

Expanding Ethical Education Through Neuroethics

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ABSTRACT

The article substantiates the necessity of teaching neuroethics in the system of Russian higher education. Neuroethics is considered as a section of bioethics, which uses its theoretical base: principles and rules, a conceptual thesaurus. The main trends in ethical education in the aspect of the spread of bioethics as a type of applied ethics are analyzed. The disciplinary problem-oriented structure of neuroethics is presented. On the example of a thematic block devoted to neuroimaging, a list of basic questions for study is compiled. Additional ethical issues that are significant for biomedical, technical, legal, psychological and pedagogical areas of vocational training are highlighted.

Keywords: *neuroethics, ethical education, bioethics, engineering ethics, digitalization of education, neuro-education, problem-oriented approach in education*

1. INTRODUCTION

1.1. The problem and its relevance

The modern level of development of science and technology has a huge transformative potential: the conditions and nature of the existence of human communities, man himself and the world as a whole are changing. Fundamentally new moral and ethical conflicts arise as well as ethically controversial precedents. Moreover, the results of moral choice are global in nature and therefore need a critical humanitarian assessment. Along with the capabilities of man, his responsibility for actively interfering in the natural course of things increases, especially since such an intervention is always ambivalent. In this regard, ethical competencies have acquired great importance in education. Both in private life and in professional activity, a modern specialist must understand the value foundations of moral conflicts, must know the ethical content of various aspects of his activity, and be capable of responsible moral choice. So, a bioethics course was introduced into the training programs for biomedicine researchers and medical workers, which brought polemic discourse to universities about how to determine the boundaries of the manipulation of human life and death in modern biomedical knowledge and practice. Further, in the context of the rapid development of biomedical technologies, new directions of ethical reflection and regulation were introduced into bioethical education in the areas of research, assisted reproductive technologies, genetic mapping and editing,

transplantology, the application of resuscitation procedures, the introduction of remote communication methods between a doctor and a patient, etc. To prepare specialists in engineering and technical areas, the requirements for competence in the field of professional ethics have also taken shape. Experts from accreditation agencies and professional engineering associations assess the engineer's readiness to follow the code of ethics [1]. A number of US universities have introduced engineering ethics courses in the training system for their specialists, and most often this is implemented in the format of a situational analysis (case study) [1]. The relevance and diversity of ethical education increased in proportion to the complexity of the technosphere and the corresponding diversification of moral issues [4].

Since the end of the 80s of the XX century, a neuro-trend began to take shape in science. Within its framework, studies of the brain were not simply continued, but they began to focus on the technology and widespread practical use of the results of neuroscience not only for medical purposes, but also where the impact on human consciousness and behavior opened up new perspectives: in education and marketing, in politics and forensics, etc. Neuroethics emerged as part of this trend at the beginning of the new century, and today it has sufficient potential to be integrated into educational programs. Of particular relevance is the neuroethics training course for training specialists of any profile due to the following reasons: 1) neuroscience and neurotechnology are inextricably linked with digitalization processes in modern society [5]; 2) high importance is attached to the development of neurotechnologies and their implementation at the state level, as, for example, the directions of national technological initiatives testify: in Russia it is Neuronet

[6], the US national project is the BRAIN Initiative [7], and the national project in Japan is Brain / MINDS [8], Europeans launched the Human Brain Project program [9] and others; 3) neuro-gadgets and psychopharmacology are distributed in the consumer market, forming new social practices and changing familiar ideas about anthropological norms [10, 11]; 4) the educational process today demonstrates a clear commitment to the processes of digitalization, virtualization of the educational space, which fits into the contours of neuro-education [12, 13].

The formation of effective ethical and legal regulators of new social processes and practices is a long process. Therefore, in a rapidly changing social reality, a willingness to reflectively work with ethical ideas and principles is an important condition for social stability. The main purpose of this article is to offer a methodological justification for education in the field of neuroethics. To achieve this goal, it is proposed to solve the following problems, which determined the structure of article 1) on the basis of an analysis of ethical education, highlight methodological approaches relevant to neuroethics; 2) to identify the structural components of neuroethics as a separate academic discipline or section of ethics; 3) to offer components in neuroethical education that are significant for biomedical, technical, legal and psychological-pedagogical specialties.

1.2. Study methodology

In our study, we rely on the belief that ethical education is necessary in a rapidly changing social reality. The theoretical basis of our study is the understanding of neuroethics as the application of the principles and arguments of bioethics to ethical, legal and social issues that arise in the context of neuroscience and neurotechnology. The specific content of neuroethics, which gives it an independent character, is due to the exclusivity of the subject of research and technological impact: we are talking about brain activity, consciousness, behavior and mental health of a person and society. Related to this is the particular complexity and prolonged nature of ethical issues.

Based on many years of experience in teaching ethics and bioethics for students of biomedical, psychological, legal and technical specialties, and the introduction of elements of neuroethics in their courses in recent years, we propose to consider methodological approaches to integrating neuroethics into educational modules of ethical education in higher educational institutions. The subject of analysis was various elements of bioethical and ethical education: training programs, competency sets, teaching and methodological aids, teaching methods, as well as colleagues' research on these issues. In the context of digitalization of education, online courses on bioethics and neuroethics and new opportunities for studying ethical issues related to their use were taken into account. In fact, digitalization, for example, in the form of distance education raises questions similar to those considered by neuroethics, the main of which are: how to protect

personal boundaries, how not to lose the moral and psychological advantages of a live contact between a teacher and a student. In addition, new technologies of digital learning can use the knowledge gained in the development and use of neurocommunicators and other neurointerfaces. Therefore, issues of neuroethics are relevant to digital education.

1.3. Our contribution

The article substantiates the introduction of a course of neuroethics in the system of Russian higher medical, psychological, pedagogical, legal and technical education and proposes the development of the structure of the educational discipline "Neuroethics".

2. RESULTS AND DISCUSSION

2.1. Methodological approaches in ethical education relevant to neuroethics

Clarification of the issue of modern trends in ethical education is of methodological significance. Traditionally, in Russia, ethical education was part of the philosophical training of students, which primarily focused on the formation of a scientific worldview. Here, ethics was seen as a compendium of ethical and philosophical theories and concepts. However, one should not forget that Aristotle, the creator of ethics as a science, attributed it to practical philosophy, emphasizing that it is needed to educate the virtuous citizen of the polis [14] [15]. In the digital age, this sounds like a requirement to educate a person who is responsible to society and future generations for the results of their activities and their choice. In the twentieth century, ethics, having survived unsuccessful attempts to create a meta-ethics that transforms moral maxims on the model of scientific judgments, seeks greater recognition as an applied ethics. Here, abstract philosophical ideas proved their relevance, as they were needed for argumentation in debates, at the center of which were the most difficult ethical dilemmas, for example, related to the legitimization of abortion and euthanasia, the death penalty, etc. [16]. New tools of ethical analysis have also appeared: a cultural specification of ethical problems, highlighting a variety of value judgments and moral positions, substantiating the moral justification of decisions and their influence on subsequent decisions [17], thought experiments in which the motives of moral choice were revealed [18], a multi-aspect analysis of moral conflicts [19], a critical and prognostic discussion to assess the long-term effects of technology, and many others related to the interdisciplinary nature of bioethics.

Ethical education in the field of bioethics, as one of the pioneers of applied ethics, has become not only a field for transmitting knowledge, but also a way to develop its methods. Bioethical education in the world began to

spread widely in the late 90s, when the necessary theoretical and methodological basis was accumulated for its disciplinary design. Another reason was the formation of a system of ethical control in biomedical research. Scientists, members of research groups needed to prepare for the submission of documentation to the Ethics Committees. Then it was required to organize courses, which included an overview of abuse and other negative and positive effects of scientific activity. It was important for the scientist to understand how to minimize harm, how to ensure the autonomy and voluntariness of research participants. Members of the Ethics Committees also needed training courses. These included familiarity with ethical assessment procedures. The introductory rationale for these procedures was related to material that received a general theoretical status in bioethical knowledge: a history of ethical regulation, a history of abuse in biomedical science, principles of bioethics, the rights of patients and research participants, the definition of basic concepts such as autonomy, confidentiality, informed consent, voluntariness, correlation of harm and benefit, equal access, safety, interest of populations, risk, its gradation and assessment, etc. A special impetus to the development of bioethics was given by the activities of the bioethics committee established at UNESCO. The promotion of bioethical education has become a priority in the activities of this organization, as a result a network of bioethics departments has been created under the auspices of UNESCO around the world. An important step was the development of a modular curriculum, as well as the organization of the periodic international conference "Bioethics, Medical Ethics and Medical Law", which this year is held for the fourteenth time [20].

We believe that neuroethical education can successfully develop under the "institutional branch" of bioethics. Moreover, the analysis of the formulation and discussion of the problems of neuroethics obviously gravitates toward the use of its approaches. Firstly, the teaching of neuroethics can be implemented in the language of fundamentalism, which makes up the theoretical thesaurus of bioethics. Fundamentalism in bioethics includes the requirements to respect autonomy, not to harm, bring benefits, strive for an equitable distribution of the burdens and benefits that new knowledge and technologies bring, observe caution and responsibility, assessing their consequences, uphold the right to privacy, respect the integrity of the individual. The principle of autonomy is used in the formulation and discussion of the problems of neuroimaging, not only as a diagnostic technique in medicine, but also in marketing, in understanding the connection of this method with methods of monitoring a person using neural networks. The unity of the diagnosis of neuro- and psychophysical parameters in order to identify the person and obtain information about feelings, preferences, readiness for any actions, actualizes the appeal to the confidentiality rule worked out for relations regarding medical secrets in medicine. It turns out to be important for discussing the confidentiality of the inner world of a person when they use neuroimaging and neurointerfaces [22]. The principles of bioethics will have

to be adapted in neuroethics, since it is necessary to keep in mind the orientation of bioethics mainly on somatic aspects relevant to biomedical practice. In neuroethics, the assessment of impacts on mental aspects additionally calls for the principle of respect for the integrity of the individual, understood as a unique psychophysical unity that ensures its identity, which is of moral value and needs protection. In this vein, neuroethics discuss human rights to psychological continuity and mental integrity [23].

The second important approach is the need for neuroscientific education: acquaintance with modern results of scientific knowledge in the field of brain research and psychophysiology at a sufficient level for an informed discussion. This is necessary in view of the spread of myths and fictitiousness around new data in neuroscience [24]. The level of awareness that one needs to strive for can be defined as a level that surpasses the popular exposition, but is less detailed and more accessible than the professional one.

2.2. Structural components of neuroethics

For neuroethics, we offer a problem-oriented structure, the elements of which are individual topics localized in the areas of research and effects on the human brain. A theoretical introduction should precede the consideration of individual problems: familiarity with moral categories and ethical principles. The designated thematic blocks can be addressed to all trainees in various areas of professional training. But they can acquire specific content and accents in accordance with the professional requests of future doctors, lawyers, engineers, educators and psychologists. (1) The first thematic block is recommended to be devoted to ethical issues related to modern methods of brain research, primarily with various methods of neuroimaging. This requires the problematization of world-meaningful conclusions about the very possibility of "peering" with the help of neuroimaging into the conscious and unconscious aspects of cognitive activity, and a critical analysis of the widespread use of neuroimaging in law, in education, in marketing, etc. [25] (2) In the second block, it is recommended to consider ethical problems associated with real and potential practitioners of neuropharmacology, paying particular attention to the problems of pharmacological non-therapeutic "improvement" of cognitive and emotional states. (3) The third block examines the ethical problems of using brain-computer neural interfaces. (4) The fourth thematic block should be devoted to a critical analysis of the phenomena of an emerging neuroculture: from neuromyths and neurogadgets to neuro-education and neural networks that enter our lives and change moral and social orders. Ethical issues related to the digitalization of the education and thinking of students should be reflected in this block.

Ethical problematization is the formulation and search for answers to a number of questions related to understanding the significance of principles worked out in bioethics: justice, respect for autonomy, refusal to cause harm and the pursuit of benefit, recognition of the right to

confidentiality, etc. As an example, we give questions related to neuroimaging. Is there an invasion of personality space during neuroimaging? Can this method reliably describe what a person thinks and feels? Is it ethical to use the reading of brain waves for various purposes: a) to identify a person, b) to diagnose his psycho-emotional state, c) to identify his abilities, d) to identify his predisposition to a certain type of behavior, e) to determine the measure of guilt and responsibility when committing a crime, etc.? Is it possible to use neuroimaging to learn about the ethnic, gender, racial characteristics of people? What is psychoneurogenetics and how are neuroimaging data used by genetics, neurologists and psychophysicologists? What should a volunteer involved in neuro research be informed of? New questions may arise that will arise in the discussion of those listed.

2.3. Discussion of certain aspects of neuroethical education for biomedical, technical, legal and psychological-pedagogical specialties

The presented thematic blocks form the framework of the discipline “neuroethics”, which is equally important for specialists of different profiles and areas of professional training. They introduce the main vectors of development of the modern neuro-trend and pose important questions related to the assessment of the social, moral and legal consequences of this trend. At the same time, for certain specialties, this framework should be supplemented with topics and more specific issues of quite practical interest. So for specialists in biomedical profile, issues related to the confidentiality of the survey and the conditions for disposing of the information received are important, which requires an answer to the question: who is the “owner” of the information received from the brain: patient, researcher, medical institution? The very status of information obtained using neuro-methods needs further clarification: do these data differ from the usual results of laboratory tests? The question of what should be informed to the patient in order to obtain his informed consent is ethical accentuation, especially if the patient is a representative of vulnerable categories, for example, a child, or a patient with a neuropsychiatric diagnosis [26]. Specific will be the assessment of iatrogenic effects from neuroscopy procedures and interventions in brain activity, for example, as is the case with transcranial brain stimulation. An important issue is the validity of examinations for the patient in cases when it is carried out for the purpose of training or obtaining data for scientific research. High-precision neuroimaging, for example, with fMRI, is still an expensive procedure, therefore, questions about its accessibility to patients and the ratio of costs and the benefits received by them will be significant.

Neuroimaging clearly demonstrates how to overcome personal boundaries and violate the integrity of the human inner world. For future lawyers, forensic experts,

psychologists, and teachers, the topic of detection of lies and determination of guilt and responsibility using neuroimaging is important [27]. Future psychologists and educators also need to understand the ethical viability of various neuropsychological diagnostic procedures using this method. For example, they should be familiarized with ethical issues that arise when using data on the connection between the perception of information and the effectiveness of training, which underlie a new direction in pedagogical science, neuro-education. How and from whom is it necessary to obtain consent to receive such data from a child, and who has the right to access it? Should such data be guided by the organization of the educational process, for example, by assigning children to special groups, or deliberately limiting the methods used for pedagogical work? Could such a practice of “brain sorting” lead to stigmatization, increased bullying at school? Will the diagnostic procedure itself cause mental harm to the child [28]?

It will be useful for technical education representatives to understand more deeply the ethical consequences of the development and application of various devices that are used to “communicate” with the brain: neurocommunicators and other neural interfaces. On the one hand, neurointerfaces can improve the treatment of traumatic brain injuries, paralysis, epilepsy or schizophrenia, provide the possibility of at least minimal communication with paralyzed people and in the so-called “locked” state: with locked-in syndrome [29]. On the other hand, such technologies can later be used for other purposes, including for unauthorized “penetration” into the cogito sphere or the transmission of thought from a distance, which will affect assessments of a person’s capabilities, cause social inequality and give corporations and state structures new ways of exploitation and manipulation of people. The various effects of the development of neurotechnologies should be evaluated and the positive goals of the developers should be paid tribute to. Therefore, the order of the questions is important. For example, the first question to be asked is whether neural interfaces pose a threat of direct influence on human thoughts and actions? And further focus on identifying which ethically vulnerable consequences non-verbal commands have to control through the neuro-interface.

3. CONCLUSION

In bioethics, methods of multilateral discussions have been long and firmly established, in which representatives of various value orientations, doctors, scientists, ethics experts, law and other interested parties express their positions on ethical issues. The principle of involving spokesmen of different opinions and carriers of special knowledge about the subject of discussion for making a consensus decision is reflected in approaches to the formation of independent ethical committees designed to ensure the representation of diverse opinions. So, their composition should include not only experts who

understand the scientific side of the project being evaluated, but also authoritative people who can give a moral assessment, make an ethically balanced decision. For discussions on neuroethics, of course, it is also important to reproduce the scientific and social spectrum of opinions. It must be pointed out that ethical analysis in understanding the problems of neuroimaging, for example, will not only be a pronouncing of different opinions. The focus of attention should be shifted to assessing the discriminatory potential of the individual and protecting his mental integrity and integrity in the field of neuroscience, neurotechnology, neuro-education, etc. Thus, neuroethics should clearly articulate its regulatory nature. This is due to the fact that the institutional control by ethical committees over neuroscience studies, which are most often not associated with any serious risks for participants, turns into a formal procedure. Meanwhile, the proliferation of neurotechnologies in the consumer sphere, as well as with drug neuro-stimulators and neuro-gadgets, takes these technologies beyond the scope of biomedicine and makes institutional control over their use difficult. Today, ethical control is shifting to the individual sphere and is associated with a person's ability to carry out ethical reflection and make responsible decisions regarding the consequences and risks associated with the application of neuroscience and neurotechnology.

A methodological approach to ethical education that is relevant to neuroethics and meets modern tasks of maintaining social integrity has been developed in bioethical education. The combination of fundamentalism and discursiveness, enlightenment in the field of new neuroscientific knowledge and critical reflection on their practical use most closely meets the objectives of the training course in neuroethics. From this point of view, a problem-oriented structure of the course seems appropriate where problems are grouped around individual areas of research and the impact on the human brain. The task of forming a scientific worldview, which was solved by humanitarian training, today includes ethical competence, therefore it is necessary to expand ethical education aimed at a critical study of emerging issues in modern technologically advanced, digitized reality.

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