

Technologies for Applying Pedagogical Laboratory and Instrumental Methods to Enhance the Effectiveness of Hygiene Lessons

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Abstract: In medical education, hygiene holds a crucial place as a discipline that shapes future doctors' knowledge of the principles of sanitation and hygiene to ensure health, prevent diseases, and provide a safe environment. However, the traditional form of teaching, focused mainly on lectures and note-taking, is insufficient to achieve targeted professional outcomes.

Keywords: Hygiene, equipment, diagnostics, professionalism, research activity, integration, motivation.

Introduction: In modern medical education, hygiene holds a crucial place as a discipline that shapes future doctors' knowledge of the principles of sanitation and hygiene to ensure health, prevent diseases, and provide a safe environment. However, the traditional form of teaching, focused mainly on lectures and note-taking, is insufficient to achieve targeted professional outcomes.

In such conditions, the importance of pedagogical technologies that enhance the effectiveness of laboratory sessions is increasing. These technologies enable students not only to assimilate learning material but also to engage in professionally significant activities, conduct sanitary-hygienic research, and develop critical and analytical thinking.

The pedagogical advantages of using laboratory-instrumental methods are as follows:

A) Competence-based education: By using laboratory-instrumental methods, students acquire the functional professional actions specified in the federal state educational standard.

B) Activation of cognitive activity: Participation in laboratory measurements stimulates research interest and develops skills in analysis, generalization, and drawing conclusions.

C) Professional practice orientation: Implementing sanitary control scenarios, examining working

conditions, and assessing the sanitary condition of objects all create conditions for professional modeling. Purpose of introducing modern pedagogical technologies into hygiene laboratory sessions:

- To activate students' cognitive activity;
- To develop skills in sanitary control and examination;
- To foster professional thinking and hygienic culture;
- To increase independence and responsibility for results.

Moreover, laboratory activities allow for the implementation of contextual and modular teaching technologies, personalization of the educational process, and the development of teamwork skills. Thus, laboratory and instrumental methods become an important tool in the teacher's arsenal, ensuring the transformation of knowledge into stable professional skills.

Educational process tasks of laboratory and instrumental methods:

1. Educational
2. Developmental
3. Diagnostic
4. Professionalizing
5. Motivational

The educational function of laboratory-instrumental methods lies in ensuring firm assimilation of learning material through practical activities. The student not only perceives information but also acts actively in the learning context, thereby forming stable knowledge and practical skills. Regular completion of laboratory tasks consolidates theoretical rules and develops abilities to observe, measure, analyze, and interpret results.

This educational function is carried out through:

- Involving medical students in active practical activity;
- Immersing them in real or simulated clinical and hygienic contexts;
- Developing logical thinking from a professional perspective;
- Integrating theoretical knowledge with practical activity.

The developmental function of laboratory-instrumental methods is realized through the formation of intellectual, communicative, and practice-oriented skills that contribute to the future doctor's professional and personal growth. These methods aim to develop analytical, critical, and systematic thinking, the ability to interpret medical data, and to develop well-founded solutions.

Literature analysis

According to S. A. Smirnova, "Laboratory sessions using modern pedagogical technologies enable students to develop not only subject knowledge but also critical analytical skills, the ability to act in conditions of uncertainty, and professional responsibility"

She notes that the effectiveness of laboratory sessions depends not only on content but also on how they are organized. Modern pedagogical technologies create a learning environment in which students:

- Participate in creating information instead of passively consuming it;
- Learn to analyze situations, interpret data, formulate and test hypotheses;
- Develop professionally significant qualities: responsibility, independence, and hygienic culture.

Thus, laboratory sessions become a platform for shaping clinical and research thinking.

According to A. V. Khutorskaya, "Laboratory-type pedagogical technologies are not about transmitting knowledge but about jointly developing it with students, engaging them in research, analysis, and drawing conclusions" A. V. Khutorskoy sees the laboratory not as a site of reproductive repetition but as a place of pedagogical creativity. This means that in

teaching hygiene, it is necessary to create problem situations in which students not only follow instructions but also search, discuss, model, and justify their actions. This technology enhances the motivational and value component, turning laboratory work into a tool of personal development.

Laboratory-instrumental methods facilitate the implementation of clarity, accessibility, and scientific principles, strengthen interdisciplinary links, and promote an integrated approach to solving professional problems. As N. D. Nikolaeva emphasizes, "The educational function of practice-oriented learning lies in transforming information into knowledge, and knowledge into action"

METHODOLOGY

Laboratory-instrumental methods in hygiene classes are a key means of practice-oriented teaching of medical students. However, their effectiveness depends not only on content and organization but also on the methodological techniques used by the teacher to activate cognitive activity, increase motivation, and develop professional competences.

- Pedagogical technologies are a key factor in enhancing the effectiveness of laboratory sessions, ensuring the transition from formal education to an activity- and value-rich process.
- Laboratory sessions in hygiene should not merely demonstrate measurements but be organized as professional modeling.
- Effective use of technologies requires high methodological preparedness from the teacher and the ability to manage students' research and reflective activities.
- Analysis of references confirms that the most effective technologies include: project method, problem-based learning, modular competence-based approach, workshop method, and digital modeling.

Purpose of using laboratory-instrumental methods

To develop students' professional skills and sanitary-hygienic monitoring and prevention activities.

Main tasks of laboratory-instrumental methods:

- Mastering methods for measuring and analyzing environmental factors;
- Developing the ability to interpret hygienic indicators;
- Forming stable practice-oriented competences;
- Familiarizing with professional activities in realistic conditions.

RESULTS

The use of laboratory-instrumental methods in medical education contributes to the formation of practical

skills and abilities. However, to achieve maximum pedagogical impact, competent methodological organization of learning activities is necessary, in which specially chosen methodological techniques play a key role. They aim to increase the effectiveness of each stage of laboratory sessions and to achieve the professional training goals of future doctors.

When working with laboratory-instrumental methods, methodological techniques are used not in isolation but as a means of pedagogical technology aimed at achieving the following goals:

- Activating students' cognitive activity;
- Increasing motivation for learning and professional activity;
- Developing professional competences;
- Developing critical and analytical thinking skills;
- Developing reflective ability and conscious learning.

The main directions of applying laboratory-instrumental methods in hygiene create a comprehensive understanding of sanitary safety, the validity of preventive measures, and the role of medical workers in healthcare. Their systematization and targeted pedagogical use create a foundation for developing students' professional qualifications, ensuring interdisciplinary integration, a practical focus, and motivational saturation of the educational process.

CONCLUSION

Modern pedagogical approaches require not only the use of equipment and measuring tools but also the creation of an interactive learning environment in which students are effectively engaged. Interactive methods enhance the impact of laboratory-instrumental methods, making laboratory sessions active, emotionally engaging, and professionally significant.

Interactive methods are pedagogical tools that ensure active interaction between students, the teacher, and learning materials, aimed at jointly solving problems, developing competences, and fostering thinking. In the context of hygiene laboratory-instrumental methods, interactivity ensures maximum involvement of students in profession-oriented activities essential for preparing future doctors.

The application of methodological techniques when working with laboratory-instrumental methods encompasses all the tasks of professional education — from cognitive assimilation of content to the formation of personally significant competences and professional preparedness. Properly chosen techniques make laboratory sessions not merely a formal procedure but a relevant and effective form of training a medical

professional capable of independently assessing sanitary conditions, making decisions, and preventing health risks.

Thus, studying and substantiating the didactic conditions for applying laboratory-instrumental methods in hygiene is an important scientific and practical task, whose solution enhances the quality of medical students' professional training, strengthens the practical component of education, and shapes a stable hygienic culture as a component of general medical competence in future doctors.

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