

## SCIENTIFIC INTEGRITY FOSTERING IN THE COURSE OF TERTIARY EDUCATION

## ВИХОВАННЯ АКАДЕМІЧНОЇ ДОБРОЧЕСНОСТІ В ПРОЦЕСІ ЗДОБУТТЯ ВИЩОЇ ОСВІТИ

*The article deals with fostering scientific integrity requiring a profound understanding and a multifaceted approach. The whole process is regarded as a mechanism for consensus on scientific integrity standards that can be used broadly across scientific disciplines enabling scientists to carry out their R&D activities more efficiently in a rapidly changing research environment.*

*The article is aimed at considering and analyzing the main issues of academic integrity as well as substantiating the importance of the latter and its fostering in the course of tertiary education by incorporating such fundamental principles as professional values, information security, etc. into the curricula of the would-be R&D specialists.*

*The very notion of academic integrity includes such principles as honesty, scrupulousness, transparency, independence, respect towards colleagues, responsibility towards society etc.*

*University students are involved in this or that kind of research directly related to curricular activity comprising laboratory experiments, course works, graduation projects, seminars and individual tasks such as reports, analytical reviews, oral presentations etc. from their first year of studies. Hence, scientific integrity should be part and parcel of the learning process in the course of obtaining tertiary education. Its main principles must be regarded, analyzed and integrated into all professionally oriented disciplines and research related activities performed by university students. It is also very critical to understand in what way academic institutions can foster a research integrity culture and accountability among their faculty, staff and students.*

*Thus, the would-be specialists, scientists and researchers should get acquainted with salient principles of scientific integrity from the very beginning of their studies, adhering them in all kinds of their curriculum activities in order to be able to meet all the standards and requirements of the International academic and research community and to successfully cope with all the challenges of modern science.*

**Key words:** *scientific integrity, tertiary education curricula, professional values, information security, scientific misconduct.*

*Стаття присвячена вихованню наукової доброчесності, що вимагає глибокого розуміння та багатогранного підходу. Весь процес розглядається як механізм*

*досягнення консенсусу щодо стандартів наукової доброчесності, які можна широко використовувати у навчальних дисциплінах, пов'язаних з різними галузями знань, що дозволить науковцям ефективніше виконувати свою науково-дослідну діяльність.*

*Стаття має на меті розглянути та проаналізувати основні положення академічної доброчесності та обґрунтувати важливість її виховання у процесі здобуття вищої освіти шляхом інкорпорації таких засадничих принципів як професійні цінності, інформаційна безпека, у робочі програми навчальних дисциплін фахового спрямування для майбутніх спеціалістів, дослідників та науковців. Саме поняття академічної доброчесності включає наступні принципи: чесність, скрупульозність, прозорість, незалежність, повага до колег, відповідальність перед суспільством тощо. Студенти університету залучаються до тих чи інших досліджень, безпосередньо пов'язаних з навчальною діяльністю, яка включає лабораторні експерименти, курсові роботи, дипломні проекти, семінари та індивідуальні завдання, такі як доповіді, аналітичні огляди, усні презентації тощо, з першого року навчання. Отже, наукова доброчесність має бути невід'ємною частиною процесу навчання під час здобуття вищої освіти. Її основні принципи необхідно враховувати, аналізувати та інтегрувати в усі професійно орієнтовані дисципліни та дослідницьку діяльність, яку виконують студенти університету. Також дуже важливо розуміти, яким чином навчальні заклади можуть розвивати культуру наукової доброчесності та відповідальності серед своїх викладачів, співробітників і студентів.*

*Таким чином, майбутні спеціалісти, науковці та дослідники повинні ознайомитися з основними принципами наукової доброчесності з самого початку навчання та дотримуватись їх у всіх видах своєї навчальної діяльності, щоб мати можливість відповідати стандартам і вимогам міжнародної академічної та наукової спільноти і викликам сучасної науки.*

**Ключові слова:** *академічна доброчесність, навчальні програми вищої освіти, професійні цінності, інформаційна безпека, наукова містифікація.*

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**The problem being regarded:** Scientific integrity should be part and parcel of the learning process in the course of obtaining tertiary education. Its main principles must be regarded, analyzed and integrated into all professionally oriented disciplines and

research related activities performed by university students.

**Research and publications review:** Jordan Richard Schoenherr (Department of Psychology, Carleton University, Ottawa, ON, Canada) claims that

'research methods textbooks used to support these courses do not appear to address the issues of scientific integrity in a comprehensive or consistent manner. This leaves the responsibility for scientific integrity education in the hands of individual instructors, supervisors, and mentors' [1].

A Scientific Integrity Consortium put forward a set of principles and best practices for scientific integrity reflecting the results of the joint efforts of both US and Canadian government agencies representatives as well as professional societies, universities, and non profit scientific organizations members [2].

The Netherlands Code of Conduct for Research Integrity as the guiding principle for its integrity policy (1 October 2018) distinguishes five principles which are regarded as 'virtues' of a good researcher, guiding them towards the right choices in all kinds of circumstances': (1) Honesty; (2) Scrupulousness; (3) Transparency; (4) Independence; (5) responsibility [4].

Besides honesty, Code of conduct for scientific integrity (2021) by Swiss National Science Foundation also includes accountability, respect towards colleagues and responsibility towards society to the list of high ethical standards concerning scientific integrity which is treated as a key basic requirement [5].

**Issues requiring further consideration.** Since 'much of the scientific integrity curriculum is necessarily implicit <...> a more *explicit* treatment of scientific integrity issues should be pursued' [1] and incorporated into academic disciplines students major in.

**The aim of the article.** The article is aimed at considering and analyzing the main issues of academic integrity as well as substantiating the importance of the latter and its fostering in the course of tertiary education by incorporating such fundamental principles as professional values, information security, etc. into the curricula of the would-be R&D specialists.

**The main body.** Recognizing the fact 'that work on scientific integrity policies has proceeded for several decades and yet the scientific community continues to experience periodic lapses in this area' [2] a Scientific Integrity Consortium treats scientific integrity according to the definition provided by R. Nek and A. R. Eisenstadt in the 'Review of federal agency policies on scientific integrity' [3]. It reads as follows: 'the condition that occurs when persons... adhere to accepted standards, professional values, and practices of the relevant scientific community... Adherence to these standards ensures objectivity, clarity, and reproducibility, and utility of scientific and scholarly activities and assessments and helps prevent bias, fabrication, falsification, plagiarism, outside interference, censorship and inadequate procedural and information security...' [3, p. 11].

Truth, trust and integrity are very important to research at higher educational institutions. C. Whitbeck expresses it in such a way: "Scientific research, like other cooperative endeavors, requires trust to

flourish". [6, p. 411] C. Whitbeck does not support blind trust, but backs N. Luhmann's [7, p. 94] concept of "warranted trust and trustworthy behavior" to foster permanent trust and cooperation.

Four concepts have been taken into consideration as being of theoretical importance, namely research integrity, research ethics, fostering and institutional policies [8]. In the case of defining the notions of research integrity and research ethics P. Cosette gives definitions of the concept that are used synonymously. Lapses in ethics are the same as lapses in integrity, he points out. He divides them into two types, namely, fraud and violation of standards of scientific conduct. He writes: "any deliberate conduct that goes against the more or less explicit rules that a community of researchers has agreed on at a specific point in time concerning the behavior to adopt when preparing or publishing the results of a research project" [9, p. 215].

A conceptual model has been developed that includes the elements that are present in institutional policies to foster research integrity. This model consists of the following three elements:

- (a) the researchers' accountability to their scholarly community;
- (b) their actions, behavior and inclination with regard to their planning, proposing, conducting and disseminating of research;
- (c) and the extent to which the aforementioned meet the values, principles and standards as determined by their constitutional, regulatory and scholarly imperatives.

For the purposes of this conceptual model, the following four characteristics of good policy are pivotal:

- (1) clarity in purpose and outcomes;
- (2) alignment with organizational direction (vision, mission and values);
- (3) clarity of accountability;
- (4) enforceability by means of clear sanctions.

With regard to the fostering of research integrity these policies demonstrate the good characteristics of good policy:

- Enhance normative evaluation of research.
- Foster a change in researchers ethical inclination with regard to research.
- Be implemented through the support of adequate institutional resources.
- Provide for adequate distance between the regulator and the regulated.
- Enhance and not inhibit research.
- Not unreasonably constrain researchers.
- Enable Research Ethics Committees to make sound ethical decisions about particular research projects and consequently avoid inability to improve the ethical quality of social science research.
- Clearly legitimize the jurisdiction of Research Ethics Committees.
- Adequately limit any negative consequences of ethical review.

– Clarify and assure the needed expertise of committee members.

– Establish a common ground on what is regarded as ethical within diverse contexts [8].

Coming back to the Consortium we should say that wide range of scientific disciplines and fields the Consortium participants belong to, their broad representation (scientists, scientific integrity officers, presidents of professional scientific societies, etc.) and their responsibilities concerning scientific integrity have proved to be quite beneficial in achieving the main goal i.e. fostering scientific integrity with a profound understanding using a multifaceted approach. The developed recommendations are regarded as a mechanism for consensus on scientific integrity standards that can be used broadly across scientific disciplines enabling scientists to carry out their R&D activities more efficiently in a rapidly changing research environment.

University students are involved in this or that kind of research directly related to curricular activity comprising laboratory experiments, course works, graduation projects, seminars and individual tasks such as reports, analytical reviews, oral presentations etc. from their first year of studies.

It is also very critical to understand in what way academic institutions can foster a culture of research integrity and accountability among their faculty, staff and students. Here are some tips and guidelines:

– first clearly define what makes up research integrity and accountability, and what are the ethical principles and standards that rule academic research. This can be done through policies, models of behavior, different teaching programs, and campaigns that deal with topics such as authorship, peer review, data investigation, rivalry, competitions and ethics of research.

– The second step is to provide aid for the researchers. This is related to such categories as organizational structure and facilities, funding, governance and cooperation.

– The third step is to cause openness and transparency in research processes that can foster cooperation and innovation.

– The fourth step is to create and practice successful mechanisms for analyzing the cases of research misbehavior and fraud, as well as thinking over appropriate punishment and corrective measures.

– The fifth step is to learn from practical experience and challenges in promoting a culture of research integrity and accountability.

– The sixth step is to come into contact with society in fostering a culture of research integrity and accountability.

This can mean different sorts of consultations with funders, publishers, scholars, students, media, and the public, clarifying the needs of society, as well as

the risks and advantages of the changing research environment [11].

Besides, all institutions should have an obligation to promote research integrity. Academies promote quality and interest in science and scholarship. Universities and research performing organizations have a special responsibility for training students in good research citizenship. Funding organizations should encourage good research practices. Science journals and magazine editors are obliged to detect fraudulent behavior before publication. ESF Members of Forum on Research Integrity put forward the ideas that early preventive measures to raise awareness among scientists of research integrity should be treated as part of curricula. After studying all the documents of different organizations it was proposed that the coherent research integrity governance structure should:

- Protect the idea of 'mutual trust', important for research collaboration;
- Create common standards for all scientific community;
- Protect scientific individuals and organizations;
- Empower public confidence in the research procedure [10].

The most important challenge and the guiding thought in developing a framework structure of the research integrity governance structure is that these structures should be flexible and compatible in different settings yet preserve all the main rules and regulations. So the initial step should identify and adopt the main elements expressed in the European Code of Conduct.

Thus, to sum up we can say that proper research should be based on trust between research colleagues and between academic institutions and industry, and the trust of the public and policy makers in the research community. Trust in science and scholarship needs to be a priority for all nations and institutions. Protecting research integrity, without stifling research creativity, is a constant learning process. There is no universal framework for research integrity governance, it has to be flexible though based on legal laws and regulations.

**Conclusion.** The would-be specialists, scientists and researchers should get acquainted with salient principles of scientific integrity from the very beginning of their studies, adhering them in all kinds of their curriculum activities in order to be able to meet all the standards and requirements of the International academic and research community and to successfully cope with all the challenges of modern science.

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