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## Modernization of theoretical and practical aspects of the development of higher medical education in Ukraine

### Modernización de los aspectos teóricos y prácticos del desarrollo de la educación médica superior en Ucrania

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Written by:

**Holomb Lyudmyla**<sup>74</sup><https://orcid.org/0000-0003-1864-4122>**Rogachevskyi Olexandr**<sup>75</sup><https://orcid.org/0000-0002-8063-258X>**Karbovanets Olena**<sup>76</sup><https://orcid.org/0000-0003-4429-7371>**Senkevych Olena**<sup>77</sup><https://orcid.org/0000-0002-7968-1202>**Vivsyannuk Volodymyr**<sup>78</sup><https://orcid.org/0000-0002-5192-6757>

#### Abstract

The coronavirus pandemic has become a challenge for national health care systems, a global problem that has accelerated the processes of reforming medical education in many countries. The purpose of the article is to analyze the modernization of theoretical and practical aspects of the development of higher medical education in Ukraine. The research uses general scientific (analysis, synthesis, deduction and induction) and specialized methods (prognostic, axiological). The results trace the transformation of the state regulation of higher medical education, the use of research methods in education, the use of modern teaching methods aimed at making the medical education sector in Ukraine more efficient. It has been proven that transformations in higher medical education were hampered due to a lack of funding. During 2015–2017, the first changes occurred: the "KROK" testing system, based on American samples was implemented. The latest teaching

#### Resumen

La pandemia de coronavirus se ha convertido en un reto para los sistemas nacionales de salud, un problema global que ha acelerado los procesos de reforma de la educación médica en muchos países. El propósito del artículo es analizar la modernización de los aspectos teóricos y prácticos del desarrollo de la educación médica superior en Ucrania. La investigación utiliza métodos científicos generales (análisis, síntesis, deducción e inducción) y especializados (pronóstico, axiológico). Los resultados trazan la transformación de la regulación estatal de la educación médica superior, el uso de métodos de investigación en la educación, el uso de métodos modernos de enseñanza dirigidos a hacer más eficiente el sector de la educación médica en Ucrania. Se ha demostrado que las transformaciones en la educación médica superior se vieron obstaculizadas por la falta de financiación. Durante 2015-2017, se produjeron los primeros cambios: se implementó el sistema de

<sup>74</sup> Asistent Head of the department of microbiology, virology and epidemiology with the course Infectious Diseases Medical Faculty State University «Uzhhorod National University», Ukraine.

<sup>75</sup> Chief of Department, PhD professor of economics, PhD of medicine Department of simulation medical technologies Odessa National Medical University, Medical Faculty №1, Ukraine.

<sup>76</sup> Associate Professor, Candidate of Pedagogic Sciences (Ph.D.), docent Uzhhorod National University, Faculty of Medicine, department of microbiology, virology and epidemiology with a course of infectious diseases, Ukraine.

<sup>77</sup> assistant professor (MD) Department of Pediatrics № 2 Danylo Medical Faculty No.2, Halytsky Lviv National Medical University, Ukraine.

<sup>78</sup> Candidate of Medical Sciences, assistant department of Internal Medicine, Higher Educational Institution of Ukraine «Bukovinian State Medical University», Ukraine.



methods, updated in recent years, are also actively implemented in teaching practice. In the conclusions, it is noted that in the future, employers should play a more active role in the formation of educational programs, as is customary in the leading countries of the world. In Ukraine, due to the aggression of Russian troops and the destruction caused by them, the further commercialization of medical education may become an important trend for further development.

**Keywords:** modernization, theory, practice, higher medical education, Ukraine.

### Introduction

The quest to update medical education is urgent because of the rapid spread of the coronavirus pandemic around the world. The new challenges of declaring a global quarantine, finding and producing vaccines, and other treatments have entailed the emergence of updated training methods for specialists. The COVID-19 problem has re-presented the prestige of medical work, so even in Ukraine, university education in this field has interested a considerable number of potential entrants (although medical professions have traditionally been in steady demand). At the same time, the experience of training specialists has become the foundation stone for the formation of medical systems in many countries. Ukraine in this respect has been on the margins of similar trends for a long time, as healthcare reform has been extremely protracted in time, the traditional lack of funding has significantly narrowed the possibilities for improving the professional training of future specialists. In addition, the ability to join already applied programs and the use of their own experience shows the promise of similar endeavors. The main directions of such structural transformations are relevant problems for the study because on the basis of their consideration it is possible to form specific proposals.

The article aims to analyze the modernization of theoretical and practical aspects of higher medical education development in Ukraine. When considering this issue, smaller aspects are highlighted, the study of which allowed to generalize certain results and summarize the results. We are talking about changes in the state-regulatory aspect of higher medical education, the organization of research work as an element of modernization, the use of the latest teaching methods capable of changing the medical

pruebas "KROK", basado en muestras americanas. Los últimos métodos de enseñanza, actualizados en los últimos años, también se aplican activamente en la práctica docente. En las conclusiones, se señala que en el futuro, los empleadores deben desempeñar un papel más activo en la formación de los programas educativos, como es habitual en los países líderes del mundo. En Ucrania, debido a la agresión de las tropas rusas y a la destrucción causada por ellas, la mayor comercialización de la educación médica puede convertirse en una tendencia importante para el desarrollo futuro.

**Palabras clave:** modernización, teoría, práctica, educación médica superior, Ucrania.

education industry in Ukraine. We should note that the proposed analysis is of additional importance due to the absence of similar studies in Ukrainian medical science: against the background of the pandemic and the deployment of the Russian army aggression, the ways of reforming the medical industry may be an important material for European and American scientists to study.

### Theoretical Framework or Literature Review

The scientific understanding of the role of medical education has been active since the end of the twentieth century. The problem of reforming or modernizing the educational process in medical educational institutions was mainly of interest to European authors. However, the problem of reforming or modernizing the educational process in medical educational institutions was mainly of interest to European authors. In particular, Custers & Cate (2018) highlighted the problem of modern medical education through a historical prism. However, these authors conclude in their article that "given the high cost of medical care today and the increasing demand for patient safety and teaching effectiveness, the continuation of historical models of non-standardized practices will no longer be possible. Efforts are needed to limit, restructure, and individualize training and licensure times to optimize training, both in the United States and Europe" (Custers & Cate, 2018, 49). At the same time, Ayaz & Ismail (2022) characterized the main innovative technologies to be used in medical education. They focused on the problem of integrating simulation technology into training programs. Ayaz & Ismail (2022) believe that "this technology will become important in medical education by providing the

means to practice and teach under the supervision of qualified facilitators” (p. 301). The outbreak of the Covid-19 pandemic has led to a new rethinking of previously accepted concepts. Distance learning began to take center stage in the educational process. A lot of new author's concepts of rethinking modern education appeared in scientific literature, the authors began to focus on the analysis of the effectiveness of distance education and its reorganization. In particular, Laufer et al. (2021) characterized the features of the implementation of distance models in the field of education. In addition, Lekic et al. (2019) investigated the impact of evidence-based medicine on learning and decision-making in medical practice through the lens of contemporary globalization issues. Roberts (2020) explored the impact of COVID-19 on the development of medical education and outlined how medical teaching competencies will help overcome the coronavirus outbreak. Specifically, he believes that higher medical school should incorporate last-year medical student volunteers into practical clinical services during a pandemic as “medical assistants”. This would improve not only the practical skills of the latter but also help to increase the staffing of medical institutions. Also valuable to this study are the findings of educational authors who have generally studied a variety of educational innovations. In particular, Demiray (2017) investigated the characteristics of the implementation of distance education, which are also relevant to the current development of the medical industry. Pinheiro & Santos (2022) characterized the potential development of distance education and analyzed the use of various modern E-learning platforms. At the same time, Ungerer (2019) also investigated the specifics of the use of open-distance e-learning platforms.

So, as can be seen from the analysis of the literature, many European authors were interested in the problem of modernization of the educational process in the field of medicine. Their developments serve as a valuable foundation for this study. Taking into consideration the European experience of medical education reform, we can characterize the possible prospects of medical education development in Ukraine through both theoretical and practical planes.

### Methodology

When writing this work, both general theoretical (logical) methods of research and special pedagogical methods were used. Among the

general theoretical methods, we will distinguish analysis, synthesis, induction, and deduction. The method of analysis involves the division of the subject of research into certain parts (coverage of scientific understanding of the problem, characterization of the main transformations in medical education in Ukraine through the prism of state-regulatory aspect, etc.). At the same time, the method of synthesis implies combining the above-mentioned selected parts. Such methods as abstraction and concretization are also used in the work. The principle of abstraction implies the study of general theoretical problems. At the same time, based on using the method of concretization it was possible to study the problem of changes in medical education in Ukraine based on the analysis of the main state-regulatory mechanisms. Among the special pedagogical methods, we shall single out observation, prognostic and axiological methods of research. In particular, by means of the prognostic method of research, it was possible to forecast the main vectors of development of medical education in Ukraine in the future. The axiological method of research assumes the highlighting of the main values and reference points of the medical education system of Ukraine. Based on systematic method of research the field of medical education is considered as a complex system consisting of many components, and the research of some of them are the key task of this work. Additional methods of research are systemic, functional, comparativists methods. At the same time, the main empirical data of this study are materials of the Ministry of Education and Science of Ukraine, the Ministry of Health of Ukraine. Analysis of the data is a valuable source for the article. Consequently, this work is based on the principles of consistency, objectivity, retrospective, and scientific.

### Results and Discussion

The system of Ukrainian medical education since the end of the XX century is still in search of new ways of modernization and reforming. The system of Ukrainian medical education by the end of the XX century is still in search of new ways and methods of modernization and reforming in accordance with the changes occurring in the history of the state and society, the requirements of the European Union on the quality of professional training, the direction of the introduction of new models of education. New challenges put new demands on the educational system to act effectively. For this reason, one of the main problems is the professional burnout of medical education specialists, which is a complex consequence. Outlining the key

objectives facing modern education, many scientists admit the optimal solution to this problem is to apply the principles of humanitarianization, to promote diverse individual (it is said about creative, cultural) development of education applicants.

#### Changes in Medical Education: State-Regulatory Aspect

The need to reform the system of medical staff training in Ukraine has been discussed at the highest state level. In particular, an important function of the Ministry of Health of Ukraine is to establish requirements for quality control of professional training of medical and pharmacological specialists. Specialists of the state management of the medical industry found that a critical need is forming to improve the system of university training, its harmonization with the leading modern standards operating primarily in European countries and the United States (Lekic et al., 2019). Achievement of relevant indicators was considered in 2017-2018 a condition for the successful implementation of the reform of the whole industry, which was actively implemented. Expert interdepartmental working groups, which have been working for a long time on solving strategic problems of adapting national higher medical education to the leading standards of our time, have identified the main backbone areas of overcoming the current educational crisis and formed recommendations for short- and long-term development perspectives:

1. To organize and conduct a comparative assessment of the content of Ukrainian higher medical education in comparison with international standards, in particular those adopted in the United States. Assessment of the Ukrainian system of medical higher education based on the formation of generalized conclusions.
2. Reducing the number of students trained at the expense of the state budget. It is a question of gradually replacing quantitative indicators with qualitative ones - also by increasing the funding of higher medical education institutions.
3. The formation of more transparent conditions for the competitive selection of the best applicants, who in turn have demonstrated the best results in drafting, will allow the selection of truly talented students for the future medical profession.
4. Development of an incentive system for students, and employment of capable graduates in state medical institutions

(Roberts, 2020).

5. Establishment of unified requirements for the formation of professional competencies of graduates and teachers (Kelly, 2021).
6. Introduction of predetermined requirements for the final objective assessment of the level of theoretical and practical training of students and interns. We are talking about conducting an evaluation of their knowledge, skills, and abilities in front of an independent commission capable of assessing their competence (Kelly, 2021).
7. Ensuring the implementation of updated standards of higher education, reforming the state of educational and methodological support, and bringing it in line with modern requirements for highly qualified medical specialists, the introduction of modern treatment protocols, the introduction of high standards of diagnosis (Kem, 2022).

An effective consequence of the implementation of the proposed changes in practice was the assessment of compliance of the content of Ukrainian pregraduate and postgraduate medical education with international indicators in the field of physician training. To determine the professional level of undergraduates and interns, a system of annual licensing and integrated examinations "KROK" was introduced. In order to form the test tasks base, it was proposed to use, first of all, the American experience and use the USMLE (the United States Medical Licensing Examination) and IFOM (International Foundations of Medicine) test tasks. These tasks were developed by the United States National Board of Medical Examiners (NBME) and adapted to the current requirements of the medical industry, so they meet all the necessary criteria (Roberts, 2020).

The introduction of the KROK test system took place in 2017. The first results were an objective indicator of the vulnerability of the then-existing system of medical personnel training, the quality of educational programs approved by higher educational institutions in accordance with the program documents of the Ministry of Health of Ukraine. Unsatisfactory results of the first examinations demonstrated the need for acute reform of the management decision-making system, new program documents were developed, on which higher education in medicine would be based. According to the results of the evaluation of the graduates of higher education institutions, specific proposals were formed to change the basic provisions of the curricula for training students and interns. In fact, there was a gradual change in the working

value paradigm: from a focus on “learning” a considerable amount of information with limited application, the transformation was aimed at approving broad academic disciplines that had a practical orientation. The next direction of practical reform of medical education training was the increase in the cost of education, bringing it closer to European standards. Approximation of the approximate average cost of training of one medical specialist to the European standards allowed to improve the material base of universities and to accumulate certain funds for conducting their own medical research. We should also note that the foundations were formed of the relevant legislative framework aimed at the formation of motivational activity of young specialists after graduation from the master's degree and internship of higher educational institutions (Kelly, 2021). We are talking about employment guarantees in a particularly vulnerable area of medical protection of Ukraine - in rural areas. In particular, certain aspects of the demand for certain medical specialties in the labor market were investigated. The adopted Laws of Ukraine guaranteed certain social obligations to young specialists, who would continue to work in rural areas. For example, they spoke about providing housing for free use - the peculiarities of this process were regulated by a separate agreement concluded between the local authorities and a graduate of a higher medical school. It should be noted that together with additional funding these changes allowed to attract a certain number of young specialists to the implementation of the program.

In the future, we believe, the development of higher education in the medical sector will move to the next stage. We are talking about a broader adaptation of the requirements of educational programs to the realities of the market of services of the medical industry (Lekic et al., 2019). For example, the practice of introducing family physicians has positively shown itself. Despite all the criticism, the principle underlying the work of this medical “institution” (money follows the client) has led to positive results. Experienced family physicians due to their skills and knowledge were able to form a significant base of clients of medical services on a voluntary basis. The implementation of a policy in the medical field based on competitive democratic selection (when patients themselves determine which specialist to trust) will be the cornerstone for further transformations. Also, not only consumers of medical services, but also employers are interested in specialists of the highest category. The gradual introduction of insurance and fee-for-service medicine will be a

vector for the future development of this industry. Unfortunately, the Russian aggression against Ukraine resulted in considerable material losses, so in the future, the sphere of medicine will develop with a combination of paid and free services - in view of the devastation caused, the financing of social expenses will be reduced several times. Under such conditions, private clinics and other medical institutions (the number of which increased significantly during the COVID-19 pandemic) will be interested in employing well-trained specialists (Roberts, 2020).

Participation of stakeholders (employers) in the formation of the educational process is the reality of the European and American educational systems. Gradual transition to such system of training and formation of educational programs in Ukrainian reality was denied. At the same time, as the practice has shown, employers' advice deserves to be taken into account during training, since private medical companies, academic institutions of research direction interact more actively with global companies or other scientific institutions. Accordingly, their experience in training deserves to be taken into account.

Thus, government measures to improve higher medical education in Ukraine have had positive effects. It is true that the slow pace of their implementation, the partially biased criticism of their methods, the insufficient funding, and the outdated material and technical base create difficulties for subsequent transformations in the field of medicine. We believe that a more active cooperation of higher educational institutions and potential employers will speed up this process and find the necessary financial, methodological, and human resources for its subsequent continuation.

Organization of research work as an element of modernization

Notable importance for the modernization of practical activities of students of higher medical institutions is research work (hereinafter - HDR), which is a key stage in the formation of quality education. In Ukraine, the implementation of this activity by students is provided by legislative documents (“National doctrine of education development”, the Law of Ukraine “On scientific and scientific-technical activity”). We consider that the R&D of students of Ukrainian higher educational institutions is a significant means of increasing the quality of training and education of professionals, who will be able to creatively use the achievements of medical science in

practice. Such involvement of students to scientific cognition contributes to the fact that they will be able to use the acquired creative potential to solve urgent (as well as typical) problems of medical education, to practically implement the recommendations of teachers. Research activity also plays the role of a kind of continuation and deepening of the general educational process (Ungerer, 2019). It should be divided into research included in the educational process and activities carried out outside of class time. For example, extracurricular research includes student activities in science, learning labs, and personal (or collective) faculty-led research (Oseredchuk et al., 2022). However, students' participation in various scientific events: conferences (including international ones), research contests, Olympiads, etc., plays a prominent role in this part of the work. Such events can be attended by students both in person and remotely. In this way, the universal nature of scholarly conferences will help both develop students' research, communication, and practical skills (Pinheiro & Santos, 2022). Before a discussion or conference, students choose topics for papers. At the same time, learning excursions, where students have the opportunity to gain practical knowledge, have a separate place in this system. To develop students' skills, in addition to standard lecture classes, a significant role is

played by practical seminars, final conferences, additional professional lectures where new teaching methods should be applied: project method, brainstorming, storytelling, scientific debates, etc. Mas-Verdu et al. (Mas-Verdu et al., 2020). The use of innovative methodology based on research activities will contribute to the modernization of the practical aspects of medical education. Note that the project method involves both individual and group projects. Atypical tasks of these projects will contribute to the formation of critical skills in students. Note that the seminar (as a typical form of teaching) should contain elements of conversation and dispute. The conducting of practical training sessions influences the implementation of a variety of practical tasks, experimental experiments based on the content of the subjects. Such classes are less regulated, they focus on the formation of independence in students (Cherng & Davis, 2019). In general, research activity should consist of students' exploratory work, which is primarily expressed in individual, independent research. It is aimed at explaining processes and phenomena, establishing their relationships, identifying logical connections, theoretical and exploratory explanation of facts in accordance with scientific methods of knowledge. The main related components of students' research work are highlighted in Table 1.

**Table 1.**  
*Interrelated components of research work*

<b>Interrelated components of research work</b>
1. Teaching students the basic aspects of research activities
2. Formation of skills of methodology and organization of scientific work
3. Research work of students serves as an element of the educational part of science in general
4. Scientific research - the consequence of self-session development of a particular problem of the student, containing the results of their own scientific search, conclusions, hypotheses, and predictions, etc.

*Created based on the author's analysis*

Using the latest teaching methods to modernize medical education

Currently, the implementation of the concept of modernization of medical education is possible only in case of the formation of a modern educational space taking into account the innovative changes of society, education of a modern type of vision and culture (Laufer et al., 2021). One of the innovative tasks mentioned above is the implementation of a modern concept of learning European higher education space. We are talking primarily about student-centered learning, the basis of which is a competence-based approach to the formation and execution of

educational programs, comprehensive integration of national qualifications boundaries, modern higher education system, current generation standards, academic programs, etc. (Cherng & Davis, 2019). The implementation of the Bologna Process system in training is a significant incentive for the application of innovation in education (as well as in medical education), information and communication technologies that contribute to improving the efficiency of the educational process and the organization of distance learning (Oseredchuk et al., 2022).

Taking into account the analysis of European countries' experience, one of the ways to modernize educational content and learning technologies is the development and gradual introduction of educational innovative methods and technologies (Kelly, 2021). Nevertheless, we believe that one of the main directions of educational medical policy should be the development of both innovative and scientific work in education in general, improving the quality of education based on innovative methods (Kem, 2022). Based on this there is a

problem with the effectiveness of innovative learning processes, the results of which consist in students' deep awareness of the content of the studied, the formation of critical thinking skills. Taking into account modern trends in pedagogy development, the following innovative pedagogical methods are important for application in higher medical education: case-study method, training learning technologies, application of special quest-tasks, elements of distance education, and humanistic learning.

**Table 2.**

*Pedagogical methods of education and the organization of learning and their implications*

<b>Pedagogical methods of education and organization of training</b>	<b>Consequences of use</b>
<b>Personally oriented learning</b>	Will promote independent thinking, the ability to make personal choices
<b>Developmental education</b>	Influences the formation of students' skills for self-improvement, active creative thinking, and learning
<b>Distance learning</b>	It is based on the principle of independent learning of the student. At the same time, modern technologies of online education contribute to the possibility of constant dialogue between the teacher and the student based on the latest means of communication.
<b>Learning as an element of research</b>	skills, research students' of Formation new of stimulation work, experimental knowledge.
<b>Humanistic learning</b>	Influences the education of conscientious citizens. Contributes to the development of the student based on humanization and democratization of the education system.
<b>Information and computer technologies</b>	Promotes information transfer, which in turn deepens students' knowledge and skills and influences the development of their ability to manage social and technical problems
<b>Case-study method</b>	This method involves solving certain situations that activate students' critical thinking skills. It promotes the development of analytical and communicative abilities.
<b>Quest Assignment Method</b>	The above method promotes the practical solution of certain problems, which allows you to practice the necessary skills as part of the training of future doctors. The main goal of the quest is to find an appropriate solution or achieve a certain result faster than the competitors. For students of higher medical institutions, an important task will be to solve a certain clinical situation, in particular the prevention of disease recurrence, stopping bleeding, etc. Thus, using this method, students have the opportunity to practically use the acquired theoretical knowledge.
<b>Brainstorming method</b>	Promotes rapid response to certain medical situations and influences the development of teamwork skills.
<b>Training technologies</b>	They involve solving complex algorithms for solving typical application problems.

*Formed based on the author's analysis*

In order to fulfill these technologies, higher medical institutions must also search for and develop the content of innovative educational programs and modern educational technologies, productiveness methods of managing the educational process, etc.

### Conclusions

Consequently, the study of ways to reform higher medical education in Ukraine remains an urgent problem of scientific research. The way of modernization of this industry was hampered by the lack of funding, but also by the lack of development ideas. In fact, only in 2015-2017 real fundamental decisions were made, which changed the paradigm of training of highly qualified specialists. At the state-regulatory level, new developmental benchmarks were adopted, resulting, for example, in a final test system "KROK," based on American samples of task formation. Also adopted important in the Ukrainian realities incentives, primarily for young professionals who agree to continue working in rural areas (where there is the greatest shortage of personnel in Ukraine). The educational environment has also been improved by the introduction of a closer combination of training and research work. However, in order to modernize both theoretical and practical aspects, important attention should be paid to innovative methods of education and organization of training. In particular, the use of the case-study method, training learning technologies, special quest tasks, humanistic learning will contribute to the formation of critical, creative, practical skills of higher education students. At the same time, the latest teaching methods actualized in recent years should be actively introduced in the teaching practice. Note that employers should be more actively involved in the educational process. Word of the future stakeholders in the formation of educational programs is taken into account in many universities in Europe and the United States. For Ukraine, due to the obvious lack of funding due to martial law, the commercialization of education and focus on employers can become a defining trend of development.

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