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IL and Information Ethics: How to Avoid Plagiarism in Scientific Papers?

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Abstract. One of the most common misconducts in science is plagiarism. It has negative consequences for authors, editors and scholarly journals, causing loss of credibility, reputation, readers and finances. Academic ethics can be assured by proper education, good codes of ethics and detailed instructions to authors of scientific papers. This paper analyses contents of author's guidelines in Croatian journals in the field of social sciences. The analysis tries to ascertain whether the journals mention and/or explain ethical issues in their instructions to authors. The paper also analyses content of codes of ethics of Croatian universities, with the accent on plagiarism. A conclusion is made about the use of proper protection mechanisms in Croatian academic community when it comes to misconducts in science, especially plagiarism. Recommendations for universities and publishers on what to include in their codes of ethics and instructions to authors are given.

Keywords: Authorship, citation styles, Croatia, ethics, plagiarism, scientific communication.

1   Introduction

Misconducts in science are usually results of inadequate awareness of ethical standards. Scientists and other academics should know that ethics is an important part of scientific communication. Not only authors, but reviewers, editors and publishers, have to be aware of all the ethical rules and practices, discouraging any attempt of misconduct. Plagiarism can cause loss of credibility and reputation of a journal, of an institution, of an author. That could lead to the loss of readers, students and, therefore, finances.

All kinds of misconducts can slow down, stop or even reverse the development of science. Information literacy in that context implies knowledge of information evaluation, as well as knowledge about proper ways of quotation and citation. When discussing information literacy and ethics in the scientific communication, the double role of scientists has to be mentioned – as   both producer (i. e. author) and user (i. e. reader) of scientific information. If he wants to produce high quality information, he has to have in mind all the principles of proper citing. And if he wants to use other scientists' information, he also has to know how to properly evaluate citations and, therefore, the information itself.

2   What is Plagiarism?

Today, it is easier than ever to produce "fake" science by stealing someone else's ideas and presenting them as one's own. On the other hand, ICT gives some solutions for detecting misconducts, e. g. by using plagiarism detecting software. Many authors offer various definitions [1-2]; and one of the simplest and the most common defines research misconduct as "…fabrication, falsification or plagiarism in proposing, performing or reviewing research, or in reporting research results" [3]. Fabrication in that context means misrepresentation of results by making up data. The opposite of scientific integrity, scientific misconduct is unethical and contradictory to main principles of scientific work [4].

The term *plagiarius* was firstly used by Marcial (A. D. 40-102), meaning theft of literary text [5]. Bilić-Zulle and co-authors [6] define plagiarism as appropriation of another person's ideas or words without giving credit or listing sources properly. When discussing plagiarism among students, Martin [7] describes it as a part of a wider, cheating problem. In short, plagiarism is using the text (or ideas) of others and it constitutes serious publication misconduct [8]. Mašić [9] states that most common reasons for scientific misconduct are the persisting "publish or perish" imperative, personal ambitions, poor education, vanity and financial pressure. One fourth of all reported misconducts in science are plagiarism [10].

Authorship is very important issue when it comes to plagiarism detection. According to the International Committee of Medical Journal Editors (ICMJE), authorship is based on the four criteria: (1) contribution to the conception of the work, (2) drafting or revising the work, (3) giving final approval and (4) taking responsibility for all aspects of the work [11]. It is unethical not to add authors that fulfill the four criteria ("ghost authors") or to add "guest" or "honorary" authors (those who did not contribute to the work).

What does information literacy have to do with plagiarism? An important component of information literacy is to know how, and to understand why, information should be used in an ethical manner [12]. Authors should use appropriate citation style proposed by publisher they write for. Citation style is a set of rules that enables authors to give all the bibliographic data on the sources they used. There are many citation styles (e. g. Chicago citation style; style of Modern Language Association Citation or MLA citation style, style of American Psychological Association or APA citation style…), and they all use one of the three methods of conjunction between citations and bibliographic references. The three methods are running notes, numeric references and author-date system [13]. In author-date system, citation in text gives creator's name and date of publication. References are arranged in a reference list at the end of text in alphabetical order of authors' surnames, followed by the publication year in parentheses and all the other bibliographic data (title, journal title, volume, number, publisher…, depending on a source type). In numeric system, citations in texts are numbers (in parentheses or superscript) referring to resources in order they are firstly cited (subsequent citations receive the same number). A reference list is arranged in numerical order – each reference is numbered to be connected with the citation(s) in text. In running notes system,

numbers in text refer to notes (footnotes or endnotes) numbered in order of their appearance in text. Multiple citation of the same source is given new number each time it is cited. By naming citation style and by explaining the rules of the chosen style, publishers give their authors tool for creating complete bibliographic references and, thus, appropriate credit to authors of used resources.

Avoiding plagiarism has its roots in higher education – students have to be educated about the proper ways of using other persons' ideas. By using modern technologies, plagiarism is easier than ever. On the other hand, education and plagiarism detection software can diminish the threat. Universities and scientific journal publishers, as important players in scientific communication, have their role in detecting plagiarism. In the first place, they have to educate their students and their authors by giving them detailed guidelines and encouraging them to respect scientific integrity. They have to have clear policies, described in codes of ethics or similar documents. Journal editors should use recommended guidelines, such as those of Committee of Publication Ethics (COPE) [14], to identify their responsibilities, to improve their relation with authors and readers and to learn about best practices. COPE flowcharts can help editors when they have to decide about cases of misconduct (e. g. what to do if they suspect redundant publication, plagiarism in a submitted manuscript, ghost authorship etc.). Another valuable source are recommendations by ICMJE [15] that give some guidelines on how to conduct, report, edit and publish scholarly work in medical journals. Some publishers publish their own instructions and guidelines. An example is Elsevier's Publishing Ethics Resource Kit (PERK) [16] that has several chapters – Authorship complaints, Plagiarism complaint, Simultaneous submission, Research standards violation etc. PERK relies on the COPE flowcharts.

3 Research Aim, Sample and Methods

The aim of this research is to find out if Croatian universities and scientific journals in the social sciences pay enough attention to ethical issues, especially plagiarism, and to conclude about the importance of information literacy for accepting ethical standards in academic community and scientific communication. This research consists of two parts. In the first part, contents of codes of ethics of Croatian universities are analysed to see if they:

- define research misconducts, especially plagiarism;
- mention intellectual property rights;
- specify consequences of plagiarism;
- mention ghost, guest and/or honorary authorship;
- point out the importance of proper citation.

It is important for universities to clearly state what is considered to be plagiarism. We assume that all the Croatian universities have documents that at least mention plagiarism. Institutional awareness of the importance of research ethics and integrity is the first step in the battle against plagiarism in academia.

In the second part of the research, instructions to authors in Croatian scientific journals in the field of social science are analysed. The main method is comparative content analysis. The analysis will show if the journals:

- mention ethics in instructions to authors;
- mention plagiarism in instructions to authors;
- specify consequences of plagiarism;
- explain authorship;
- mention prior publication;
- have a separate document (aside of instructions to authors) that regulate ethical issues (e. g. code of ethics);
- mention the importance of proper citing;
- describe in details how to cite resources (naming the citation style and/or giving examples).

In the first part of the research codes of ethics of all seven public universities in Croatia are examined (University of Zagreb, Josip Juraj Strossmayer University of Osijek, Juraj Dobrila University of Pula, University of Rijeka, University of Zadar, University of Split and University of Dubrovnik). In the sample of the second part, 112 scientific journals from the social sciences, as listed on Hrčak, portal of Croatian scientific journals are analysed. Journals that do not publish peer-reviewed papers and/or do not have at least one 2012 issue available on the portal were excluded from the sample [17]. According to Croatian classification, there are six main scientific fields – biomedicine and health; nature sciences; technical sciences; biotechnical sciences; social sciences and humanities [18]. The same classification is used on the Hrčak portal. The results will show if Croatian academics can, on their institutions' web sites and on journals' web sites, find reliable guidelines for conducting ethically correct researches and writing papers that will not contain any form of plagiarism.

4   Results

The results of this study could be used for analysis of current practice of Croatian universities and Croatian journals in the field of social sciences concerning plagiarism protection.

4.1   Codes of Ethics

All the seven Croatian universities have published their codes of ethics on their web sites. All of those codes have at least one statement concerning plagiarism and authorship and some of them define plagiarism and other transgressions (such as fabrication, falsification or ghost authorship). Here are some of the statements from the codes of ethics.

- Code of Ethics of the University of Rijeka (2006):
  - all forms of plagiarism are considered to be infringements of the Code of Ethics;
  - all the members of academic community have to guarantee authenticity of their published papers;
  - any form of falsification is unethical;
  - it is important to protect intellectual property rights of all the members of academic community;
  - only those who gave their intellectual input can be specified as authors of a scientific works.
- Code of Ethics of the Josip Juraj Strossmayer University of Osijek (2011):
  - fabrication is unacceptable;
  - plagiarism is copying other authors' words, ideas or results and presenting them as one's owns;
  - inappropriate or biased use of citations is unacceptable;
  - honorary and ghost authorship is unacceptable.
- Code of Ethics of the University of Split (2009):
  - fabrication, manipulation and plagiarism are not acceptable;
  - plagiarism means copying other authors' ideas, words or results and presenting them as one's owns;
  - honorary and ghost authorships are considered to be misconducts;
  - all the accusations of misconduct have to be proven.
- Code of Ethics of the University of Zagreb (2007):
  - any form of plagiarism is unacceptable;
  - all the members of academic community guarantee originality of their published works;
  - intellectual property of all the members of the academic community has to be protected;
  - honorary and ghost authorship is unacceptable.
- Code of Ethics for Scientists, Educators and Associates at the University of Dubrovnik (2006):
  - no author will present other people's ideas as his/her own;
  - if an author finds a significant mistake in his/hers published paper, he/she has to take all the necessary steps to announce it and then remove the mistake;
  - academics should be stated as authors of only those works they actually authored;
  - in the case of secondary publication of the same results, the original source should be cited.
- Code of Ethics for Educators, Associates, Scientists and Researchers at the University of Zadar (2003):
  - it is unacceptable to use texts or ideas of other authors (including students) without giving credits;
  - it is unacceptable not to indicate all the references.
- Code of Ethics of the Juraj Dobrila University of Pula (2008):
  - authors guarantee that they are authors of all their published papers;
  - plagiarism is unethical.

As can be seen, all Croatian universities mention research misconducs in their codes of ethics – five of them use the word "plagiarism" and two of them define the word. Two codes of ethics mention the importance of the proper use of references. Authorship is mentioned in six codes of ethics, and intellectual property rights in two codes of ethics. One university mentions that accusation of misconduct must be proven.

Each Croatian public university has many faculties or departments (the biggest one is the University of Zagreb with more than 30 faculties, covering various scientific fields). Each faculty can also have its own code of ethics that has to be in accordance with the university code of ethics (e. g. Code of Ethics of the Faculty of Kinesiology at the University of Split or Code of Ethics of the Faculty of Humanities and Social Sciences at the University of Zagreb). Some universities and faculties have codes of ethics for students (e. g. Code of Ethics for Students of the School of Medicine at the University of Rijeka).

4.2   Scientific Journals

The second part of the research analyses instructions to authors in Croatian journals in the field of social sciences, as listed in the Hrčak portal (portal of Croatian scientific journals), were analysed. There are 112 scientific journals in the sample. The aim was to find out whether the instructions to authors are available on the journals' web sites (either on the Hrčak portal, or on the publishers' web sites). The context of the web sites was analysed to see if instructions to authors are available, as well as to see if some other documents and/or links about research integrity are included (i.e. international standards). The instructions to authors are analysed to find out if:

- plagiarism is mentioned;
- ethical issues are mentioned;
- prior publication is mentioned;
- authorship is explained;
- reference systems and styles are explained (which system is used, is it explained and/or examples are given).

107 journals from the sample (95.6%) publish instructions to authors on their web sites. In addition, three journals publish codes of ethics. Thirteen (11,6%) journals mention ethics in their instructions to authors and 10 (8.9%) mention plagiarism (eight of them overlapping, so 15 journals, or 13,4%, mention either ethics or plagiarism in their instructions to authors). For example, in one journal's ethical policy, under the title *Originality and Plagiarism*, it is written: "The authors should ensure that they have written entirely original works, and if the authors have used the work and/or words of others, that this has been appropriately cited or quoted" (Business Systems Research Journal). Another journal's instructions to authors state that by sending the manuscript "…author takes full scientific and ethical responsibility…" (Holon). Another example is the journal that states: "In submitting an article… authors are thereby confirming that the work represents their own original contribution, … that it has not been copied or plagiarized in whole or in part from other works…" (Studia ethnologia Croatica). Five journals mention COPE and its

standards, giving the link to their web site, e. g. "Our ethic statements are based on COPE's Best Practice Guidelines for Journal Editors" (Zagreb International Review of Economics and Business). Two journals mention ICMJE, e.g. "Detailed instructions about how to prepare a manuscript are given in… *Writing and Editing for Biomedical Publication* issued by the International Committee of Medical Journal" (Archives of Industrial Hygiene and Toxicology). One journal mentions PERK guidelines. In total, six journals (5.3%) recommend international standards or guidelines on ethical issues.

One journal explains that authenticity of submitted papers is verified by plagiarism detection software (Društvena istraživanja). One journal states the consequences of plagiarism: "The journal nurtures a zero tolerance policy on plagiarism. The authors, who are discovered to be submitting plagiarism, will be banned from submitting an article to the journal for the next five years" (Organization, Technology & Management in Construction).

Prior publication is mentioned in 64 journals (57.2%), e.g.: "Author(s) are required to deliver statement that submitted paper in full or in-short form has not been previously published or submitted simultaneously to another journal for publication" (Informatologia). Another journal states that it "accepts for publication only scientific research papers which are original primary publication, i. e. papers that have not been previously published in any journal (previous publication in conference proceedings has to be specified)" (Croatian Journal of Education).

Proper authorship is mentioned by 12 journals (10.7%), e. g. "Each manuscript submitted for consideration for publication should be provided with… a letter in which the first author states that the paper has been approved by all co-authors" (Alcoholism). That is one way for a journal to assure that there will be no ghost or guest authorship in the papers.
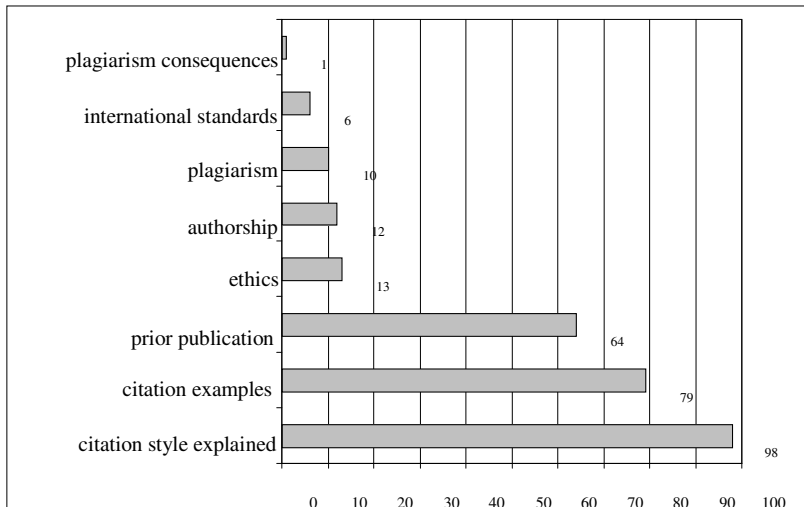

Fig. 1. What is mentioned in instructions to authors of the 112 Croatian journals from the field of social sciences (no. of journals)

Proper citing of resources is very important issue in avoiding plagiarism. Journal editors have to warn and educate their authors by giving instructions on how to cite properly. 98 journals in the sample (87.5%) publish at least some kind of explanation, examples and/or links to citation styles. Out of them, 94 journals (83.9%) give additional explanations (e. g. how to cite multiply authorship, how to arrange reference list…) and 79 journals (70.5%) give examples for citing different material types (e. g. journal article, book, book chapter, web page…). Publishers of 14 journals do not think that instructions on proper citing are important (they all use citations and references, but they do not explain citation style in their instructions to authors). Fig. 1 gives an overview of the content of instructions to authors in the analysed journals.

According to the ISO standard [13], there are three methods of making conjunction between citations (a brief form of a reference in a running text) and bibliographic references at the end of the text – running notes, numeric references and first element and date (author-date) method. In the sample, the most used method is author-date, used by 74 journals (66.1%). Running notes method is used by 28 journals (25%), and numeric references method is used by ten journals (8.9%) (Fig.2).
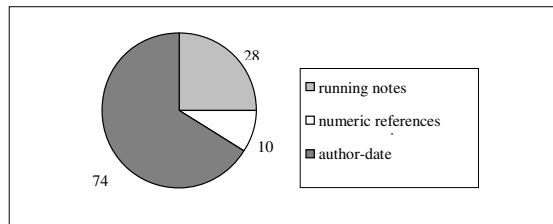

Fig. 2. Citation systems in Croatian journals in the field of social sciences

Not all the journals in the sample (i. e. their publishers and editors) are aware of the importance of proper citing. The only way to avoid plagiarism is to cite all the sources in the way that they can be undoubtedly identified. It is possible only if authors know which reference style they should use. The style should be explained and examples should be given. Instead of examples (or as addition to them), links to other sites with explanations and examples could be given, as well as sample articles that can help authors in editing their references.

5   Conclusion

Academics teach students, conduct research and publish scientific papers. They have to be aware of all the ethical rules in academia – they have to know their institution's code of ethics as well as journals' policies. Knowing how to avoid plagiarism and all the other misconducts in science is part of information literacy. Scientific work and scientific publishing have to be ethical in order to produce valid and reliable new information. Not only academics, but also students, must be aware of other peoples' intellectual property. They have to cite all the sources they consult while writing their papers. Proper citing include all the important information about a resource – its author; its title; journal, volume and issue (for journal articles); book title (for book chapters);

pages, publisher etc. Results showed that Codes of Ethics of Croatian universities include statements on plagiarism and authorship. Nevertheless, some of the codes could define plagiarism and other misconducs more precisely. They should also explain what the procedures in the case of misconduct are and what the consequences are. Codes of ethics that are analysed in this research are written for the academics (some of them stating that in the title, e. g. Code of ethics for educators, associates, scientists and researchers at the University of Zadar). Some Faculties have codes of ethics for students, but additional effort has to be done by universities and their faculties to develop guidelines for students. Students have to be educated about research integrity; they have to be aware of all the possible consequences of misconduct and other ethical issues. Students are future educators, academics, scientists. They have to be taught how to act properly when it comes to ethical issues in research. Further researches could be done to investigate Codes of Ethics on faculty level.

Analysis of Croatian journals in the field of social sciences shows that almost all of them publish instructions to authors on their web sites. Those that do not publish the instructions should do that in order to educate and to inform authors, reviewers and readers on the concept and the rules of the journal. There are also some journals that do not mention the importance of proper citing (12.5% of the journals). Maybe they believe that authors are aware of the fact, but they have to think of young authors and/or authors that submit their manuscripts for the first time to a scholarly journal. Journal publishers should educate authors about proper ways of citing.

Only a few journals mention explicitly either plagiarism or ethics, and only one journal explains retributions. That, of course, does not mean that all the other journals tolerate plagiarism – there are many other ways to control it, e. g. through peer-review process, using plagiarism detecting software, using contracts that include statements about authorship and plagiarism etc. Nevertheless, for raising awareness about plagiarism it is important to mention it in the instructions to authors. It is important especially for young authors who do not have experience and are not always aware of all the possible consequences of misconducts in scientific communication.

As the results show, some universities and some journals specify code of ethics more carefully than others. Students have to be educated constantly; all the subjects of scientific communication, as well as all the educators, have to be aware of the importance of research integrity. That is the only way to ensure proper communication and development of science.

Scientists have double role in the process of scientific communication – they are authors, but they are also users of scientific information. As authors, they should do their best to produce high quality information, and that includes avoiding plagiarism by citing used sources properly. As users, scientists have to know how to evaluate scientific information and that includes plagiarism detection.

Knowing how to avoid research misconduct is part of information literacy. Universities and scholarly journals' publishers should do their best to educate and inform their students, educators, scientists, authors. Academics should know all about the journal they want to publish in (its policy, instructions to authors, instructions to peer-reviewers, codes of ethics etc.), they have to be familiar with all the acts and rules connected with scientific communication in their field of research, they should follow instructions for citing resources and be aware that self-citations can help in avoiding self-plagiarism. They should know how to use quotations properly; they should put all the citations in the reference list, and vice versa.

Scientists as users of scientific information should be able to detect plagiarism by recognizing false bibliographic references, using plagiarism detecting software, checking authorship of cited references and by evaluating publication and its publisher. All the participants in scientific communication – authors, publishers, journal editors, librarians, peer-reviewers, users – should do their best to diminish the possibility of misconduct in scientific publishing.

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