفتاحية: الانتحال العلمي، النزاهة الأكاديمية، البحث العلمي، أخلاقيات البحث.

Abstract:

This study seeks to provide an in-depth understanding and an accurate diagnosis of the most prominent issues resulted in the rapid technological transformations in the academic environment, namely the scientific plagiarism. This phenomenon has become a real threat to the quality and credibility of scientific research and negatively affects the standing and global rankings of universities. Various forms of plagiarism represent a violation of research ethics, especially with the availability and ease of accessing information and the speed of its circulation. These factors have made students and researchers, whether consciously or

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unconsciously, fall into the plagiarism, particularly in the context of a weak culture of academic integrity. Ultimately, this leads to the spread of unethical scientific behaviours and irresponsible research practices that require serious intervention and the development of effective mechanisms to limit them.

Keywords: Scientific plagiarism, academic integrity, scientific research, research ethics

Introduction:

In recent decades, the scientific landscape has witnessed a radical transformation due to the tremendous technological development and the information revolution which make access to information easier and more convenient than ever before. This transformation has contributed to improving the quality of scientific research, accelerating its pace and enabling researchers to engage in an open global space of knowledge and experiences (Borgman, 2007). However, this digital boom is not without drawbacks, the most prominent of which is scientific plagiarism. The latter represents the most critical ethical challenge that threatens the credibility of scientific production in various academic institutions.

Scientific plagiarism, whether direct or indirect appropriation or citation without proper attribution, represents a blatant violation of research ethics. This phenomenon has worsened with the rise of electronic publishing and digital repositories which turn the Internet into a dual arena that offers knowledge opportunities as well as a ground for plagiarism (Sutherland-Smith, 2008). In the absence of strict regulations and effective academic supervision, many students and even researchers have become vulnerable to engaging in such unethical practices, consciously or unconsciously of its consequences.

Studies point out that negligence in promoting a culture of academic integrity and the lack of awareness about research ethics are the factors contributed to the spread of this phenomenon. This calls for a reconsideration of educational and training policies within universities (Park, 2003). Therefore, the current issue has significant importance in the Arab academic context in general and in Algeria in particular, especially in light of national ambitions in improving university rankings and enhancing the quality of scientific research.

This study seeks to explore the dimensions of the phenomenon of scientific plagiarism, the reasons of its spread, and mechanisms to limit it. It also focuses on building an academic culture based on integrity and responsibility.

- Significance of the Study

The significance of this study stems from its direct connection to plagiarism as a fundamental ethical issue that threatens the structure and credibility of scientific research in the digital age. With the expansion of electronic publishing and the

availability of open-access tools, accessing scientific works has become easier; however, the opportunities for misuse and plagiarism have also increased. The significance of this study is as follow:

1. Academic Dimension: It aims for a deeper understanding of academic plagiarism within the Arab university context, with a focus on higher education institutions.
 2. Awareness Dimension: It sheds light on research ethics and promotes a culture of academic integrity.
 3. Practical Dimension: It provides proposals and applicable mechanisms to reduce plagiarism practices and improve the quality of research outputs.
 4. Institutional Dimension: Controlling this phenomenon contributes to enhancing the ranking of universities and rising their scientific standing both locally and internationally.
- Previous Studies

Many studies addressed the phenomena of plagiarism and academic misconduct, especially with the spread of digital technology. Among these studies are:

- Park (2003): This study indicated that plagiarism among university students results from a lack of sufficient understanding of research ethics in addition to academic performance pressures.
- Sutherland-Smith (2008): This study focused on the impact of the internet in reshaping student writing practices. It argued that the digital environment has weakened the boundaries of intellectual property.
- Mahmood & Mahmood (2010): This study highlighted the importance of building an academic culture based on transparency and responsibility. It also called for the development of mechanisms and electronic programs to detect plagiarism.

Despite the several Western studies, research in the Arab and Algerian contexts still limited, particularly those linking the phenomenon to the modern digital environment

Knowledge gap

In spite of the previous research efforts, there are knowledge gaps that need to be addressed:

1. The lack of field studies in the Arab and Algerian universities that explore the behaviours of students and teachers towards academic plagiarism in light of the technological developments.

2. The absence of comprehensive educational frameworks that clarify the concept of academic integrity to students and instil a culture of proper citation and scientific documentation.
3. The lack of studies that offer practical and applicable solutions within university institutions through strict policies, effective software, and structured training programs.

In 2007, 67 documents were deleted from the site An.Xiv.org due to plagiarism. 40% cases were reported by the Centre for Academic Integrity in 2018 under the term: academic misconduct in the use of the Internet.

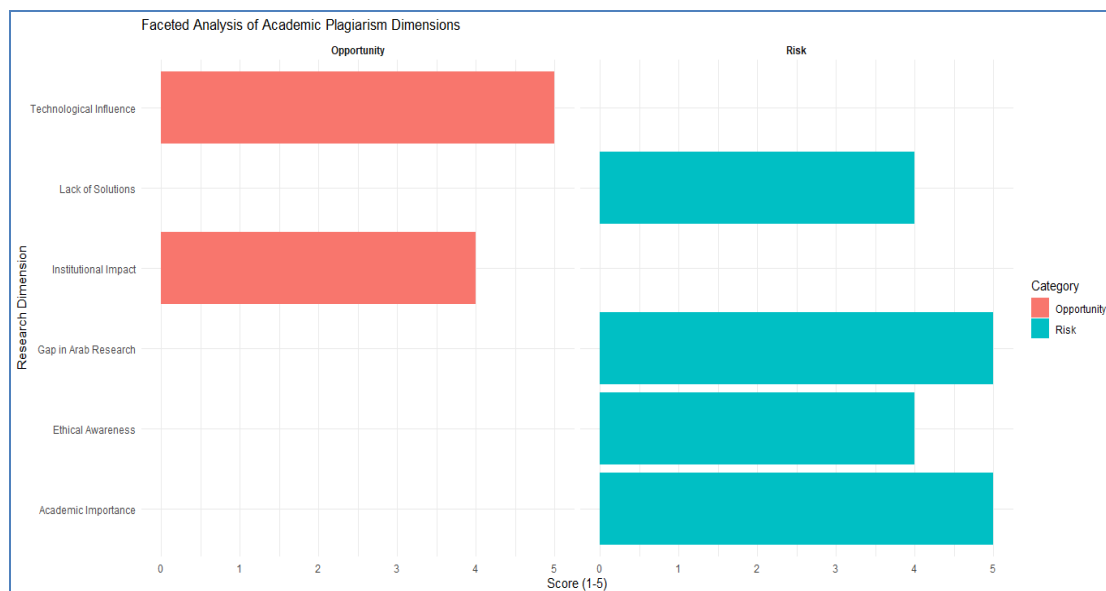
Based on the above, the discussion of academic integrity inevitably leads us to manifestations of deviations and corruption within the academic community which made possible by open-access resources. This raises an important question: Is open access a blessing or a curse? It is a blessing when it enhances scientific research characterized by academic integrity through transparency and fairness. However, it becomes a curse when it facilitates the rise of plagiarism, theft, and manipulation; thus, it is considered a plague upon the university and its scientific standing.

On the other hand, some believe that open access reduces plagiarism and promotes integrity through monitoring and detection programs, while others argue that it leads to scientific theft. Therefore, we are called upon to uphold academic integrity to reduce the phenomena of plagiarism, forgery, and falsification. It is certain that technological revolutions, the knowledge invasion, and the wealth brought by new technologies will continue to raise the same issue of the impact of the ease of access to information on academic integrity.

Through what is mentioned, we will attempt to answer the following questions:

- What are the ethics of scientific research?
- What is plagiarism? and what are its types?
- What are the requirements for maintaining academic integrity in the light of the information revolution?

Figure (01)
academic plagiarism dimensions



Source: by authors

The faceted bar plot provides a clear visual representation of the dual impact of technological and academic transformations on the rise of scientific plagiarism. Each bar corresponds to a specific research dimension, such as *Academic Importance*, *Ethical Awareness*, *Technological Influence*, *Institutional Impact*, *Gap in Arab Research*, and *Lack of Practical Solutions*. The plot separates them into two overarching categories: Risks and Opportunities to help us understand how different aspects contribute either to the vulnerability of academic systems or their enhancement.

Within the "Risk" facet, dimensions like *Academic Importance*, *Ethical Awareness*, *Gap in Arab Research*, and *Lack of Practical Solutions* score high (between 4 and 5). This highlights major areas where academic environments are under strain. The high score for *Academic Importance* (5) underlines that plagiarism directly undermines the credibility of scientific output, which can distort university rankings and global perceptions. Likewise, a score of 4 for *Ethical Awareness* indicates a significant deficiency in ethical training or enforcement mechanisms which contribute to intentional or unintentional violations of academic honesty.

The *Gap in Arab Research* dimension also scores 5, which suggests that a lack of localized studies and region-specific regulatory frameworks leaves universities in the Arab world vulnerable to issues of plagiarism and unethical practices. This is further

compounded by a 4 in *Lack of Practical Solutions*, pointing to the absence of clear protocols to detect and prevent such behaviours at institutional levels.

On the other hand, the "Opportunity" facet includes *Technological Influence* and *Institutional Impact*, each with high scores (5 and 4 respectively). This shows that while digital technologies facilitate misconduct, they also hold immense potential to improve academic practices. The high score for *Technological Influence* (5) suggests that the same tools which enable plagiarism, open-access databases, fast information retrieval, and digital copy-paste, can also empower institutions to implement plagiarism detection systems, improve citation monitoring, and automate ethical review processes. Similarly, *Institutional Impact* at a score of 4 reflects a growing awareness within universities to address these challenges through institutional reforms, digital governance, and stricter academic policies.

By visually contrasting risks and opportunities, this plot allows researchers and policymakers to see where intervention is most needed and where potential lies. It reinforces that technology is a double-edged sword in academic integrity, capable of both enabling misconduct and offering solutions. The challenge lies in shifting the focus from reactive control to proactive education and systemic reform, particularly in developing academic systems like those in the Arab world, where plagiarism often reflects deeper institutional and epistemological gaps.

• Definition of Scientific Research

The notion of scientific research has been defined differently by researchers. This may be due to the variety of research methods and the lack of a specific and universal concept of science. This term consists of two words: "research" and "scientific."

- Research is derived from the verb "search," meaning: to seek, explore, examine, investigate, question, attempt, and discover.
- Scientific relates to "science," which refers to knowledge, awareness, and understanding of facts. Science means knowing and comprehending facts and everything related to them.

Science is defined as a series of interconnected concepts, laws, and theoretical frameworks that arise as a result of experimentation or systematic observation. It is a human activity aimed at understanding various phenomena by discovering the relationships and laws that govern these phenomena, predicting events, and finding appropriate ways to control and regulate them.

Van Dalen defined scientific research as: "A careful, organized, and critical attempt to find solutions to the various problems that face humanity and cause human concern and confusion." It is defined by *Whitney* as: "A precise inquiry aimed at discovering facts and general rules that can be verified." Thus, scientific research is a methodical

and organized attempt to solve human problems in various fields. It is a set of organized efforts carried out by humans using the scientific method and rules in their quest to increase control over their environment, discover its phenomena, and determine the relationships within them.

Therefore, it can be said that scientific research is a systematic and purposeful human effort that connects means and goals to achieve human ambitions, address problems, and meet human needs. It involves a collection of tools, data, and organized, goal-oriented information, and it links theories, ideas, and human creativity on one side with experience, practice, problems, and human aspirations on the other.

From a purely scientific perspective, it consists of organized and methodological procedures aimed at solving knowledge problems or answering scientific questions by producing new knowledge. According to the Oxford Dictionary, scientific research is: "The systematic investigation of ideas and information in order to reach new conclusions."

From the previous definitions, it is clear that researchers do not agree on a single definition of scientific research. However, all of them share the following points:

- It is an organized attempt that follows a specific method and approach.
- It aims to increase knowledge and expand the circle of understanding.
- It is used in various fields to solve problems.
- Definition of Ethics

-Linguistically: "Ethics" is both singular and plural. It refers to religion, trait, disposition, and noble-mindedness.

-Terminologically: Ethics refers to a deeply ingrained state of the soul from which actions are effortlessly produced without the need for deep thought or deliberation. If the resulting actions are bad, the underlying disposition is called bad ethics. Therefore, ethics are not found in the action itself, but rather in how we direct the action toward what is deemed good or bad.

Research Ethics are also defined as a set of qualities that a researcher must possess and adhere to. He should acknowledge the contributions of previous scholars and must not steal their work. Research ethics require respecting the rights, opinions, and dignity of others, whether they are fellow researchers, research participants, or the target audience of the research. Generally, the principles of research ethics are founded on two main values: doing positive action and avoiding harm. These values should form the cornerstone of ethical considerations throughout the research process.

In another context, research ethics are defined as the set of proper behavioural practices that must be respected and adhered to in all its fields, stages and applications. Among the key ethical principles for research, as determined by the Economic and Social Research Council (ESRC) and Oxfam, are:

1. Research should achieve benefit for individuals and society and minimize risks and harm to the fullest extent.
2. The rights, dignity, and respect of individuals and groups must be upheld.
3. Participation must be voluntary and based on adequate information and awareness (participation of research subjects).
4. Research should be conducted with integrity and transparency.
5. Lines of responsibility and accountability must be clearly defined.
6. The independence of research must be preserved.

- **Academic Integrity: Definition and Requirements**

Academic integrity is a set of principles and values aimed at maintaining honesty and truthfulness in all aspects of scientific research, including study design, data collection, result analysis, and publication. Also, it is an ethical system for teachers, students, and all staff members in educational institutions. It organizes their lives and provides them with guidelines and principles that regulate their behaviours. Moreover, it is an ethical charter and a set of values and mechanisms that aim to create a culture and proper conduct in scientific and academic research matters.

Under the umbrella of academic integrity, many topics are addressed. The most important of which are: fighting cheating in exams, research plagiarism, submitting projects that are not the students' work, manipulating the rules, and anything that violates the rights of others and contributes to providing misleading information or dishonest projects is a violation of academic integrity.

- **Principles of Academic Integrity**

Adherence to the principles of integrity requires several considerations:

- Citing all ideas, results, or written works of others, whether from published or unpublished research, scientific materials, or any form of participation in the research work, and documenting them accurately in a scientific manner.
- Understanding that failure to adhere to the principles of academic integrity not only harms the value of one's academic production and scientific reputation but also damages the reputation of the department they belong to and the value of the degrees awarded to its students.

- Understanding that all violation forms of academic integrity, including plagiarism, cheating, fabricating information, or facilitating any of these actions, are unethical behaviours and may lead to legal consequences.

- **Violation Forms of Academic Integrity:**

There are many forms of actions that violate the standards and principles of academic integrity. Some of these include:

1. Cheating: Copying others' work or using unauthorized notes, information, or materials in academic exams or other student assignments.
2. Intellectual Theft / Plagiarism: Copying phrases and works of others, using unauthorized intellectual property or any information in any academic exam without referencing it as a source.
3. Misuse of Academic Assistance: A student taking advantage of a peer's work that was meant to provide academic help, such as copying a report or an old exam without informing the peer.
4. Exploitation of Collaboration: A student depending on another within their group to complete a joint task or exploiting another student to complete individual assignments.
5. Fabrication and Forgery: A student altering or fabricating information in an academic test/assignment or presenting a forged medical certificate to be absent from attendance.
6. Impersonation: A student claiming to be someone else in class, in an exam, or in any academic assignment. In this case, the impersonating student is punished.

- **Scientific Plagiarism**

1-Linguistically: The word *Plagiat* or *Plagiarism* is derived from the Latin word *Plagiarus*, meaning "kidnapper." It was used to mean "plagiarism," and refers to the theft of others' ideas, words, inventions, or writings. In Arabic, its equivalent word is (*intihal*), which carries a similar meaning: claiming ownership of something without right, that is, attributing to oneself what belongs to someone else. It is when someone claims something as their own falsely, such as poetry or writing created by another person. Some linguists differentiate between (to claim with justification) and (to falsely claim).

Overall, *Plagiat* in Latin and *intihal* in Arabic both mean attributing something, whether tangible or intangible without rightful ownership. In this sense, plagiarism

parallels "theft," except that while traditional theft involves material possessions, plagiarism pertains to intellectual (literary and creative) rights. Thus, plagiarism is often described as "literary theft," "theft of ideas, opinions, or an author's words."

2-Terminologically: The term *plagiarism* originates from the Greeks and it meant "deceiver" or "crooked person," while in Roman, it referred to the kidnapping of children for slavery. In the academic world, scientific plagiarism means "the appropriation of others' efforts during the preparation of theses and dissertations, in contradiction to the originality and integrity of scientific research." At King Saud University's Deanship of Graduate Studies and Scientific Research, plagiarism is defined as "the unauthorized use of others' ideas and work, whether intentional or unintentional."

According to *Chambers Dictionary*, a plagiarist is "a person who steals the ideas and writings of others and presents them as their own. When this occurs at university, it aims to gain rewards such as scholarships, and this constitutes a breach of trust." *Merriam-Webster Dictionary* defines plagiarism as "stealing and claiming ownership of another's ideas or products, using them as one's own without crediting the original source."

Johns Hopkins University defines plagiarism as: "Plagiarism, the most common form of academic dishonesty, occurs when students use the work, research, ideas, or words of any other person or source without proper credit."

In its simplest meaning, scientific plagiarism is the unauthorized use of others' ideas and works, whether intentional or not. Regardless of intent, it is considered a serious academic violation. The term "work" encompasses words, ideas, graphics, computer programs, and all forms of creative expression, such as writings, illustrations, charts, images, websites, and all types of media. The term "source" refers to all published works, including books, articles, magazines, conference papers, textbooks, theses, films, images, and paintings. Scientific plagiarism can also be defined as: "Partially or wholly copying another's writing or meaning and attributing it to oneself."

Thus, plagiarism involves a student or researcher claiming an idea, paragraph, scientific work, research, pedagogical material, data, statistics, images, or videos produced by others as their own.

3-Legally: Scientific plagiarism is defined in Article 3, Section 2 of Ministerial Decree No. 933 dated July 28, 2016. According to this decree, it refers to "any act committed by a student, research teacher, university hospital researcher, permanent researcher, or anyone involved in confirmed acts of plagiarism, result falsification, or scientific dishonesty in required academic or scientific work or other academic publications."

In the same context, Dr. Ahmed Adhmi from the University of Algiers 3 states that in the scientific field, anyone who copies a paragraph or idea from any document, book, or media outlet without citing the source is considered a thief. He adds that even taking intellectual production from students or acquaintances, even if unpublished, constitutes plagiarism. Thus, scientific plagiarism is every unethical and illegal act of taking others' ideas and attributing them to oneself.

Scientific plagiarism is also considered to include:

- Any full or partial quotation of ideas, information, texts, paragraphs, or excerpts from published articles, books, magazines, studies, reports, or websites — or the rephrasing of such materials — without mentioning the original source or authors.
- Quoting passages from a document without placing them within quotation marks and citing the original source and authors.
- Using a specific argument or reasoning without crediting its source and original authors.
- Publishing a text, article, printed work, or report produced by an organization or institution and presenting it as a personal work.
- Using an artistic production, or including maps, images, charts, statistical tables, or diagrams in a text or article without citing their source and original authors.
- Translating works from one language into the language used by the student or research teacher (including university hospital researchers and permanent researchers), either wholly or partially, without citing the translator and the original source.
- A lead researcher listing another researcher's name as a co-author without their participation or consent, to facilitate the publication of the work based on the latter's scientific reputation.
- Including the names of experts and reviewers as members of scientific committees for national or international conferences, or in journals and periodicals, for the purpose of gaining credibility without their knowledge, consent, written approval, or actual participation in the work.

This constitutes a form of illegal appropriation which means taking someone else's work and claiming it as your own. It is a wrongful act, whether intentional or unintentional. Every student should trace the information they use and to be fully aware when utilizing the work of others.

- **Definition of Misconduct**

Among the key concepts related to scientific plagiarism is *misconduct*, which can be defined as presenting another person's phrases, sentences, ideas, or work as the researcher's own. It also includes using others' work without acknowledgment, or presenting a work as new and original when it is actually derived from previous work. To avoid unintentional misconduct, researchers must understand its meaning, master citation techniques, and learn how to properly paraphrase texts without borrowing the language or structure of the original text.

- **Types of Scientific Plagiarism**

We can distinguish five types of scientific plagiarism:

-Plagiarism through Copying and Pasting: This occurs when a sentence or expression is used verbatim from its original source without using quotation marks and citing the source.

-Plagiarism by Word Substitution: This involves quoting a sentence from a source while changing some of its words to make it seem original. To avoid this, any quotation should be placed within quotation marks, with the author of the book or article properly cited. Researchers should use quotations only when absolutely necessary for the topic they are discussing. It is also important to note that even when paraphrasing a quote, they must cite the original source and indicate that the wording has been changed.

-Plagiarism of Style: This refers to following the same writing method of the original article, sentence by sentence and paragraph by paragraph. Even if the writing does not match the original word for word or in structure, it is still plagiarism of the logical thinking and construction developed by the original author.

-Plagiarism by Using Metaphors: Metaphors are used to clarify ideas or present an explanation that resonates emotionally with the reader, better than a direct description. Therefore, they are an important tool for authors. If they cannot create their metaphor, they can borrow from others' works, but they must attribute them to their original source.

-Plagiarism of Ideas: When using an idea created by another researcher or a proposal to solve a particular problem, it must be clearly attributed to its original creator. Researchers should not confuse specific concepts or ideas with general knowledge, which does not require citation. For example, the definition of a black hole or the calculation of Earth's escape velocity are common knowledge and do not require referencing. However, if a researcher draws on new ideas proposed by others in their

study of black holes or a new solution to a physics problem, they must carefully attribute those ideas to their rightful owners.

Scientific plagiarism includes a variety of types that differ depending on the work carried out by the researcher, regardless of their academic rank or status. These types are:

1-Plagiarism through Copying and Pasting: In this type of plagiarism, the researcher copies and pastes information without referencing the original source. It is known as *verbatim plagiarism*, and it is widely spread among researchers, especially with the availability of electronic sources, which have made copying and pasting effortless without considering quotation marks or properly citing the original source from which the information was taken.

2-Plagiarism by Word Substitution: It occurs by quoting sentences from a source but changing some words to make it appear innovative.

3-Plagiarism by Stealing Ideas: The researcher takes ideas from previous researchers without acknowledging the original source.

4-Plagiarism through Borrowing: This happens when a researcher uses examples, images, drawings, or tables taken from one or more sources and recreates similar versions to illustrate their own ideas, without crediting the original creator.

5-Plagiarism through Translation: It involves translating a foreign research work into another language. The researcher then claims this intellectual production as their creation. This type of plagiarism is widespread in academic universities.

- **Forms of Scientific Plagiarism in Algerian Law**

- 1. Scientific Plagiarism through Imitation (misconduct): This form includes several types, namely:**

- Full or partial copying of ideas, information, texts, paragraphs, or sections from a published article, books, magazines, studies, reports, or websites, or rephrasing them without citing their original sources and authors.

- Quoting sections from a document without enclosing them in quotation marks and mentioning their source and original authors.

- Using specific data without indicating its source and original authors.

- Employing an argument or a particular reasoning without citing its original source and authors.

- Publishing a text, article, printed material, or report created by an organization or institution and presenting it as a personal work.

-Using artistic productions such as maps, images, charts, statistical tables, or diagrams in a text or article without referencing their sources and original authors.

-Translating from one language to another (used by the student, research teachers, clinical research professor, or permanent researcher) either partially or completely, without citing the translator and the source.

2-Scientific Plagiarism through Cheating: Among the well-known forms of academic cheating are the following:

-A research teacher, clinical research professor, permanent researcher, or any other person adding their name to a research project or any scientific work without having contributed to its preparation.

-The principal researcher adds the name of another researcher who did not participate in the work, with or without their consent, to facilitate the publication of the work by relying on the other researcher's scientific reputation.

-A research teacher, clinical research professor, permanent researcher, or any other person assign students or other parties to carry out scientific work with the intention of adopting it for a research project, scientific book, educational publication, or scientific report.

-A research teacher, clinical research professor, permanent researcher, or any other person use students' work and dissertations for national or international conferences or for publishing scientific articles.

-Inserting the names of experts as members of scientific committees at national or international conferences or in journals and periodicals to gain credibility, without their knowledge, consent, or written agreement, and without their actual participation in the activities.

3- Scientific Plagiarism through Falsification: Falsification is the deliberate alteration or deletion of research data and results, or tampering with materials, equipment, devices, and research processes to suit and achieve the desired research outcomes.

Other Forms of Scientific Plagiarism Not Mentioned in Decree 1082:

1-Scientific Falsification: Decree No. 1082 does not mention this form of plagiarism despite its seriousness.

2-Self-Plagiarism (Auto-Plagiarism): This occurs when a researcher or author literally copies parts of their previous works into new works without referencing them. It also includes re-publishing the same works under a different title (known as redundant or inflated publication), whether in articles, research papers, or university theses; for

example, when a student reuses their undergraduate thesis for a master's degree or a master's thesis for a PhD, with little or no change. The purpose of self-plagiarism is to inflate the researcher's academic record and increase the number of their publications for fame or career advancement, but it happens at the expense of scientific integrity and efficiency.

- **Commentary on Some Points in the Law**

1-This law does not use one consistent term for "scientific plagiarism", it alternates between terms like plagiarism and imitation which leads to some confusion.

2-While the law defines scientific plagiarism in detail and focuses on who commits plagiarism, it does not address the intention behind the act.

3-The law limits the forms of plagiarism to a specific set, whereas it would have been better not to restrict it because many forms of plagiarism exist beyond what is listed.

- **Requirements to Reduce Plagiarism and Promote Academic Integrity**

According to the previously mentioned Decree 1082/2020, the main anti-plagiarism measures are:

-Establishing a database at higher education institutions for students' and teacher' work.

-Creating a database of researchers' names and CVs, and using their academic work effectively.

-Using local software programs to detect scientific plagiarism.

-Requiring researchers to sign a pledge of scientific integrity.

-Adopting an academic honour code.

-Promoting a culture of academic integrity inside and outside university campuses.

-Rewarding honest behaviour by honouring and praising researchers for their integrity.

-Reinforcing religious values alongside clarifying and implementing the laws.

Table (01)

Applications Detecting Scientific Plagiarism

Uses and Features	Type	Technology
One of the most widely used plagiarism detection tools globally. It compares documents against vast academic databases and online sources. It also serves a preventive role that allows students to check their papers before submission. It is known for its speed and accuracy.	Software	Turnitin
A web-based search engine that analyzes articles by checking sentence structures and identifying copied phrases. It provides a detailed report highlighting instances of duplication. It respects copyright laws, but it has a limited database size.	Software	PlagAware
A high-accuracy tool that mimics fingerprint recognition by summarizing and tagging texts with keywords ("fingerprints"). It is capable of scanning across billions of online documents and supports simultaneous multi-document comparison. It also crawls forums, PDFs, Word files, and more. It is extremely fast and extensive.	Software	CheckForPlagiarism.net
It is designed for authors and researchers; iThenticate provides deep scanning via its massive database. It allows users to detect plagiarism even in deleted content and supports over 30 languages. It offers direct integration with many academic journal databases and institutions.	Software	iThenticate
It is designed to help professors and students quickly detect plagiarism using a large internal database. It checks sentence structure similarity. It is not compatible with all languages and cannot analyze multiple documents simultaneously.	Software	Plagiarism-Detection.org

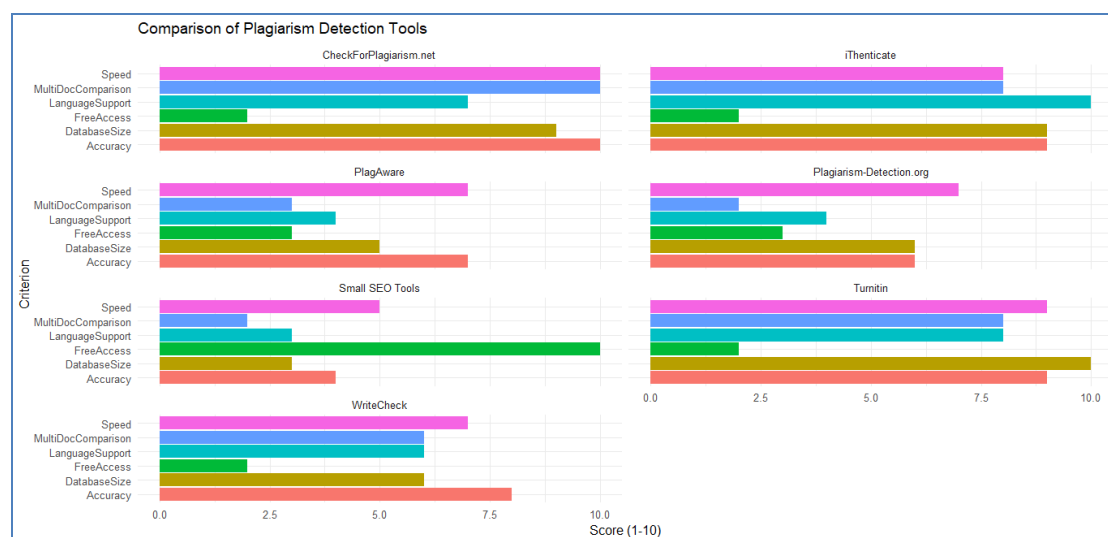
As we can see in the table above, scientific plagiarism detection programs have the following functions:

- Matching one document with another or with multiple documents, highlighting similarities, differences, and the percentage of similarity between them.
- Assisting in making corrections to the document being examined.
- Printing reports and saving them as text files.

- Storing document examination reports in the user's account.
- Sharing reports with other registered users who have accounts on the same program.
- Handling documents in multiple languages.
- Supporting various document file formats such as PDF, DOC, and DOCX.
- Offering multiple methods for submitting the document text to the program (email, copy and paste, upload, ...).

Figure (02)

plagiarism detection tools



Source: by authors

The faceted bar plot offers a clear tool-by-tool breakdown of performance across the key dimensions that affect the efficiency and reliability of plagiarism detection software. Each tool is visualized in its panel which eases the evaluation of its strengths and limitations without overlapping data.

- *Turnitin* stands out for its high accuracy, speed, and massive database size, scoring 9, 9, and 10 respectively. These attributes make it reliable for institutions looking for comprehensive detection. However, it poorly scores in free access where it indicates its commercial nature.
- *PlagAware* shows moderate performance across most criteria, but lags in database size and language support, scoring 5 and 4 respectively. Its focus is on respecting copyright laws, but the limited dataset restricts its detection range.

- *CheckForPlagiarism.net* exhibits excellent all-round performance, especially in accuracy, speed, and multi-document comparison, all scoring 10. Its advanced fingerprinting method makes it a robust tool although access is likely restricted to paying users only.
- *iThenticate* is known for academic publishing, scores very high in language support (10) and maintains strong marks in accuracy and database size. Its unique ability to compare with deleted documents from the web offers an edge in uncovering deep-level plagiarism.
- *Plagiarism-Detection.org* performs well in accuracy and speed, but struggles with language support and multi-document handling. It is more suited for simpler and monolingual document checks.
- *WriteCheck* is tailored to students, its strength lies in grammar and citation help and not just detection. It scores moderately across most criteria, but supports academic integrity with value-added features.
- *Small SEO Tools*, the only free tool in this comparison, unsurprisingly scores the highest in Free Access (10), but lower in all other categories, highlighting the trade-off between cost and capability.

The faceted bar chart effectively visualizes the trade-offs between tools. Institutions seeking comprehensive and high-accuracy systems may lean towards Turnitin, iThenticate, or CheckForPlagiarism.net. In contrast, students or individuals with limited resources might opt for WriteCheck or Small SEO Tools, despite their limitations. This visualization aids both academic institutions and researchers in selecting the tool that aligns best with their plagiarism prevention needs.

Conclusion

Many researchers and experts believe that the limit of this phenomenon centres on adhering to scientific honesty and relying on detection programs. However, the matter requires a solid foundation that starts from the educational system and social upbringing institutions to instil the values of integrity, honesty, ethics, and proper handling of information. It is essential to make the child at an early age responsible and aware of his behaviour within this digital environment.

Recommendations

1. **Adopt a Tiered Tool Approach:** Institutions should consider using a combination of tools, such as Turnitin or iThenticate for formal plagiarism checks, and WriteCheck for student self-assessment to cover both educational and evaluative needs.
2. **Prioritize Tools with Large Databases and Multilingual Support:** For multilingual academic contexts, prioritize software like iThenticate and CheckForPlagiarism.net, which offer broad database coverage, support multiple languages and enhance detection accuracy.
3. **Encourage Pre-Submission Self-Checks:** Encourage students and researchers to use tools like WriteCheck or PlagAware to run preliminary checks, improve academic writing and reduce unintentional plagiarism.
4. **Avoid Relying Only on Free Tools for Institutional Use:** While Small SEO Tools can be useful for casual checks; its limited scope and database make it unsuitable for official academic integrity processes.
5. **Enhance Training on Tool Interpretation:** Provide training for both students and faculty members on how to interpret similarity reports effectively, as even high-performing tools require human judgment to differentiate between legitimate citations and plagiarism.
6. **Implement Policies Backed by Technology:** Pair software usage with clear institutional policies and ethical guidelines ensures that detection tools are part of a broader culture of academic honesty.
7. **Regularly Evaluate Tool Performance:** Universities should conduct periodic evaluations of the plagiarism tools they use, update or replace them as needed to ensure alignment with evolving academic and technological standards.

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