
Essays

Plagiarism: What does the future hold for science writing?

Farrokh Habibzadeh

Immediate Past President, World Association of Medical Editors (WAME); Editor in Chief and Founder, The International Journal of Occupational and Environmental Medicine; Adjunct Professor, Shiraz University of Medical Sciences, Shiraz, Iran; Farrokh.Habibzadeh@theijoem.com, ORCID <http://orcid.org/0000-0001-5360-2900>

Abstract Over the past years, plagiarism has received much attention from the scientific community and has become one of the most frequent misconducts reported worldwide. There are numerous published articles on the prevalence of plagiarism worldwide, its definition, causes, and management. Herein I reflect on some new aspects of plagiarism of ideas and texts and forecast the future of this problem.

Keywords Plagiarism; misconduct; editing; education; publishing trends

Introduction

One of the most important and persistent problems faced by journal editors is plagiarism. As the number of articles on plagiarism increases,¹ this form of misconduct attracts a great deal of attention from the concerned global scientific community. Hopes are high that the problem can be solved by software that identifies text similarity, which became widely available a few years ago (eg iThenticate®, eTBlas®, Google Scholar®).²

Plagiarism has been variably defined by research and ethics organizations.³ Generally, it is referred to as the appropriation of others' published or unpublished ideas or words without proper acknowledgement and permission. Most researchers consider it to be a breach of ethics and/or theft.

Two main categories of misconduct can be distinguished—"plagiarism of ideas" and "plagiarism of words". Most experts would find it extremely difficult to define the former, as no metrics are available to assess the theft of ideas.^{4,5}

Plagiarism of ideas

Scholars may discuss ideas in public, deliver presentations at academic meetings, watch documentaries, and receive bulk information from everywhere. Even if they do not remember what they have captured, the received information finds its way to change mentality and to influence the generation of scholarly ideas.

Perhaps the most important related issue is the flow of ideas during the peer review process. All referees are asked to keep the information throughout the review strictly confidential, not share, or re-use ideas presented in the assessed manuscripts. However, it is impossible to entirely forget what is presented and discussed throughout the review, especially when the topic is close to the referees' current research interests. Journal editors ask the reviewers to destroy all processed electronic and print copies after the review. But all these materials may change their thinking and accrue professional skills. The more energy they spend

on ignoring others' ideas, the more attention they pay to these ideas and unintentionally re-use them. The tactical approach to overcome this problem is simply to wait and observe what happens after the review. If a new scientific product has traces of others' ideas picked from the peer review, then responsible journal editors and authors could suspect a re-use. Perhaps it sounds too naïve, but it is ultimately the reviewers' ethical duty to acknowledge source(s) that influenced their thinking. Otherwise, there is no straightforward way to uncover plagiarism of ideas, and this is why it is often reported by reviewers, editors, or readers after an unethical publication comes to light.

Plagiarism of words

Verbatim text copying has become frequent over the past years, after the introduction of copy-paste functions of word processors and availability of electronic sources on the Web.⁶ Such type of plagiarism is absolutely unacceptable by most stakeholders of scientific communications, and particularly in the disciplines where the essence of the work is masterful wording and phrasing.⁵ Plagiarism of words is a serious misconduct leading to punishment when it is discovered.^{3,7} Thanks to the current availability of software to track text similarities, plagiarism of words is now easier to report than plagiarism of ideas. And this may be a reason why the absolute majority of articles on plagiarism are about English text similarities, related algorithms for detection, and measures to prevent such type of misconduct. Currently available plagiarism detection software support only a few languages. For example, iThenticate®, one of the most globally used and powerful programmes, only supports English, Korean, and Japanese.⁸

Causes of plagiarism

Although plagiarism is known to cause serious penalties which threaten career prospects of the plagiarists, many novice and seasoned authors alike still commit such misconduct.⁷ Academic laziness is believed to be the main cause of plagiarism amongst native English speakers.^{4,7} In non-Anglophone environments, causes of plagiarism are different.

The Canadian philosopher Herbert M. McLuhan noted that technology has contracted our world into a "global village". With the wide-spread use of the Internet and digital networks, this village has become even smaller. To succeed in the global science competition, and in an attempt to show off their capabilities, many developing countries push their scholars to publish more in prestigious journals. As most of these journals are published in English

in the Western world, scientists from developing countries should strive to present their research data in a language different from their mother tongues.⁵ Describing complex scientific findings in any language is difficult, and in a non-native language it is even more so.

The originally western motto “publish or perish” is now all-pervasive in academia in developing countries, where many authors seek short cuts and are tempted to borrow well-crafted English phrases from articles of native speakers.⁵ In most cases plagiarists cannot write eloquently themselves and embark on borrowing words of more skilled writers.

Another big issue is that many novice and seasoned researchers in developing countries are not aware of the seriousness of committing plagiarism. Academics handling cases of plagiarism are not aware of the international regulations, most of which come from the West. Researchers from developing countries are actually newcomers to the international scientific league. They are not yet aware of all the tips and tricks. But they have to abide by the regulations if they want to remain in the league. *Noblesse oblige!*

Treatment options

Different organizations have differing penalties for plagiarists.^{3,9} My firm believe is that “intention to deceive” readers is critical for judging them. Those who commit plagiarism unintentionally—mainly junior researchers lacking exposure to the Western science writing standards and those who copy words but refer to primary sources—should be trained to properly write and paraphrase.⁷ The writing courses should be a part of undergraduate and continuing professional development (CPD) curricula. Students who commit plagiarism after passing proper writing courses should be punished and blacklisted by universities and journals. Students should be aware that even ‘minor’ misconduct can be detected, with appropriate penalties being followed.

In 1982, two social scientists, James Q. Wilson and George L. Kelling, proposed the so-called broken windows theory for criminology.¹⁰ They noted that “...if a window in a building is broken and is left unrepaired, all the rest of the windows will soon be broken.”¹⁰ They believed that “...one unrepaired broken window is a signal that no one cares...”¹⁰ If the scientific community does not avoid ‘minor’ breaches of publication ethics, much bigger and devastating consequences can follow.

Alternative views

Some believe that language in scientific writing has a role different from that it plays in other fields such as social sciences.⁴ In other words, while eloquence is of paramount importance for literature, arts, and humanities, it is not so important for scientific writing in the natural sciences, where the comprehensibility of the text matters more. Language is merely a conduit for transfer of scientists’ ideas, and it is fine as long as the transfer is done with high fidelity; eloquence is not mandatory. As a prime example, participants of most scientific meetings are encouraged to

use *simple* language.

Languages have their own limitations. To better understand them, I give an example of computer languages sharing structural similarities with human languages. When someone writes a computer programme, he/she considers the language syntax, semantics, and lexical rules. The same is considered when someone writes in English or other languages. As such, plagiarism in computer and human languages is comparable. Any language with inherent limitations will ultimately require re-cycling of words and exact word combinations. For example, if a number of students are asked to develop a computer programme to print out integer numbers from 1 to 20, more than half of the codes will be very similar. Almost all programmers use ‘i’ as the loop variable, though they are not obliged to do so technically. This practice originated from the fact that in the original FORTRAN, a programming language commonly used by scientists in 1960s and 1970s, ‘i’ is the first variable that is integer by default. This unintentionally inherited habit, which is similar to the word collocation in human languages, causes similarities between the programmes. The level of similarity between computer programmes is apparent when one considers a limited number of keywords used. If someone cannot stand similar limitation of human languages, he/she has to create new words and phrases (to cheat on text similarity software programmes!). And for a final example, in how many ways one can describe blood pressure measurement?

Forecasting

The limitations of human languages and growing use of information technologies will ultimately make all scientists intentionally commit “plagiarism of words.” Meta-analyses, systematic reviews and trial reports are cornerstones of evidence-based practice. The number of related publications is constantly increasing. Sooner or later, researchers will not be able to analyze the large pile of accumulated information. Given the progress in computer sciences and information technologies, it is likely that artificial intelligence will take over and perform meta-analyses and systematic reviews in the near future. As there is the precedent of research reporting standards such as CONSORT, STROBE, or PRISMA, new templates are warranted to make the artificial processing of data more correct and systematic.

Within the next thirty years, we will reach a point, when hundreds of templates will be ready to be filled by research findings. Thereafter, writing a manuscript will become a process of selecting and inserting in the machine a set of references (most probably suggested by a machine), research protocols (out of thousands of standard operating protocols) and obtained findings. The machine will do the rest and come up with interpretations rarely subjected to corrections by researchers. In such scenario no one will care about plagiarism of words and will not even consider it as a misconduct. Now that machines are going to help us in such a way, I see no reason not to finish my article with two FORTRAN commands:

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STOP
END
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Introducing the new ESE Chief Editor - Ksenija Baždarić



Ksenija Baždarić is a senior research fellow at the Department of Medical Informatics Rijeka University School of Medicine in Croatia from 2006. Her academic background lies both in social sciences and biomedicine. She received her master's degree in psychology (2002) and PhD in social medicine (2012). She teaches medical informatics,

statistics and scientific methodology. Her investigation for the PhD thesis *The Value of Plagiarism Detection Procedure in a Biomedical Journal* was focused on the detection of similar texts with web-services CrossCheck and eTBLAST in the *Croatian Medical Journal* (www.cmj.hr) during 2009-2010, and the development of a standard operating procedure for detecting and dealing with plagiarism in biomedical journals. She became Research Integrity Editor at the *Croatian Medical Journal* in 2012. Her current research activities include detection of plagiarism in a journal of oral sciences and dental medicine. She is also interested in biostatistics and scientific methodology; and she speaks English, Russian and Italian.

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