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THE CONCEPT OF "HYGIENIC COMPETENCE" IN THE PROFESSIONAL TRAINING OF FUTURE DOCTORS: CONTENT, ESSENCE, AND FACTORS OF FORMATION

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Abstract: This article presents a theoretical and methodological substantiation of the concept of "hygienic competence" as a key component of the professional training of future doctors in the context of modernizing medical education. The relevance of the study is driven by the need to transition from a knowledge-based paradigm to a competency-based approach, which requires a clear definition of the structure, content, and factors of hygienic competence formation among medical students. The aim of this work is a theoretical analysis and systematization of approaches to defining the essence of hygienic competence, identifying its structural components and formation factors within an innovative educational environment. The methodological framework is based on the competency-based approach, contextual learning theory, as well as integrative and systemic approaches to professional education. The research employed methods of theoretical analysis of scientific literature, pedagogical modeling, and synthesis of advanced pedagogical experience. The results of the study clarified the content of the concept "hygienic competence of a future doctor," defined its structure, which includes motivational-value, cognitive, activity-practical, and reflexive-evaluative components. The main factors of hygienic competence formation were identified and systematized: organizational-pedagogical, psychological-didactic, information-technological, and personal factors. Based on theoretical analysis, a structural-functional model for the formation of hygienic competence in the process of studying hygiene disciplines was developed. The practical significance of this work lies in the possibility of using the obtained results to improve the content and teaching methods of hygiene disciplines in medical universities.

Keywords: hygienic competence, professional training, future doctors, competency-based approach, medical education, formation factors, hygiene disciplines.

**КОНЦЕПЦИЯ «ГИГИЕНИЧНОЙ КОМПЕТЕНТНОСТИ» В
ПРОФЕССИОНАЛЬНОЙ ПОДГОТОВКЕ БУДУЩИХ ВРАЧЕЙ: СОДЕРЖАНИЕ,
СУТЬ И ФАКТОРЫ ФОРМИРОВАНИЯ**

Аннотация: В данной статье рассматривается теоретико-методологическое обоснование понятия «гигиеническая компетентность» как ключевого компонента профессиональной подготовки будущих врачей в условиях модернизации медицинского образования. Актуальность исследования обусловлена необходимостью перехода от знаниевой парадигмы к компетентностному подходу, что требует четкого определения структуры, содержания и факторов формирования гигиенической компетентности у студентов медицинских вузов. Целью работы является теоретический анализ и систематизация подходов к определению сущности гигиенической компетентности, выявление ее структурных компонентов и факторов формирования в инновационной образовательной среде. Методологическую основу составили компетентностный подход, теория контекстного обучения, а также интегративный и системный подходы к



профессиональному образованию. В ходе исследования использовались методы теоретического анализа научной литературы, педагогического моделирования, обобщения передового педагогического опыта. Результаты исследования позволили уточнить содержание понятия «гигиеническая компетентность будущего врача», определить его структуру, включающую мотивационно-ценностный, когнитивный, деятельностно-практический и рефлексивно-оценочный компоненты. Выявлены и систематизированы основные факторы формирования гигиенической компетентности: организационно-педагогические, психолого-дидактические, информационно-технологические и личностные. На основе теоретического анализа разработана структурно-функциональная модель формирования гигиенической компетентности в процессе изучения дисциплин гигиенического профиля. Практическая значимость работы заключается в возможности использования полученных результатов для совершенствования содержания и методики преподавания гигиенических дисциплин в медицинских вузах.

Ключевые слова: гигиеническая компетентность, профессиональная подготовка, будущие врачи, компетентностный подход, медицинское образование, факторы формирования, гигиенические дисциплины.

Introduction

The transformation of higher medical education in the context of global trends and national priorities necessitates a fundamental revision of approaches to the training of future doctors. Modern healthcare demands not only a specialist with a deep knowledge base but also a professional capable of applying this knowledge in complex, non-standard situations, demonstrating responsibility, critical thinking, and the ability to make informed decisions in the field of disease prevention and health promotion. In this regard, the competency-based approach becomes the leading methodological strategy, shifting the emphasis from the process of knowledge transmission to the outcome of training—the formation of competencies that ensure the successful performance of professional activities.

Among the key competencies of a medical professional, hygienic competence occupies a special place. This is due to the fact that preventive medicine, the basis of which is hygiene, is becoming a priority direction for the development of healthcare systems worldwide. The World Health Organization defines prevention as the cornerstone of public health, and the COVID-19 pandemic has clearly demonstrated the importance of hygienic knowledge and skills not only for professional activities but also for ensuring the safety of the population. In this context, the formation of hygienic competence among future doctors acts as a strategic task of medical education, ensuring the readiness of graduates to carry out preventive activities, sanitary and educational work, and to organize a safe environment for patients and the population.

However, an analysis of the scientific literature shows that despite the widespread use of the term "hygienic competence" in pedagogical and medical discourse, its conceptual framework remains insufficiently developed. There is no unified approach to defining the essence, structure, content, and criteria for the formation of this competence. Researchers often consider individual aspects of hygienic training without offering a holistic view that integrates pedagogical and medical perspectives. The problem is exacerbated by the introduction of innovative teaching methods, digital technologies, and interdisciplinary integration into the educational process, which create new opportunities and at the same time require adaptation of traditional approaches.

The relevance of this study is also confirmed by the priorities defined in the regulatory documents of the Republic of Uzbekistan. The Decree of the President of the Republic of Uzbekistan No. PF-5847 dated October 8, 2019 "On Approval of the Concept for the



Development of the Higher Education System of the Republic of Uzbekistan until 2030" and the Decree No. PF-60 dated January 28, 2022 "On the Development Strategy of New Uzbekistan for 2022-2026" define the improvement of the quality of education, the training of highly qualified personnel that meet modern labor market requirements, and the implementation of innovative technologies as priority tasks. The resolutions of the Cabinet of Ministers on the development of medical education emphasize the need to strengthen the preventive orientation of training and improve the teaching methods of hygiene disciplines.

The aim of this work is a theoretical analysis and systematization of approaches to defining the essence of hygienic competence, the identification of its structural components and factors of formation in the innovative educational environment of a medical university.

Literature Review

The theoretical analysis of the problem of forming hygienic competence in future doctors is based on several key scientific areas.

First, the philosophical and methodological foundations of professional education are reflected in the works of domestic and foreign researchers. In the context of the development of higher medical education in Uzbekistan, significant contributions have been made by Y.Kh. To'raqulov, A. Qosimov, R.A. Sobirova, O.A. Abrorov, F.Kh. Inoyatova, A.N. Aripov, P. Mirxamidova, N. Kamolova, S.N. Dalimova, U. Inoyatov, U. Begimqulov, R.G. Isyanov, G.B. Umarova. These researchers have studied various aspects of introducing innovative approaches, digital technologies, and improving the quality of education. However, the specific issues of forming hygienic competence have not been the subject of their special research.

Second, the competency-based approach as a methodological basis for modern education is widely represented in international scientific discourse. The works of J. Raven, D. McClelland, and A. Bandura laid the foundation for understanding competence as an integrative characteristic of a personality that allows them to effectively perform activities. In Russian pedagogy, the ideas of the competency-based approach were developed by A.V. Khutorskoy, I.A. Zimnyaya, V.I. Baidenko, who defined key competencies and proposed models for their formation. In medical education, the competency-based approach has become the basis for the development of educational standards (CanMEDS, ACGME), which define the roles and competencies of a medical specialist, including the role of a health promoter and a communicator.

Third, the concept of hygienic training of medical students has its own history. Traditional approaches to teaching hygiene were based on the transfer of normative knowledge about environmental factors and their impact on health. However, modern research emphasizes the need to form not just knowledge but also the ability to apply it in practical activities. Studies by N.V. Zilber, Yu.P. Pivovarov, and others emphasize the importance of the practical orientation of teaching hygiene disciplines.

Fourth, the problems of integration in medical education are considered in the works of domestic and foreign authors. Interdisciplinary integration, the connection of hygiene with clinical disciplines, and the use of problem-oriented learning are recognized as effective means of forming professional competencies. Studies by H.G. Schmidt, S. Van der Vleuten, and others show the effectiveness of integrated curricula for the development of clinical thinking and professional skills.

Despite a significant number of studies, an analysis of the literature allows us to state that the concept of "hygienic competence" remains insufficiently defined. Researchers often use this term to denote a set of knowledge about hygiene, without clearly distinguishing it from other related concepts (sanitary culture, hygienic education, etc.). There is also no systematized



understanding of the factors that influence the formation of this competence in the context of innovative transformations of medical education.

Methodology

The methodological basis of this study is a set of complementary scientific approaches. The competency-based approach allows us to consider hygienic competence as an integrative result of professional training, expressed in the readiness and ability of a graduate to effectively perform preventive functions. The contextual learning theory (A.A. Verbitsky) substantiates the need to model subject and social content of professional activity in the educational process, which is especially important for the formation of practical skills. The integrative approach provides for the combination of knowledge from different disciplines, the combination of theoretical and practical training, and the connection of academic and research activities. The systemic approach allows us to consider the process of forming hygienic competence as a holistic, multidimensional phenomenon that includes interconnected structural components.

The research was conducted in several stages. At the first stage, a theoretical analysis of scientific literature on the problems of professional education, competency-based approach, hygiene training, and modern teaching technologies was carried out. The analysis covered domestic and foreign sources, including publications indexed in the Scopus, Web of Science, and RSCI databases. At the second stage, the conceptual apparatus of the study was developed, the essence and structure of hygienic competence were determined, and the main factors influencing its formation were identified. At the third stage, based on the results of the theoretical analysis, a structural-functional model of the formation of hygienic competence was developed, which was then discussed with experts—teachers of hygiene departments and practicing doctors.

The main research methods were: theoretical analysis and synthesis of scientific literature, pedagogical modeling, content analysis of educational programs and normative documents, generalization of advanced pedagogical experience, and system analysis.

Results

The theoretical analysis conducted in this study allowed us to formulate a number of provisions that clarify the concept of "hygienic competence of a future doctor."

Hygienic competence is understood as an integrative professional and personal quality of a future doctor, representing a set of motivational-value orientations, theoretical knowledge, practical skills, and reflexive abilities that ensure readiness and ability to effectively carry out preventive activities, assess and manage environmental factors affecting human health, conduct sanitary and educational work, and comply with the principles of a healthy lifestyle in professional activities and everyday life.

The structure of hygienic competence includes four interconnected components presented in Table 1.

Table 1. Structural Components of Hygienic Competence of a Future Doctor

Component	Content	Formed Elements
Motivational-Value	Awareness of the importance of preventive medicine, the value of health, the formation of professional motivation for hygienic activities	Interest in hygiene disciplines, understanding the social significance of prevention, readiness to comply with hygienic norms, internal need for a healthy lifestyle
Cognitive	System of fundamental knowledge about environmental factors, their impact on health, hygienic	Knowledge of general and private hygiene, sanitary legislation, basics of epidemiology, methods of hygienic research, principles of a healthy lifestyle



	standards, methods of assessment and management	
Activity-Practical	Skills and abilities to apply hygienic knowledge in professional and life situations	Skills in conducting hygienic assessment of environmental objects, skills in carrying out sanitary supervision, skills in conducting sanitary and educational work, skills in organizing a safe environment
Reflexive-Evaluative	Ability to evaluate the results of one's own activities, the readiness for continuous professional development and self-improvement	Self-assessment of the level of hygienic knowledge and skills, ability to analyze errors, orientation towards continuous learning, critical thinking

The analysis of the factors influencing the formation of hygienic competence allowed us to systematize them into four groups, presented in Table 2.

Table 2. Factors of Formation of Hygienic Competence of a Future Doctor

Factor Group	Description	Examples
Organizational-Pedagogical	Conditions for organizing the educational process that contribute to the effective formation of competence	Structure of the curriculum, integration of hygiene with clinical disciplines, availability of practical bases, organization of independent work, quality of educational and methodological support
Psychological-Didactic	Features of the teaching methods, the nature of interaction between teachers and students, the use of active and interactive learning technologies	Application of problem-oriented learning, case methods, business games, project-based learning, the use of modern pedagogical technologies (Kvartet-blok, problem-based learning technologies, collaborative learning)
Information-Technological	Use of digital technologies and electronic educational resources in the learning process	Electronic information and educational resources, multimedia presentations, video materials, interactive simulators, mobile applications for hygienic assessment
Personal	Individual characteristics of students that influence the success of mastering hygienic competence	Level of motivation, cognitive activity, ability to self-organization, previous experience, personal attitudes towards health and a healthy lifestyle

Based on the identified components and factors, a structural-functional model for the formation of hygienic competence in future doctors was developed. This model reflects the interrelation of the target, content, procedural, and effective blocks.

The target block determines the purpose of forming hygienic competence and the tasks that ensure its achievement. The purpose is to ensure the readiness of a medical university graduate to effectively carry out preventive activities.

The content block includes the main sections of hygiene disciplines (general hygiene, municipal hygiene, food hygiene, occupational hygiene, radiation hygiene, etc.), as well as interdisciplinary connections with related subjects (general medicine, epidemiology, public health, etc.).

The procedural block reflects the methods, means, and organizational forms of training. The following teaching technologies are of particular importance:



Problem-Based Learning Technologies: creation of problem situations based on real-life hygienic problems (assessment of the sanitary condition of a medical institution, investigation of a food poisoning outbreak, etc.).

Project-Based Learning: development and defense of projects aimed at solving specific hygienic problems (creating a sanitary and educational video, developing recommendations for improving the environment, etc.).

Collaborative Learning: organization of group work to solve complex problems, conduct joint research, analyze clinical cases.

Kvartet-Block Technology: integration of four blocks of information (theoretical, practical, analytical, reflexive) within one topic or section.

Interactive Teaching Methods: business games, role-playing games, discussions, case studies.

Digital Technologies: the use of electronic information and educational resources, virtual laboratories, interactive simulators, platforms for creating tests and surveys.

The effective block includes criteria and indicators for assessing the level of formed hygienic competence. Based on the analysis of scientific literature and the requirements for a medical specialist, the following levels of formation are proposed:

Reproductive Level: the student has knowledge of basic hygienic standards and rules, can reproduce them in standard situations, but experiences difficulties in independent application in non-standard conditions.

Productive Level: the student demonstrates confident knowledge of hygiene disciplines, applies them to solve typical professional tasks, shows the ability to analyze hygienic situations.

Creative Level: the student demonstrates deep systemic knowledge, creatively applies them in non-standard situations, generates new ideas in the field of prevention, demonstrates a stable motivation for preventive activities, and shows initiative in conducting sanitary and educational work.

Discussion

The results obtained allow us to clarify the place and role of hygienic competence in the system of professional training of future doctors. Hygienic competence is not simply a sum of knowledge about hygiene, nor is it only a set of practical skills. It is a complex integrative formation that combines cognitive, motivational, and behavioral aspects. Such an understanding corresponds to the general logic of the competency-based approach, which considers competence as a readiness for activity, including the ability to mobilize knowledge and skills in a specific context.

The identified structural components are consistent with the models of competence presented in the works of I.A. Zimnyaya and A.V. Khutorskoy, but they also have specifics related to the content of preventive medical activity. The motivational-value component is of particular importance for hygiene, since the effectiveness of preventive activities is directly related to the personal attitudes of the doctor, his conviction in the importance of prevention, and his own adherence to a healthy lifestyle.

The systematization of factors for the formation of hygienic competence allows us to understand the complexity and multidimensionality of this process. It is noteworthy that among the organizational-pedagogical factors, special attention is paid to the integration of hygiene with clinical disciplines. This is due to the fact that the value of hygienic knowledge becomes obvious to students precisely when they see their connection with specific clinical situations, patient outcomes, and the effectiveness of treatment. The use of problem-oriented learning, which is based on real clinical cases with a hygienic component, contributes to the formation of holistic professional thinking.



The information-technological factor in the formation of hygienic competence deserves special discussion. The digitalization of education creates fundamentally new opportunities for visualizing hygienic processes, modeling situations, and conducting virtual experiments. At the same time, as our analysis shows, the effectiveness of using digital tools depends on the degree of their integration into the overall educational context. The mere use of multimedia presentations or electronic textbooks does not automatically lead to increased competence. A systematic approach is needed, combining digital technologies with active learning methods and the practical activities of students.

The developed structural-functional model can serve as a theoretical basis for the development of specific teaching methods, the creation of educational and methodological complexes, and the organization of the educational process in hygiene departments of medical universities. The model reflects the logic of the process of forming hygienic competence, starting with the formation of motivation, then the assimilation of theoretical knowledge, the formation of practical skills, and ending with the development of reflexive abilities that ensure continuous professional development.

Conclusion

The conducted theoretical analysis allowed us to clarify the essence and content of the concept of "hygienic competence of a future doctor," to define it as an integrative professional and personal quality that ensures the readiness and ability to carry out preventive activities. The structure of hygienic competence includes motivational-value, cognitive, activity-practical, and reflexive-evaluative components, which are in close interconnection.

The factors of formation of hygienic competence are systematized into four groups: organizational-pedagogical, psychological-didactic, information-technological, and personal. This systematization makes it possible to purposefully manage the process of competence formation, taking into account all aspects of the educational environment.

The developed structural-functional model reflects the target, content, procedural, and effective blocks of the process of forming hygienic competence. The model can be used as a theoretical basis for improving the teaching of hygiene disciplines in medical universities, for the development of educational and methodological support, and for the assessment of learning outcomes.

Prospects for further research are seen in the empirical verification of the developed model in the educational process of a medical university, the development of a diagnostic toolkit for assessing the level of formation of hygienic competence, and the study of the influence of individual factors on the effectiveness of its formation. The development of specific methods for the formation of hygienic competence using modern educational technologies, including digital tools and active learning methods, is also an urgent task.

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