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BASIC PRINCIPLES OF PREVENTION AND DETECTION OF ACADEMIC PLAGIARISM IN A MEDICAL UNIVERSITY (HIGHER MEDICAL EDUCATIONAL INSTITUTION)

Abstract. The problem of plagiarism is acute in institutions of higher education, since the fight against it is a guarantee of progress and diversity of opinion, when a person creates something new based on materials for learning, and does not mindlessly copy what is found on the Internet. Anti-plagiarism examination is an integral part of the system of educational and scientific activities and the quality of higher education. Our research is devoted to the issues of implementation of academic integrity, principles of counteraction and detection of academic plagiarism in the modern scientific and educational process. One of the current trends in the fight against academic plagiarism is its detection with the help of programs that are constantly improving and becoming more efficient, should adequately analyze some matches and be freely available. Using a sophisticated algorithm, software robots divide the text into logical phrases and identify content parts and their authorship online. The existing licensed software was updated and new licensed software was implemented – Unichek, StrikePlagiarism and Plagiarism Detector Pro, an important function is to highlight words with a color and size that coincide with more than 5% of the text. On accordance of the Law of Ukraine "On Higher Education" has been approved and implemented Regulation on Anti-Plagiarism Examination, and takes legally and technically adequate measures, including the introduction of appropriate new technologies to comply with the norms of ethical scientific behavior, preventing and detecting academic plagiarism in the works of researchers, research and teaching staff, as well as higher education students. The task of plagiarism prevention is to struggle with academic plagiarism, to determine the percentage of the text uniqueness stated by specialized software that are constantly improved and become more effective.
Keywords. Plagiarism prevention and examination, software, scientific and educational process, academic integrity.

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ОСНОВНІ ПРИНЦИПИ ПРОФІЛАКТИКИ ТА ВИЯВЛЕННЯ АКАДЕМІЧНОГО ПЛАГІАТУ В МЕДИЧНОМУ УНІВЕРСИТЕТІ (ВИЩОМУ МЕДИЧНОМУ НАВЧАЛЬНОМУ ЗАКЛАДІ)

Резюме. Проблема плагіату гостро стоїть у закладах вищої освіти, адже боротьба з ним – це запорука прогресу та різноманітності думок, коли людина імплементує якісь нові наукові чи навчальні дані, а не бездумно копіює знайдене в Інтернеті. Антиплагіатна експертиза є невід'ємною частиною системи освітньої та наукової діяльності та якості вищої освіти. Наше дослідження присвячене питанням впровадження академічної доброчесності, принципам протидії та виявлення академічного плагіату в сучасному науковому та освітньому процесі. Одним із актуальних напрямків у боротьбі з академічним плагіатом є його виявлення за допомогою програм, які постійно вдосконалюються, мають адекватно аналізувати текстові збіги та знаходяться у вільному доступі. Використовуючи складний алгоритм, програмні роботи розділяють текст на логічні фрази та ідентифікують частини вмісту та їх авторство в Інтернеті. Наявне ліцензійне програмне забезпечення оновлено та впроваджено нове – Unichek, StrikePlagiarism та Plagiarism Detector Pro; важливою їх функцією є виділення співпадінь кольором та розміром, у випадках наявності збігів більш ніж 5% логічного текстового фрагменту. Відповідно до Закону України «Про вищу освіту» було затверджено та введено в дію Положення про антиплагіатну експертизу, а також вживаються законодавчо та технічно адекватні заходи, включаючи впровадження відповідних нових технологій для дотримання норм етичної наукової поведінки, запобігання та виявлення академічного плагіату в роботах науковців, науково-педагогічних працівників, а також здобувачів вищої освіти. Важливими завданнями є превентивні заходи, боротьба з академічним
плагіатом, визначення відсотку унікальності тексту, ствердженого спеціалізованим програмним забезпеченням, яке постійно вдосконалюється та стає більш ефективним.

Ключові слова. Профілактика та експертиза плагіату, програмне забезпечення, науково-освітній процес, академічна доброчесність.

Problem statement. Anti-plagiarism examination is an integral part of the system of educational and scientific activities and the quality of higher education [1, 3, 8, 9]. Adequate use of anti-plagiarism tools forms the most advanced conceptual and methodological knowledge necessary for patent search, comparison of hypotheses, theories and results with the scientific work of other researchers and scientific institutions, in the educational process and in professional activities; lays the foundation for knowledge of the key principles, methodology and measures to implement and ensure academic integrity and high professional standards, and prevent violations of academic integrity, adherence to the principles and generally accepted norms of ethical behavior, academic plagiarism prevention [7, 8, 10-12]. This educational principles on academic integrity of some Ministry of Education and Science of Ukraine are based. Implementation of the principles of evidence-based medicine for professional analysis is provided by biomedical data on possible ethical violations and conflicts of interest, comparison of results with scientific developments of other researchers and scientific schools in the context of ensuring and maintaining an appropriate scientific level [6-8]. Taking into account the provisions of the Law of Ukraine "On Higher Education" and the Charter of University, orders and resolutions to prevent academic plagiarism. Duties of promoting academic integrity, compliance with norms of ethical behavior, including preventive measures regarding academic plagiarism at Medical University are delegated to autonomous public collegial expert-consultative bodies [2, 6, 10]: the student agency for cooperation in the quality of education, the group for the promotion of academic integrity, and the commission on issues ethics and academic integrity, whose activities are associated with the scientific department and anti-plagiarism examination [2, 4, 7].

Analysis of the latest research and publications that address this issue. The unification of publication quality control and anti-plagiarism examination from the standpoint of academic integrity includes a set of measures to ensure the preservation of copyright by checking scientific works (scientific reports, monographs, articles, theses, etc.) for plagiarism before their publication (defense); formation and development of a database and electronic repository as a source of free access to scientific materials to
enhance the prestige research activities from the perspective of implementing academic integrity strategies [2-5, 8]. Analysis of the latest research and publications that address this issue. The unification of publication quality control and anti-plagiarism examination from the standpoint of academic integrity includes a set of measures to ensure the preservation of copyright by checking scientific works (scientific reports, monographs, articles, theses, etc.) for plagiarism before their publication (defense); formation and development of a database and electronic repository as a source of free access to scientific materials [3, 4, 8, 9, 11].

Expert evaluation of scientific papers, including anti-plagiarism checking, is an important prerequisite for the implementation of complex scientific topics, which objectifies the overall assessment of the quality of presentation of research results in professional and other scientific publications [1-4, 6, 7]. One of the current trends in the fight against academic plagiarism is its detection with the help of programs that are constantly improving and becoming more efficient [1, 2, 6, 10-12], should adequately analyze matches in Cyrillic and Latin and be freely available. Using a sophisticated algorithm, software robots divide the text into logical phrases and identify content parts and their authorship online. An important function is to highlight words with a color and size that coincide with more than 5% of the text [4, 5, 12]. The optimal value for the use of repeated words in the text (taking into account word forms) is 3-4% [5, 8, 9, 12]. Some articles in specialized journals, scientific papers (including abstracts), and scientific reports of the departments are reviewed by the senior inspector of the scientific department on the recommendation of the structural subdivision of the university and/or public collegiaexpert advisory commissions, structural subdivisions / department of the medical university [2, 6, 7, 10]. Expert evaluation of scientific papers, including anti-plagiarism checking, is an important prerequisite for the implementation of complex scientific topics, which objectifies the overall assessment of the quality of presentation of research results in professional and other scientific publications [3-6, 8, 11]. Even though reports of completed scientific works are heard at meetings of specialized departments (laboratories), given the large number of articles and abstracts submitted by departments for publication, the process of their technical review in a standard way (extensive, sequential) requires significant time [1, 3-5, 8, 9, 11]. Therefore, the problem of optimizing the examination by introducing new algorithms for the integrated use of online and desktop software is relevant [3, 5, 9-12].

The aim of the research. The study is devoted to academic integrity implementation, counteraction principles and academic plagiarism detection in the modern scientific and educational process.
The main content of the work. Even though reports of completed scientific works are heard at meetings of specialized departments (laboratories), given the large number of articles and abstracts submitted by departments for publication, the process of their technical review in a standard way (extensive, sequential) requires significant time. Therefore, the problem of optimizing the examination by introducing new algorithms for the integrated use of online and desktop software is relevant. The study is devoted to academic integrity, which occupies an important place in the modern scientific and educational process. This communication must take the first educational place and basis on the academic integrity, all stages of scientific work [8-10]. Articles in specialized journals, scientific papers (including abstracts), and scientific reports of the departments are reviewed by the senior inspector of the scientific department on the recommendation of the structural subdivision of the university and/or public collegial expert advisory commissions, structural subdivisions of the medical university [4, 6]. Expert evaluation of scientific papers, including anti-plagiarism checking, is an important prerequisite for the implementation of complex scientific topics, which objectifies the overall assessment of the quality of presentation of research results in professional and other scientific publications [4, 6-8, 10-12]. One of the current trends in the fight against academic plagiarism is its detection with the help of programs that are constantly improving and becoming more efficient, should adequately analyze matches in Cyrillic and Latin and be freely available. Using a sophisticated algorithm, software robots divide the text into logical phrases and identify content parts and their authorship online. An important function is to highlight words with a color and size that coincide with more than 5% of the text. The optimal value for the use of repeated words in the text (taking into account word forms) is 3-4%. Even though reports of completed scientific works are heard at meetings of specialized departments (laboratories), given the large number of articles and abstracts submitted by departments for publication, the process of their technical review in a standard way (extensive, sequential) requires significant time [5-7].

This communication must take place on the basis from the perspective of implementing academic integrity strategies. To conduct the initial anti-plagiarism examination at the departments and faculties, it is not recommended to use free anti-plagiarism online resources with the possibility of "batch checking" (providing information about the research to third, legally irresponsible persons, commercial structures contains various legal educational risks [6-8].

To improve preventive anti-plagiarism measures based on current legislation, regulatory orders, and university regulations, the principles of
comprehensive verification of scientific works, to characterize anti-plagiarism software and a set of expert measures in a medical university from the standpoint of implementing of academic integrity principles [8, 9, 11]. In 2019, the existing licensed software was updated and new licensed software was implemented – Unichek, StrikePlagiarism and Plagiarism Detector Pro. On accordance of the Law of Ukraine "On Higher Education" has an approved and implemented Regulation on Anti-Plagiarism Examination, and takes legally and technically adequate measures [1, 3, 6-9, 12], including the introduction of appropriate new technologies to comply with the norms of ethical scientific behavior, preventing and detecting academic plagiarism in the works of researchers, research and teaching staff, as well as higher education students, and bringing them (in the event of violations of academic ethics, including falsification of research results and academic plagiarism) to disciplinary responsibility. Each anti-plagiarism software, despite the similarity of algorithms, has its characteristics, advantages, and disadvantages, including search indexing, convenience, and accessibility in practical use. Internet searches are performed in the appropriate color depending on the software, applied algorithms, and search engines/services [2, 4, 5, 12]. Internet searches and the University Repository are performed by licensed and freely available software such as some desktop plagiarism software. Articles in professional journals and abstracts are checked using the software Plagiarism Detector Pro, AdvegoPlagiatus, if necessary, checking small English-language texts (for quick additional examination of abstracts, annotations, etc.) with additional involvement of resources from other Internet services. Dissertations and abstracts are checked by shingles (by the method of shingle text breakdown) using the software Unichek, StrikePlagiarism, Plagiarism Detector Pro, and Viper. The result of the initial check was subject to additional detailed semantic and cross-technical analysis for quantitative and qualitative monitoring of rewrites and replications, textual characteristics of the identified matches, and adequacy of references to primary sources, including scientific publications of the author(s). The plagiarism search is performed using the index of the largest search engines, which adequately determines the percentage of text uniqueness about various Internet sources. For the primary verification of textual educational and methodological works to detect academic plagiarism, an algorithmic logical functional sequence of anti-plagiarism examination “Plagiarism Detector Pro”, etc. with further separate checking and determination of the percentage of text uniqueness by the freely available program "AdvegoPlagiatus, versions 1.3.1.7., 1.3.3.1., 1.3.3.2". Plagiarism Detector Pro program, which also has the function of examining
presentations in .ppt and .pptx formats without the need to convert them to other formats. In total, over the five years, 7987 checks and the development of general competencies in the correct management of information when working with primary and secondary information resources and intellectual property; publishing on the websites of Danylo Halytsky Lviv National Medical University (LNMU) periodicals a statement of ethical standards of reviewing and publishing; instructions and procedures and measures to form an aversion to academic dishonesty; creating conditions that make academic plagiarism impossible. Plagiarism was found in 885 papers, which was the basis for their rejection. Academic integrity and the code of academic ethics, as a set of standards in relations and as a certain social ideal, should actively counteract the excessive commercialization of universities, plagiarism, and deviant pseudoscience, which distort not only the social and pedagogical missions of the university community but also call into question the feasibility of their further activities [3-5]. According to part of the Law of Ukraine "On Copyright and Related Rights", legal protection extends only to the form of expression of a work and does not apply to any ideas, theories, principles, methods, procedures, etc. The justification of the scope of free use of another's work may vary, and therefore it is difficult to say whether a violation has occurred based on the nuances in the Law. After the implementation of preventive measures, the number of auto plagiarism and replications in the scientific works of applicants decreased from 14.8% in 2020 to 10.3% in 2023, which indicates the positive impact of the implementation of these measures, the creation of specialized training programs and the updating of methodological recommendation a negative phenomenon is an increase in the number of auto plagiarism among teachers from 9.75% in 2020 to 12.2% in 2023 (p≤0.05), which requires further research to find effective preventive measures, as well as the development of a repository (electronic depository) of scientific works as a source of free access to scientific materials and promotion. The certification of applicants, lies with the Vice-Rector for Research, the person responsible for ensuring the activities of specialized academic councils for the award of doctoral degrees [3, 4, 6-8, 10] and the employee of the research department responsible for the initial automatic verification of scientific texts and dissertation materials [1-3, 8, 9, 12]. The Code of Academic Ethics provides for adequate sanctions and administrative measures for academic dishonesty [4, 6, 9-12] and plagiarism by decision of the Ethics and Academic Integrity Commission [6, 8-11]. The best research papers of applicants, including those submitted via remote communication with a moderator (including a supervisor, head of a course or department, head of a laboratory, and/or a
structural unit of the university) are subject to discussion at scientific conferences and may be presented for public presentation (including at professional conferences) and publication in university and other scientific journals. It is important to familiarize academic staff, researchers; responsibilities of promoting academic integrity, compliance with ethical behavior, including preventive measures against academic plagiarism are primarily delegated to autonomous public collegial expert advisory bodies of the LNMU: the Student Agency for Education Quality Assurance. The technologies of "personal accounts" StrikePlagiarism, Unichek, and other licensed and freely available software, in particular, Plagiarism Detector and Advego Plagiarism; comparative and semantic analysis was performed using the licensed software Plagiarism Detector Pro, in repositories – after conversion to a text format – using AntiPlagiarism.NET, freely available programs AdvegoPlagiatus and ETXT Antiplagiarism, in case of doubtful results was carried out a second software examination in compliance with the principle of not exceeding 30% of the maximum coincidence of text data. Doubtful results of the anti-plagiarism resource check determine some methodological recommendations, the amount of material presented, technical aspects of time optimization, and economic factors.

Conclusions. The article considers some theoretical and methodological anti-plagiarism principles in the context of the implementation of complex scientific research, objectification of the quality results of research presentation in professional and other scientific journals. The task of plagiarism prevention and examination is to struggle of academic plagiarism, to determine the percentage of the text uniqueness stated by specialized software that are constantly improved and become more effective. The task of the code of academic ethics and other program provisions in a medical university is to establish ethical standards and optimal relations in the academic environment, to establish the basic principles of academic behavior that all members of the university community must follow in the context of laying the basic foundations of knowledge about the key principles, methodology, and measures to implement and ensure academic integrity and high professional standards, preventing violations of academic integrity, adherence to the principles and generally accepted norms of ethical behavior, counteraction principles and detection of academic plagiarism in accordance with higher education standards. The result of the plagiarism examination was subject to additional analysis for the presence of rewrite and replication (duplication), the adequacy of references to primary sources, including author's scientific publications. In case of doubtful results was carried out a re-validation (second validation) software examination in compliance with
the principle of not exceeding 30% of the maximum coincidence of text data. It is important to familiarize academic staff, researchers, and students of the university with the documents that determine the prevention of violations of academic ethics and establish liability for academic plagiarism, which are necessary prerequisites for expanding the capabilities and increasing the validity of anti-plagiarism expertise in the context of improving scientific communication and implementing the principles of academic integrity, specify the procedure for considering appeals, applying preventive measures and sanctions for violations of academic integrity.

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