# THE ROLE OF VIRTUAL AND SIMULATION TECHNOLOGIES IN THE ORGANIZATION OF QUALITY MEDICAL EDUCATION

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## ABSTRACT.

Comprehensive measures are being implemented in our country to develop the health care system, ensure that the rights of citizens to health care are guaranteed by the state, create a healthy lifestyle for citizens, and create conditions for all layers of the population to use medical services. Today, modern trends in medical education suggest the wide use of simulation technology, which allows to achieve the maximum level of realism in simulating various clinical scenarios, as well as to develop technical skills for individual diagnostic and treatment manipulations. The introduction of modern training complexes of the new generation, the creation of key training centers will smoothly build a bridge from the simulation to the clinic to the real patient. Simulators allow to train the basic methods of open surgery with a small surgical field, endovascular surgery and endoscopic surgery, and to train the surgeon in these methods, which allows to repeat various operational situations, and to evaluate the actions performed by the doctor-surgeon, to the hardware-software complex. In addition, it provides an opportunity to disseminate information on simulation of new techniques and tools via the Internet, as well as distance learning.

**Key words**

medicine, educational process, stimulant, mannequin, trainer, imitator

## SIFATLI TIBBIY TA'LIMNI TASHKIL ETISHDA VIRTUAL VA SIMULYASIYA TEXNOLOGIYALARINING ROLI

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## Annotatsiya

Mamlakatimizda sog'liqni saqlash tizimini rivojlantirish, fuqarolarning sog'liqni saqlashga doir huquqlari davlat tomonidan kafolatlanishini ta'minlash, fuqarolarda sog'lom turmush tarzini shakllantirish, aholining barcha qatlamlari tibbiy xizmatdan foydalanishi uchun sharoit yaratish borasida kompleks chora-tadbirlar

amalga oshirilmoqda. Bugungi kunda tibbiyot ta'limining zamonaviy tendentsiyalari simulyatsiya texnologiyasidan keng foydalanishni taklif qiladi, bu turli xil klinik stsenariylarni taqlid qilishda realizmning maksimal darajasiga erishish, shuningdek, individual diagnostika va davolash manipulyatsiyalari uchun texnik ko'nikmalarni rivojlantirish imkonini beradi. Yangi avlodning zamonaviy o'quv majmualarini joriy etish, asosiy o'quv markazlarini yaratish simulyatsiyadan klinikaga haqiqiy bemorga ko'prikni muammosiz quradi. Simulyatorlar kichik jarrohlik maydoni bilan ochiq jarrohlikning asosiy usullari, endovaskulyar jarrohlik va endoskopik jarrohlik va jarrohni ushbu usullarga o'rgatish imkonini beradi, bu esa turli xil operatsion vaziyatlarni takrorlash imkonini beradi, va shifokor - jarroh tomonidan amalga oshirilgan harakatlarni baholash, apparat-dasturiy kompleksga qo'shimcha bo'lib, internet orqali yangi texnika va asboblarni simulyatsiya qilish bo'yicha ma'lumotlarni tarqatish imkoniyatini beradi, shuningdek, masofaviy o'qitish imkonini beradi.

**Kalit so'zlar**

tibbiyot, o'quv jarayoni, stimulyator, maneken, trenajyor, imitator

Comprehensive measures are being implemented in our country to develop the health care system, ensure that citizens' rights to health care are guaranteed by the state, create a healthy lifestyle for citizens, and create conditions for all segments of the population to use medical services.

In the past period, many decrees and decisions aimed at further development of the field, increasing the scope and quality of medical services were adopted, and the process from medical institutions to personnel activities in our country changed in a new order and turned towards development. In Uzbekistan, comprehensive measures aimed at providing high-quality medical services to the population and increasing the coverage of the health care system have been implemented.

Today, Modern trends in medical education suggest the wide use of simulation technology, which allows one to achieve the maximum level of realism in simulating various clinical scenarios, as well as to develop technical skills for individual diagnostic and treatment manipulations [2].

Currently, many important problems that determine the quality of medical care for the population in the world practice of training specialists and practical health care in higher medical educational institutions in our country are clearly expressed:

- in the presence of biological material necessary for the training of surgeons and other specialized doctors, and the process of direct work with patients, the possibility of training is increasingly limited;

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- the rate of introduction of advanced surgical methods and appropriate devices into practice is insufficient;

- the impossibility of an objective and standardized assessment of the quality of the operations performed by the intern, the impossibility of reliably taking into account all the details of the performed manipulations, including hidden damage;

Simulation is the art of imitating reality. It can be a sequence of events and actions or a thought process. Simulation training is one of the effective ways to learn error management [1].

It is very important that different types of simulation training are involved in solving a specific task: activity, visualization, listening.

Currently, simulators are used for training and objective assessment of students in many areas of human activity that involve high risks.

In the world, scattered research is being conducted to create 3D simulation systems for various fields of science and industry. There is no active scientific and practical research in the direction of integration of 3D simulation systems, simulation of physical processes and properties, feedback systems and manipulators that provide two-way interaction between the operator and the simulated system. Also, the issue of using such integrated systems in education and other fields has not been resolved.

The use of phantoms and simulation learning is considered an acceptable and necessary direction in the educational process. The presence of simulators alone is not enough to ensure high quality of practical training for students. At all stages of student education, it is necessary to use certain pedagogical technologies that ensure the continuity of the system of training and improvement of practical skills and preparation for professional activities [3].

The introduction of modern training complexes of the new generation, the creation of key training centers will smoothly build a bridge from the simulation to the clinic to the real patient. An important issue of organizing practical training is to exchange quality and fast information between the educational institution and the employer, to provide practical training with all the necessary resources, and to carefully define the educational task. The classification of simulators is based on the practical application and the technology behind the simulation.

Simulator types:

1) Computer dummies. The installed models can be canceled or changed at the request of the instructor. Such simulators include physiological and pharmacological computer models that automatically respond to interventions and medications. Simulators for practicing practical skills. These devices allow to simulate the performance of practical skills, usually with very high mechanical

realism, they are created in the form of body parts. These are simulators for practicing fibrobronchoscopy, colonoscopy, gastroscopy, laparoscopy, spinal puncture, vein access and other virtual reality. Computer monitors are used to display patient information and other visual information.

2) Screen simulators. There are many computer programs available on personal computers that simulate various clinical conditions. Models with specific tasks. These simulators are similar to the anatomical zones of the body, they include venopuncture simulators, injections, mannequins for basic cardiopulmonary resuscitation, etc.

Advantages of training on mannequins, simulators, imitators:

- realistic exercises that do not pose a risk to the patient;

- the duration of the educational process is not limited;

- the number of repetitions is not limited;

- no initial stress for the student;

- objective assessment of the student's actions.

The use of training programs based on simulation technologies allows improving the professional skills of medical personnel, which has a positive effect on the quality of emergency medical care and patient care.

The hardware and software complex includes simulation of specialized manipulators, imitators used in endovascular surgery and endoscopic surgery and open surgery, and provides realistic feedback. A software package that allows visualization of regions of the human body, simulation of tissues, organs and physical properties of the human body, various states and reactions to operational actions, and supports feedback. The hardware and software complex also includes educational and methodological modules, including the basic methods of open surgery with a small surgical field, endovascular surgery and endoscopic surgery, and allows the surgeon to be trained in these methods, which allows for various operational allows to repeat the situations, and evaluate the actions performed by the doctor-surgeon, in addition to the hardware-software complex, provides the opportunity to distribute information on the simulation of new techniques and devices via the Internet, as well as distance learning allows.

The establishment of a hardware and software complex as a technical and methodological basis for a qualitatively new level of training of surgeons at the undergraduate and post-graduate stages of education made it possible to:

- use of virtual reality technologies and real sensory communication in teaching;

- creation of educational materials based on modern 3D modeling and interactive technologies;

- to develop the possibility of individualizing the model of the human body based on the information about the physiology and topography of a particular patient;

- expansion of opportunities for rapid dissemination of new surgical methods, including virtual models of new instruments and operating situations in electronic form via the Internet [7].

In addition, the created hardware and software complex can be the basis for systems for training and improving the skills of specialists in other fields, where equipment telemetry and manipulation control or partially requires the use of stationary devices, which requires the creation of manipulators, simulation of the necessary control elements and It allows the use of a platform for 3D modeling [6].

Thus, the virtual simulator is certainly useful for watching lectures, video and multimedia materials, assisting operations, etc. does not replace traditional forms of training, but before allowing a young specialist to independently carry out surgical interventions, it is necessary to develop practical skills and skills in the simulator.

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