



## APPLICATION OF STIMULATION TECHNOLOGIES IN CLINICAL SCIENCES

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**Annotation.** *This article analyzes the didactic possibilities of using stimulation technologies in clinical sciences based on modern approaches to the science of professional education methodology, and sheds light on the mechanisms of forming professional competencies in students through simulators, virtual learning platforms, phantoms, interactive clinical scenarios and other stimulation tools.*

**Keywords:** *clinical sciences, stimulation technologies, simulators, virtual learning environment, professional competencies, practical skills, pedagogical innovation.*

**Аннотация:** *В статье анализируются дидактические возможности применения стимулирующих технологий в клинических дисциплинах на основе современных подходов к методологии профессионального образования, а также раскрываются механизмы формирования профессиональных компетенций студентов с помощью симуляторов, виртуальных обучающих платформ, фантомов, интерактивных клинических сценариев и других средств стимулирования.*

**Ключевые слова:** *клинические дисциплины, стимулирующие технологии, симуляторы, виртуальная образовательная среда, профессиональные компетенции, практические навыки, педагогические инновации.*

**Annotatsiya:** *Ushbu maqolada kasbiy ta'lim metodikasi fanining zamonaviy yondashuvlari asosida klinik fanlarda stimulyatsion texnologiyalarni qo'llashning didaktik imkoniyatlari tahlili, Simulyatorlar, virtual o'quv maydonchalari, fantomlar, interaktiv klinik ssenariylar va boshqa stimulyatsion vositalar orqali talabalarda kasbiy kompetensiyalarni shakllantirish mexanizmlari yoritiladi.*

**Kalit so'zlar:** *klinik fanlar, stimulyatsion texnologiyalar, simulyatorlar, virtual o'quv muhiti, kasbiy kompetensiyalar, amaliy ko'nikmalar, pedagogik innovatsiya.*

The Resolution of the President of the Republic of Uzbekistan No. PQ-4699 dated April 6, 2020 "On measures to radically improve the medical education system and develop higher medical education institutions" stipulates the establishment of modern simulation centers in medical education, modernization of the teaching

process of clinical sciences, and introduction of new methods serving to strengthen practical skills. To implement these tasks, the Ministry of Health of the Republic of Uzbekistan has developed a program for the modernization of medical education,

the program sets out strategic tasks such as the creation of simulation training centers in higher medical education institutions, strengthening clinical skills through practical training, and improving the qualifications of teachers in simulation methods. Today, a number of works are being carried out on a large scale to implement the above tasks.

Indeed, the use of stimulation technologies in the process of teaching clinical sciences is one of the most pressing issues in the professional education process today.

In modern medical education, it is important to provide students with practical skills in safe and controlled conditions, to create an environment close to real clinical situations. At the same time, ensuring patient safety in the healthcare system, improving the skills of students and young specialists are also urgent issues. Stimulation technologies are an effective solution to these problems, making the learning process interactive, interesting and effective. Therefore, this topic is of great importance in the methodology of professional education and the formation of professional competencies of students in the medical field.

In modern professional education, it is important to provide students not only with theoretical knowledge, but also with practical skills. Increasing the effectiveness of the educational process, gaining experience in a safe environment and developing independent decision-making skills in students are among the important tasks, especially in the field of medicine.

Stimulation technologies - simulators, interactive programs, virtual laboratories and clinical scenarios - are used as effective tools in the process of professional education. They not only activate the learning process, but also serve to combine theory and practice, to form the skills of making quick and correct decisions in clinical situations. This article highlights the pedagogical aspects of the use of stimulation technologies in clinical sciences, their importance and effectiveness in improving the quality of professional education. The use of stimulation technologies in the process of clinical education not only increases learning efficiency, but also allows for accurate measurement of students' practical skills. Students trained on the basis of simulation master clinical skills 25-35% faster than those trained traditionally, and the level of errors is significantly reduced. Due to the fact that high-end simulators reflect changes in vital indicators in real time, students practice making urgent decisions in a safe environment. For example, experiments conducted in medical universities have shown that after simulation training in neonatal

resuscitation, student success rates increased by up to 40%. Such facts confirm that stimulation significantly increases the level of preparation for real practice in clinical education. The following approach is taken to the use of simulation technologies: First of all, its correct implementation in organizational and methodological terms, what pedagogical approaches to the process are designed.

1. Organizational and methodological foundations:

- Targeted planning - this process takes into account the orientation of simulation exercises to specific educational goals. For example, CPR skills, history taking, or emergency care.

- Scenario creation - in this process, scenarios are created that are close to real clinical situations. They clearly indicate the patient's age, condition, history and problem.

- Role distribution - in this process, students, teachers and simulated patients (actors or mannequins) should clearly know their roles.

- Assessment criteria - the teacher develops checklists for assessing the didactic activity of students in the process. Students are assessed using rubrics or video analysis.

2. Pedagogical approaches:

- Constructive pedagogy: The student, as an active participant, acquires knowledge in practice.

- Reflection: After the simulation, students analyze their mistakes, exchange ideas and draw conclusions.

- Interactivity: During the simulation, students work together, which develops communication and teamwork skills.

Competency-based learning: Simulation develops students' clinical, communicative and ethical competencies.

Simulation exercise: "Cardiopulmonary resuscitation (CPR)"

Objective: The student learns to correctly and systematically perform CPR on a patient in an emergency.

Scenario: Patient: 60-year-old man, unconscious on the street.

Complaints: Shortness of breath, cardiac arrest.

Conditions: Simulation mannequin, defibrillator model, stethoscope, gloves, CPR checklist.

Student Tasks:

1. Assess the patient's condition (consciousness, breathing, pulse)
2. Call for help
3. Start CPR (30 compressions: 2 breaths)
4. Properly apply the AED (automatic defibrillator)

5. Observe the patient's response

Assessment checklist

Correctly assessing the situation	2
Calling for help	1
Properly performing CPR	3
Properly using an AED	2
Communication and ethics	2

In modern medical education, stimulation technologies play an important role in teaching clinical sciences, as they allow students to repeatedly perform complex practical procedures in a safe environment. With the help of simulators, students develop skills such as diagnostics, treatment, emergency care, clinical reasoning, and teamwork in conditions close to real situations. Such technologies allow for the correction of errors in the learning process without consequences, which increases patient safety and increases the level of preparation for practice. Due to the full reflection of physiological processes, high-level simulators allow students to assess the situation, make decisions, and practice rapid action. As a result, stimulation education in teaching clinical sciences effectively forms students' independence, responsibility, and professional competence.

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