

APPLICABILITY OF INTERACTIVE TECHNOLOGIES IN HEALTHCARE EDUCATION: A NARRATIVE REVIEW

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Abstract

The development and progress of technology in all spheres of life, and the continuous increase in the health needs of the population in recent decades, require a change in the training of future medical specialists.

Questions related to the applicability of interactive educational technologies in the education of health care students attract the attention of many scholars. Despite the wide range of research, many aspects and mechanisms of interactive learning are still understudied and require more in-depth analysis. The report explores and analyzes the interactive methods used in the modern educational space, the theoretical foundations, classification and specificity, and the prerequisites for effectiveness in healthcare education. The analysis shows that the introduction of interactive forms of training in the healthcare education process will facilitate the acquisition of profession-specific knowledge, skills and competencies.

Keywords: *interactive methods, university education, health care*

1. INTRODUCTION

Medical education plays a key role in preparing professionally competent specialists in the field of healthcare.

According to the European Reference Framework [11], competence is defined as a combination of knowledge, skills, attitudes and learning abilities. Competence encompasses expertise, awareness, and specialization, developed through the process of learning, through the accumulation of knowledge and skills [14,17].

As medical technology advances and healthcare conditions become more complex, the need for nurses who are not only clinically competent but also capable of critical thinking, effective communication, and leadership is increasingly important.

The global spread of the Internet, as well as communication technologies, provokes the modernization of the educational process and creates new methods for its organization. In this way, interactive teaching methods are formed and consolidated, which have distinctive features from classical educational techniques. The use of interactive didactic tools allows for increasing the level of flexibility of learning, as well as meeting the needs and interests of students with different expectations and levels of knowledge [7, 21].

In parallel with the practical training of nurses in real clinical settings, modern technologies can be used to assist students in mastering knowledge and acquiring skills and professional competence, by studying behavioral algorithms and adopting different communication styles, for example between a student and a patient, a student and a teacher, a student and a patient's relatives, as well as all other members of the professional team [14].

Innovative technologies place the student at the center of the educational process and enrich the traditional educational environment, making it more dynamic and attractive. Practice shows that optimizing and effectively implementing the learning process implies finding an optimal balance between traditional and interactive methods in order to achieve a more complete and adequate consideration of the individual needs and interests of students [8,24,28,34,36,39,42,41,43].

Questions related to the applicability of interactive educational technologies in the education of health care students attract the attention of many scholars [41,43,]. Despite the wide range of research, many aspects and mechanisms of interactive learning are still understudied and require more in-depth analysis.

Today we need to talk about the use of interactive teaching methods that encourage interest in the nursing profession; help the effective learning of the learning material; form patterns of behavior; provide high motivation, strength, knowledge, team spirit and freedom of expression; and most importantly, contribute to the complex competencies of future health professionals.

2. MATERIALS AND METHODS

The report explores and analyzes the interactive methods in the modern educational space; theoretical foundations; classification and specificity; prerequisites for effectiveness in healthcare education.

A review of modern teaching methods, which are most widely used in scientific and methodological literature and have the potential to form the competencies of future specialists, is presented. Some interactive teaching methods and their potential in professional training are briefly described.

The following were used: documentary research; analysis of national and international literary sources; personal professional experience and observations on the applicability of interactive methods in the context of healthcare education.

3. RESULTS

Training is a process of actively acquiring new knowledge, skills, experience and competencies through systematic and purposeful learning. This process can be carried out through various methods, techniques and educational environments and includes interaction between the student and other participants in the learning process - teacher, information, learning materials and other learners.

The learning process at all levels should be based on the independent performance of active actions by the students themselves. In the course of the learning process, three forms of interaction between teachers and students have become established (passive, active and interactive methods), each of which has its own characteristics.

The passive method is a form of interaction between a teacher and a student, in which the teacher is the main actor, managing the course of the lesson, and the student acts as a passive listener, subject to the teacher's instructions. The interaction is carried out through surveys, independent tasks, tests, etc. Passivity in learning does not contribute to the formation of personality traits, but it cultivates the skills of standard thinking. From the point of view of modern pedagogical technologies and the effectiveness of students' assimilation of the learning material, the passive method is not very effective, but nevertheless it has some advantages. This is a relatively easy preparation for the lesson by the teacher and the opportunity to present a relatively larger amount of learning material in a limited time frame.

The active method is a form of interaction between students and the teacher, in which they interact with each other during the lesson and the students are not passive listeners, but active participants in the learning process. Students and the teacher are equal. If passive methods imply an authoritarian style of interaction, then active ones imply a more democratic style.

Many scholars equate active and interactive methods, but despite their common features, they have differences. Interactive methods can be considered the most modern form of active methods.

The interactive method: interactive ("Inter" - mutual, "act" - I act) means to interact, to be in a conversational mode, in a dialogue with someone. In other words, unlike active methods, interactive methods are focused on a broader interaction of the student not only with the teacher, but also with his colleagues. The student's activity in the learning process dominates. The functions and the role of the educator are changing. Compared to traditional learning, the teacher's activity gives way to the activity of the students, and the teacher's task is to create conditions for initiative, as can be seen in Fig. 1.

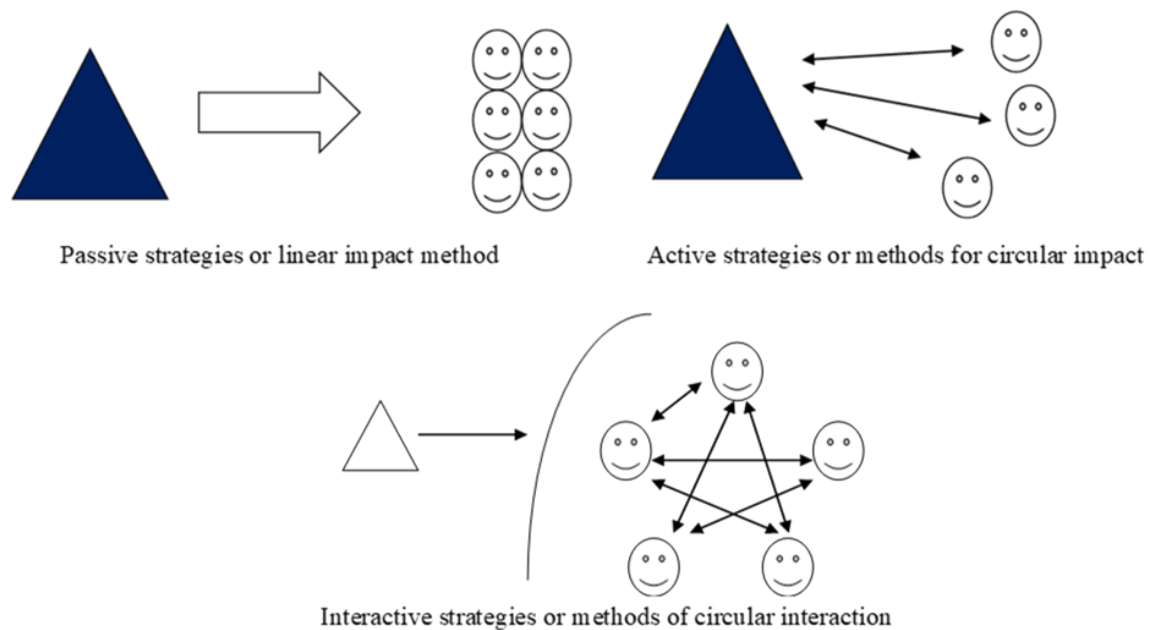


Figure 1. Methods of interaction between teacher and students.

Source: Glazunova T. Nikolaevna. 2016

Interactive learning is a special form of organizing cognitive activity, with well-organized feedback and two-way exchange of information between the teacher and the student, as well as between the learners. Thus, interactive methods allow the educational process to come as close as possible to the real practical activity of the professional, develop analytical thinking, creativity and the ability to solve complex professional problems, and also stimulate self-development and self-education.

Essence of the concepts of "interactivity" and "interactive methods".

The concept of "interaction" as a term has different interpretations in scientific circles [16,18,19,20,23,27]. It is a subject of research in social psychology and means "interaction and mutual influence between people in the process of their communication."

Historically, the foundations of interactive learning were laid in Ancient Greece, in particular in the dialogues of Socrates with students (470–399 BC). They represented a type of conversation-research, subordinated to the search for truth, in the process of formulating the right question and the specific answer to it [33].

The term "interactive learning" appeared in the early 1990s, when its intensive research and integration into the pedagogical field began. The emergence of the term "interactive technologies" or "interactive learning" is associated with various studies [23,25, 44,47,48].

"Interactive learning" derives from the psychological term "interaction" and means "interaction and mutual influence between people in the process of their communication" [5].

Accordingly, the concept of "interaction" can be applied to all types of social activities, including educational ones. It means "mutual or reciprocal action of two or more persons with a certain effect on them and includes communication and cooperation in the performance of a common task with a mutual result from it. Communicating, the actors exchange information and mutually change" [28], which mobilizes the internal forces of each participant [20,27,45]. Interactivity refers to the interaction between the trainer and the trainee, as well as between the trainees themselves.

Interactivity in learning, according to D. Todorina [42], manifests itself in different ways:

- as a team organization of learning activities;

- as one of the sides of communication between partners in the learning process;
- through the application of information technologies;
- within the framework of educational technologies, etc.

Interactive methods as a set of specific actions have the main purpose of introducing interactivity, purposefully implementing intensive interaction to achieve expected results in personal development [41]. Emphasis is placed not only on the activity of the learners, but also on communication as a way of realizing interaction and subsequent possible results.

The possibilities of interactivity are revealed both in the direct interaction of participants in the educational environment and through its means - information and communication technologies and their application, computer-mediated communication. According to Radev [36], interactivity has two forms: face to face interactivity and keyboard with keyboard interactivity.

How does the interactive educational model differ from the traditional one?

- the learner has a conscious need for information;
- the definition and solution of the learning problem is carried out in a dynamically changing, interactive environment;
- the information after processing is perceived as a resource;
- the presence of various types of interactions between the trainer and the learners, including through modern means of searching, transmitting and demonstrating information;
- feedback is carried out jointly by the trainer and the learners [24].

Classification of interactive learning methods.

Interactivity is manifested in the so-called "interactive learning system", which is a combination of numerous learning situations in which different types of knowledge and information are exchanged between partners involved in the learning process. Two interactive learning systems are popular in the scientific literature:

- human-centered system;
- technology-based system [19,34]

Interactive learning contains an arsenal of different methods and is considered one of the most effective at the modern stage [13].

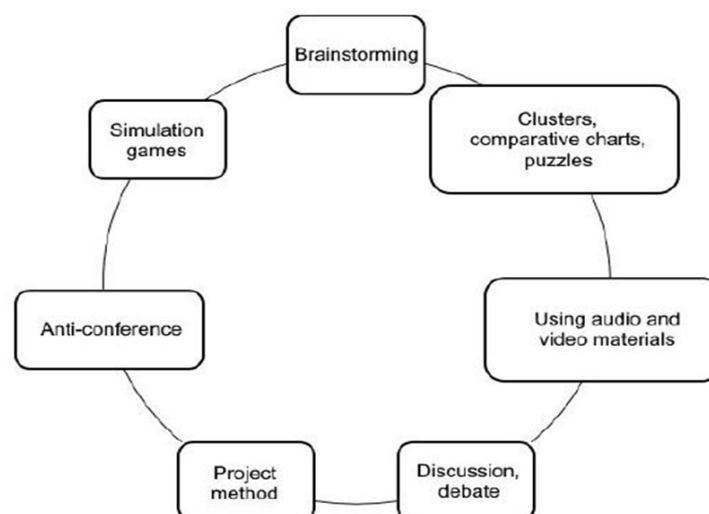


Figure 2. Modern interactive teaching methods

Source: D. A. Gaber et al., 2020.

Examining the numerous learning situations, I. Ivanov [24] grouped them into three main groups of methods – situational, discussion and empirical.

Situational methods include educational strategies and techniques that focus on the application of knowledge and skills in real or imagined situations. These methods create conditions for developing the ability to analyze and search for adequate solutions related to real practice.

In the group of situational methods is the solution of a *case study*. Its essence consists in the fact that learners are offered to make sense of a real-life situation (in particular medical), the description of which both reflects some practical problem, but also updates a certain set of knowledge that must be mastered when solving the problem. The method can be applied to various areas of healthcare: to diagnose a problem, to seek a solution to a previously encountered problem of a communicative, ethical, research or managerial nature. Learners can be assessed both on the actions taken to solve the problem and on the possible consequences of the proposed solutions. Depending on the complexity of the tasks to be solved, the method can be used as a short exercise lasting 45 minutes, or as a more extensive one – for a whole clinical practice – 6 hours, for independent work at home or for conducting an examination procedure. In some cases, a whole course for a certain discipline can be prepared, consisting of several lessons [40].

Simulation is a situational method through which clinical skills are practiced in a “controlled environment.” It provides standardization of cases, promotes professional clinical thinking, allows for supervision of patient care skills, provides immediate feedback, and helps students assimilate knowledge and experience [2].

Situational methods also include the so-called *game methods*. *Role-playing games* are suitable for developing skills for adequate response in a certain situation [34]. Participants simulate a certain situation to act out what they have learned or to develop new abilities. According to I. Ivanov [24], through role-playing games a number of social skills for communication, cooperation, negotiation and agreement, and conflict resolution are formed. The basis of role-playing games is the choice of social roles. They are considered as forms of behavior that occur in the professional environment. Role-playing games can be: situational, simulation and dramatization.

The second group of interactive methods are the so-called *discussion methods*. They provide an opportunity for active participation of students, develop analytical and communicative skills, encourage critical thinking, the ability to argue, improve understanding of information. They create space for different points of view and enrich the learning process. These include: *conversation, discussion, deliberation, debate, brainstorming*.

The *brainstorming method* is aimed at collectively finding a solution to a given problem and is widely used in the training of health care students. It helps to search for unconventional and traditional solutions to various problems and develops the ability to concentrate attention and mental efforts on solving a pressing problem. At the same time, students develop teamwork skills, learn critical and self-critical thinking, and gain confidence in their knowledge and skills.

Discussion is a dialogical method for exchanging ideas and opinions in search of a specific truth or optimal solution to a problem. It is a valuable interactive teaching method in medical school, which allows students not only to absorb information, but also to develop critical thinking, communication and teamwork skills. Discussion is a powerful tool for developing the professional and personal competencies of healthcare students, as well as for improving the quality of education.

From the group of so-called *experimental/empirical methods* in the educational preparation of students, the *project method* (project work) is most widely used. This method is usually applied in extracurricular organizational forms due to the need for more time for planning and implementing project activities [52]. The project method is successfully used in the training of nurses when developing essays or term papers. The project method opens up broad opportunities for students to build on their theoretical knowledge, gain research experience, and improve various practical skills in a real environment. The

successful handling of the tasks, in turn, gives them self-confidence, faith in their abilities, conviction in the professional choice they have made.

In recent decades, the so-called “*electronic learning*” (E-learning) has gained wide popularity. E-learning is a general educational approach that uses the Internet as a means of teaching and connecting with learners [10, 16]. E-learning involves a pedagogical approach that typically seeks to be flexible, engaging, and learner-focused; one that encourages interaction (teacher-student, student-student), as well as collaboration and communication.

Web-based technology is able to provide learners with an intuitive way to learn and interact simultaneously [3]. The web-based learning system provides effective platforms for collaborative learning and knowledge exchange [3] and represents the online learning environment [30]. Such platforms include Moodle, Classroom, Blackboard, etc. They enable online learning, communication between students and teachers, provide learning resources, and conduct control and evaluation.

A widely used teaching and learning method is *multimedia learning*. It provides an interactive way to introduce and present the learning content. Multimedia presentation, supporting the objectives of the lesson, is associated with audio-visual models that bring the student as close as possible to actual events and real practice [33].

4. DISCUSSION

The learning process of healthcare students has specific characteristics stemming from the difficulty and complexity of the learning material, the educational environment, and the patient as the subject of learning.

Scientific research on the effectiveness of interactive teaching methods in modern medical education shows [9,15,31,39,40,41,43,46] that the formation of skills and experience in students for future professional tasks is a complex process, but the precise application of these technologies in training expands, enriches and complements traditional learning.

Modern interactive technologies are part of the daily life of the digital generation and have the potential to motivate and increase student engagement [12, 32] in the learning process.

In their study, G. Yankova and P. Dobrilova [50] prove that the use of information and communication technologies in parallel with traditional teaching methods creates a positive learning environment and has the potential to improve learning [49,51].

Achievements in the field of technology and the accessibility of audio and video materials orient the teacher towards the use of video algorithms in the learning process as a means of acquiring lasting professional knowledge and skills in conditions close to the real, safe environment [49]. The introduction of video algorithms into the educational process leads to improved student skills and increased satisfaction with practical training, which is a prerequisite for better prepared and well-trained healthcare professionals [6].

Modern interactive technologies improve the quality of the learning process in healthcare. A study by Georgieva-Tsaneva et team, presents an innovative system for training nurses and midwives, containing educational video materials, serious games, problem-solving activities, and more [14]. According to the authors, artificial intelligence, virtual, augmented and mixed reality, digital multimedia presentations and global communication are becoming an increasingly integral part of the modern educational process.

The competency-based approach finds its application through interactive methods and innovative technologies in education, which are focused on stimulating student activity and acquiring profession-specific competencies.

K. Mollova [33] studies the process of implementing an interactive model in practical classes in kinesitherapy and therapeutic massage for rehabilitator students. The author establishes greater activity on the part of the students, increased academic motivation, and formation of the professional competencies necessary for the practice of the rehabilitator.

In their scientific papers, scientists describe one of the most common interactive teaching methods, namely didactic role-playing. The authors reveal that game technology significantly trains and develops the communicative skills of learners. Produces game behavior forming professional competencies that meet the requirements and standards and supporting students in their functional-personal improvement [1,38,46]. The stated positions of the researchers are united by the fact that in order to overcome the monotony of classical lectures, it is necessary to use various didactic forms, in particular game forms.

Simulation is an interactive educational tool that is increasingly used in medical education. The pursuit of new simulation technologies in nursing education is largely motivated by patient safety imperatives and finding alternatives to scarce clinical practice opportunities. Simulations are widely used worldwide and are directly related to the World Health Organization (WHO) recommendations for providing safer patient care in nursing and midwifery training [29].

There is evidence to support the role of simulation training in improving knowledge, behavior, and skill acquisition in basic nursing education. Self-esteem and confidence in performing various manipulations increases, significantly improving their technical performance and reducing the possibility of making mistakes. In this sense, clinical simulations play an essential role in the practical training of students and can significantly improve their future professional competence. The trend observed in the analysis of these publications indicates that participants who underwent simulation training during their education achieved higher levels of self-efficacy and educational effectiveness. [4,22,26,37].

Technological advances and today's generation, which is more informed about technology, contribute to the increasing use of virtual worlds in nursing education and clinical practice [26].

Interactive teaching methods occupy an important place in modern medical education. As V. Gyurova notes, there are things that literally have to be memorized – definitions, formulas, etc. In all other cases, students should be encouraged to make choices, discover the truth, doubt, seek and find alternative solutions [18].

The reviewed studies on the use of interactive educational technologies in the education of healthcare students show that they are increasingly used in medical education.

5. CONCLUSIONS

The educational methods studied have proven their effectiveness in improving the quality of education of students from higher medical education institutions.

The application of interactive educational technologies in healthcare education is vital to preparing future healthcare professionals for the dynamic and demanding nature of modern healthcare. These methods will allow for the creation of an educational environment in which theory and practice are studied simultaneously, which contributes to critical and logical thinking and the formation of individuality. They not only improve the quality of healthcare education, but also directly contribute to better patient outcomes and the overall efficiency of healthcare services.

Prospects for further scientific research lie in studying the long-term impact of interactive learning methods on the professional development of future health professionals and developing adaptive models for their implementation in the context of the digitalization of education.

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