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REVIEW

Scientific fraud: attack on the credibility of science

Fraude científico: agresión a la credibilidad de la ciencia

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ABSTRACT

Introduction: when referring to the term fraud in scientific research, 3 fundamental modalities of this can be defined that are consistent with the search for studies that are not easily rejected: manipulating data, plagiarism and the creation of non-existent data.
Objective: to describe factors that allow the detection of scientific fraud in research.
Methods: a review of the literature was carried out in the month of December 2023 through access to the databases Scopus, PubMed, Dialnet, Scielo, and the search engine Google Scholar version 2022, with the strategies: ((fraud) AND (scientific writing)), ((science) AND (plagiarism)) and ((medicine) AND (artificial intelligence) AND (scientific fraud) AND (plagiarism) AND (data invention)) and their translations into the English language , limited the search to the last 5 years –from 2019 to 2023–.
Results: together with the problem of predatory magazines, the terminology of hijacked magazines has emerged, it is nothing more than that which takes articles, steals names of editors, evaluators or proofreaders, and through its use, sells them to different websites. scientific studies for publication. In real and practical life this phenomenon occurs due to economic motivation.
Conclusions: fraud in the world of scientific communication ranges from the authors to the editorial committees of the journals, which is why both groups must be educated in 2 fundamental factors, not committing fraud and knowing how to detect it, in order to increase in terms of credibility of current science.

Keywords: ChatGPT; Scientific Writing; Academic Fraud; Artificial Intelligence; Plagiarism.

RESUMEN

Introducción: cuando se refiere al término fraude en las investigaciones científicas, se pueden definir 3 modalidades fundamentales de este que van acorde a la búsqueda de estudios que no sean fácilmente rechazados: manipular datos, plagio y la creación de datos inexistentes.
Objetivo: describir factores que permitan la detección del fraude científico en la investigación.
Métodos: se realizó una revisión de la bibliografía en el mes de diciembre de 2023 a través del acceso a las bases de datos Scopus, PubMed, Dialnet, Scielo, y el gestor de búsquedas Google Scholar versión 2022, con las estrategias: ((fraude) AND (redacción científica)), ((ciencia) AND (plagio)) y ((medicina) AND (inteligencia artificial) AND (fraude científico) AND (plagio) AND (invención de datos)) y sus traducciones a la lengua inglesa, limitada la búsqueda a los últimos 5 años –desde 2019 hasta 2023–.
Resultados: unido a la problemática de las revistas depredadoras ha surgido la terminología de revista secuestrada, no es más que aquella que toman artículos, roban nombres de editores, evaluadores o correctores de estilo, y a través de su uso, venden a las distintas páginas webs estudios científicos para su publicación. En la vida real y práctica este fenómeno ocurre por motivación económica.
Conclusiones: el fraude en el mundo de la comunicación científica abarca desde los autores, hasta los comités editoriales de las revistas, por lo cual ambos grupos deben instruirse en 2 factores fundamentales, no cometer fraudes y saber detectarlos, para de esta forma acrecentar en términos de credibilidad la ciencia

actual.

Palabras Clave: ChatGPT; Escritura Científica; Fraude Académico; Inteligencia Artificial; Plagio.

INTRODUCTION

Publishing in journals with recognized visibility and certification is a challenge considered worthwhile by professionals seeking to share knowledge and results that contribute to social improvement. Furthermore, it serves as a valuable achievement on their resumes. In various cases, these individuals commit scientific fraud in order to achieve quick publication.[1]

In scientific research, fraud can be classified into three main types: data manipulation, plagiarism, and fabrication of non-existent data. These types are used to prevent studies from being easily dismissed. [2] Plagiarism involves the reproduction or appropriation of the work of other researchers without giving them proper credit. This not only undermines the integrity of the individual researcher but also raises questions about the editorial process and the overall quality of the journal publishing such information.

Plagiarism is driven by diverse, unjustifiable reasons.[3] All of them compromise the moral integrity and ethical principles of those involved. The phenomenon is widespread worldwide, with the highest incidence of fraud in leading research countries such as the United States, India, China, Japan and Germany. It is particularly prevalent in journals with a low impact factor. Cuba is not immune to this situation, as multiple analyses have revealed the existence of published articles displaying features that identify them as cases of plagiarism.[1]

Subjecting a study to a peer-review process allows both authors and the scientific community to benefit. Authors have the opportunity to publish high-quality studies, while the scientific community receives valuable scientific articles. This collaborative process involves input from professionals, researchers, or experts in different fields, many of whom possess expertise equal to or greater than that of the author. In the field of medical sciences, a rigorous review process involves editors and reviewers who are often appointed by the journal without the author's knowledge.[4,5]

Even when identifying scientific fraud in articles can be challenging due to the skillful composition and robust arguments, there are always clues for detection. For that reason, this study aims to outline the factors that facilitate the detection of scientific fraud in research.

METHODS

In December 2023, a bibliographic review was conducted by accessing databases such as Scopus, PubMed, Dialnet, Scielo, and the 2022 version of the Google Scholar search engine. The review used specific strategies: ((fraud) AND (scientific writing)), ((science) AND (plagiarism)) and ((medicine) AND (artificial intelligence) AND (scientific fraud) AND (plagiarism) AND (data invention)). Spanish, English or Portuguese were the languages employed. The search was limited to the last 5 years –from 2019 to 2023–. The introduction and development sections were created using theoretical approaches such as analysis-synthesis, while the conclusions were structured using deduction-induction methods. The 17 investigations selected for this study met the criteria for open access, complete manuscript availability, and relevance to the authors' chosen topic. The selection process included opinion articles, original research, and literature reviews.

RESULTS

Fraud in scientific journals

Dishonesty is prevalent in scientific writings to the extent that it has gained acceptance within the scientific community. This is influenced by diverse factors. According to Picazo *et al.*[6], a significant and escalating element contributing to this unethical practice is the prevalence of predatory or hijacked journals. This encompasses fraud in the review process, the fabrication of reviewers, and the generation of false impact factors.

Predatory journals

These are journals that charge significant fees for manuscript publication but lack a proper peer-review process or, at the very least, a thorough examination to correct errors and enhance the quality of the upcoming article. Consequently, they fail to deliver beneficial studies with useful, genuine, and timely results to the community.

Identification of these journals can be done by examining different characteristics:

1. They attempt to solicit manuscripts via email, sometimes exaggerating the value of certain researchers or excessively praising others beyond the recognition they deserve.
2. They have names similar to highly prestigious journals and promise to publish manuscripts quickly, often within 5 days, at low prices.

3. The manuscripts submitted do not undergo a peer-review process and are typically accepted without the need for revisions.

4. Although they promote the presence of prestigious researchers, they do not have a proper editorial committee.

5. These journals cover a broad range of research topics, rather than focusing on a single scientific field.

6. They lack genuine indexing, violate ethical principles, and do not have a professional article submission system.

This group of journals destroy the credibility of scientific articles and science in general. The loss of authorship credit is the primary reason for this. Additionally, authors may unknowingly sign a manuscript with deceptive words that have an uncertain power of persuasion, leading to its submission to a predatory journal. This practice has become so common that it now poses a threat to research funding. Therefore, it is essential for researchers to become acquainted with the review and arbitration procedures of reputable journals, to avoid being tempted by predatory journals.[7]

Hijacked journals

Linked to the issue of predatory journals is the concept of hijacked journals. These journals appropriate articles and steal the identities of editors, reviewers, or copy editors. Subsequently, they exploit these identities to sell scientific studies to different websites for publication. In real-life practice, this phenomenon occurs driven by economic motivation.

These are their characteristics:

1. Identity theft.

2. High expenses and an additional Article Processing Charge (APC).

3. The selection of “victims” is based on curriculum review, making doctoral candidates who require publications for pre-defense applications vulnerable targets for these journals.

4. Selecting non-English language journals.

5. The publication does not have a website, links to journals, or an impact factor.

6. Use of names of prestigious researchers without authorization.

As with predatory journals, it is crucial to provide researchers with training to detect these patterns, particularly those who are new to the field.

False impact factor

Various fraudulent indexing platforms exist in the international market, which assign impact factors to journals for exorbitant sums of money. These journals then use these statistics to charge significant amounts to researchers for publication on their platforms. Such platforms exhibit patterns that allow for their identification, as in previous cases.

1. Invention of the impact factor: Researchers should verify the actual impact factor of the journal they plan to submit their manuscript to by consulting official documentation or using predefined formulas designed for such cases.

2. Forgery and manipulation of data: Authors manipulate the impact factor of journals to inflate the value of their curriculum.

The emphasis placed on the impact factor has compelled researchers to compromise ethical standards under the imperative of the "publish or perish" principle. [6,8]

Fraud from the authors

Logic suggests that authors of manuscripts bear the greatest influence on fraudulent practices in scientific publication, as they, for various reasons, may become involved in such practices. Main reasons for committing fraud are: competence for positions, recognition from the international scientific community, economic interests, pressure from the “publish or perish” principle, lack of awareness of ethical principles or absence of moral consciousness, and personal gain. It should be noted that the reasons for involvement in scientific fraud are varied.

In his research, Zuñiga Vargas [9] details the most prevalent cases: [10,11]

1. Increasing the number of references in a manuscript solely to create the illusion of an extensive literature review is not a valid approach. It only inflates the reference count without truly enriching the depth of the research.

2. Committing plagiarism in any of its manifestations is regarded as the most prevalent and varied ethical violation within the scientific community. It spans from absurd plagiarism –just cut-and-paste– to self-plagiarism.

3. Unjustified removal of author names from a manuscript usually occurs due to personal reasons. This

is often facilitated by designating one author as the correspondence contact, allowing them to remove another author without their knowledge until the manuscript is published.

4. The strategy of submitting a manuscript early involves an author choosing to submit their work to a low-impact journal with stringent evaluation standards, fully aware of its deficiencies. The goal is to have it corrected, thus enhancing its quality by wasting the time of the reviewers, with the ultimate goal of submitting and publishing it in another journal.

5. Falsification or manipulation of research data involves compromising the integrity of authentic data and methodologies, often altering or inflating them. This is typically done to corroborate a hypothesis or enhance the significance of a research study.

6. Including individuals as signatories on a manuscript without making a significant contribution, whether as a gift, through coercion, or out of commitment, is a form of fraud. This is typically influenced by personal factors. The decision to include them in the research is made by the research team or the author conducting the study. This type of fraud is particularly challenging to identify.

7. Citation exchange occurs when authors agree to cite each other's articles, with the intention of increasing the visibility and impact of their work within the international research community.

8. Authorship modification occurs when the order or number of authors is changed in an attempt to present an article as new, leading to the manuscript undergoing a new evaluation process with another journal. This phenomenon has become widespread, particularly in the context of predatory journals. There have been instances where authorship order has been rearranged to gain prestige, with a primary author designated despite not meeting the required qualifications.

9. Failing to declare conflicts of interest.

10. Excessive self-citation occurs when an author excessively references their own work in an attempt to inflate their citation index.

11. Changing the title of an article with the intention of resubmitting a previously published work to another journal is considered unethical. This is achieved by only changing the title to give the impression of being new.

12. Modifying the bibliography of an article involves adding or updating references in a manuscript to create the impression that it is new or different from the previously published one.

13. Parallel submission of a manuscript is the act of submitting the same manuscript to multiple journals simultaneously, with the intention of determining which one will accept it.

14. Inflated publication, also known as “meat extender publication”, is a fraudulent practice where authors add information to an already published study in order to present it as a new one.

Salami Slicing

The anglicism “Salami slicing” or segmented publications is the practice of dividing a study into different reports and submitting them for review in different editions or journals to increase the number of papers derived from a single study. This practice has been defined as a form of redundant publication. [12]

Data fabrication and manipulation

Within the spectrum of fraudulent practices, there is the act of generating, manipulating, and duplicating data to produce anticipated results. This behavior compromises the integrity of research, considering that even when study outcomes are negative, they still contribute meaningfully to the advancement of various scientific fields.

In current times, this situation is often referred to as productivity pressure. It is crucial for both professors and university administrators to recognize the health risks posed by the increased pressure from institutions striving to enhance competitiveness and service quality.This quality is assessed using quantitative indicators.[12]

The role of artificial intelligence (AI) in scientific fraud

The use of AI to generate scientific content is a sensitive issue in today's world. Tools such as ChatGPT are used to create entire scientific articles, sometimes without being detected by reviewers from highly respected scientific journals. The seriousness of this issue significantly undermines overall credibility, especially for novice researchers who do not engage in such misconduct but are unfairly associated with these practices simply because they belong to the current generation. A more significant challenge arises as reviewers often lack of sufficient time to identify these indicators in every manuscript they receive. Therefore, it is crucial for the global community to create tools enabling the detection of this fraudulent practice.[13,14,15,16,17]

CONCLUSIONS

Fraud in scientific communication involves authors and journal editorial committees. Both groups should be educated on two crucial aspects: refraining from committing fraud and detecting it. This effort aims to enhance

the credibility of contemporary science.

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CONFLICT OF INTEREST

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Methodology: Lisset Urquiza Portilla.
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