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THE USE OF NEW TECHNOLOGIES AND SERIOUS GAMES IN MEDICAL CARE TRAINING [1]

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Abstract: *The report presents the application of innovative technologies in the educational process. In recent years, the educational process around the world has been enriched by the inclusion of videos, serious educational games, web-based digitized resources. This trend is also observed in medical education in Bulgaria. Methods for optimizing medical education through the use of video algorithms, serious games and virtual simulations are shown. Serious educational games offer an interactive, alternative way of learning the material, while offering students the opportunity to acquire knowledge and skills, learn to solve problems and interact with each other. The presented educational game was created especially for the medical specialty Midwives in the professional field of "Health Care". The game was created in the form of a test through the educational platform Kahoot. Moments from the creation of the game and some of the issues included in it are shown. The presented educational game can be used both for distance e-learning and for preparing students for an exam. Serious games are a tool for the development of imagination and creativity, a way to automate skills and therefore can play a very useful role in the educational process in medicine.*

Keywords: *Serious educational games, medical education, medical care training.*

JEL Codes: *I23, I29*

INTRODUCTION

Serious educational games are designed for educational purposes, they have an educational focus and support the formation of professional knowledge, skills, and competencies. Unlike other fun games, educational games help learners learn new things, build on what they have learned, learn new topics, expand their concepts, contribute to the acquisition of new skills, or to strengthen existing ones. Educational games have an innovative, interactive way of learning the material, in which knowledge and skills are acquired, learners learn to solve problems, to interact with each other, to develop their social skills. Serious games can present knowledge using approaches through which learners experience pleasure and fun in the learning process, a desire for engaged participation; increase their motivation, feel satisfaction from what they have learned. Serious games provoke the imagination and develop creativity, support social interaction, and evoke a positive emotion.

Serious educational games, as part of modern technological innovations, have the potential for application in the training of professionals in the professional field of "Health Care". Their use in the process of teaching, acquisition of new knowledge and skills, as well as in the process of testing the acquired knowledge, is a current trend and necessity in the educational process of training nurses and midwives. Traditional pedagogical methods can be successfully upgraded with the help of appropriate modern interactive learning tools.

The purpose of the report is to present the possibilities of serious educational games in the field of medicine and in particular in the training of specialists in the professional field of "Health Care".

[1] The paper is presented in November 13, 2020 at the Online scientific conference RU & SU'20 in the Health Care section with the original title in Bulgarian: ИЗПОЛЗВАНЕТО НА НОВИ ТЕХНОЛОГИИ И СЕРИОЗНИ ИГРИ В ОБУЧЕНИЕТО ПО МЕДИЦИНСКИ ГРИЖИ.

There is also an educational game, which has the form of a test (asking questions and choosing answers), which can help successfully prepare students in the process of acquiring knowledge and acquiring clinical skills.

EXPOSITION

According to Fitzgerald, 1997 the game is "an instructional method requiring the learner to participate in a competitive activity with preset rules". Serious educational games have several advantages: they support the processes of creating strategic and long-term thinking that learners need to overcome learning difficulties. Through serious games, skills for making the right decisions are built-in realistic situations under pressure and for a short time. In most of the games, the team principle develops due to the need to play in a team and to make joint decisions to achieve certain goals. Educational games have a positive role in solving problems with attention deficits in student learning.

In the field of medical education, the inclusion of educational games is a tool for innovative modern education of students, a method for personal and professional growth in a safe and secure environment. Simulation games allow for the repetition of individual elements of complex procedures, thus mastering the entire procedure and creating confidence in the accuracy of their implementation.

Dewey and the gestalt theorists (Hanna, 1991) present a teaching strategy through the use of serious games in teaching. The modern generation of students grows with technological innovations, uses many technological resources in their daily lives, and in their learning, its requirements for learning are very different from those of previous generations of students Black, 2010).

The study by Foss, Mordt, Oftedal, and Lökken (2013) presents an educational game designed to teach nursing students about the use of medical units and expressions; the game includes training (introduces nursing students to the mathematical conversion of standard medical units and practical calculation), self-testing (includes problem-solving, showing ranking by points and graphs), and examination. The game allows you to increase the level of complexity by reducing the response time.

Müller and Mathews (2013) present a serious educational game designed to train nurses to identify drugs by their names.

Müller and Price (2012) created the computer video game Brevissima, which aims to teach nursing students international medical abbreviations. Game users use the arrow keys to select the correct answer; a certain number of points are awarded for each correct answer. As the level of the game increases, the response time decreases. The game is met with interest by students who find it interesting, fun and useful, motivating and enabling self-assessment.

Boyle and others create and present in their work (Boyle, E., & MacArthur, E. (2013).) And (Boyle, E., MacGregor, S., Van Rosmalen, P., Manea, M., & Penanen, T. (2014)) an educational game aimed at developing the skills of nursing students in the sciences of research and statistics. The game is related to current issues regarding healthy eating and obesity.

Müller (2012) presents a video game supporting the acquisition of pharmacological terminology. At the same time, the game helps to improve listening skills and reduces the reaction time when answering.

The free educational game Kahoot turns out to be suitable for use in teaching in many subjects, including medicine. Kahoot is an easily accessible educational platform for creating educational games in many academic disciplines. The platform allows for easy and convenient creation of the game and learners accept the game with interest.

The game is made in the form of a test, which allows students to test their knowledge effectively in a fun way for students. The game can be played several times, and thus it becomes a learning tool. The platform allows you to set a response time and award points for each correct answer. The correct answer is marked with a checkmark when composing the game. After the end of the game (for team use by students) a ranking of the participating players is given according to the number of points received. This allows each student to compare their acquired knowledge with those of other students.

Optimizing medical education through the use of video methods, virtual simulations, and serious games

Medical education can be made more effective through the use of videos and virtual simulations. Created video algorithms by Angel Kanchev University, Ruse, Department of Health Care, Bulgaria support students in their training in injection technology (the Nurse and Midwife specialty). Video algorithms are of great interest to students, who can use them to study medical procedures in detail and visually. As of August 26, 2020, the video algorithm "Subcutaneous injection" (fig. 1) has 55,947 views (the video algorithm was published on May 16, 2015).

Fig. 1. Subcutaneous injection. Video algorithm.

Virtual simulation is defined as a virtual tool for artificially creating a set of conditions in order to learn and master something that exists in real life. This contributes to the achievement of educational goals through experimental training (Abdulmohsen A (2010)). The use of virtual simulations in medical education has grown since the beginning of the new century. (Flangan B, Nestel D, Joseph M. (2004), Hristova, Tsv., T. Todorova, (2020)). Medical curricula are beginning to appear around the world, including the use of virtual simulations in their plans as a means of creating clinical skills.

For the purposes of teaching nursing students at Ruse University "Angel Kanchev" (the Faculties of Public Health and Health Care), the authors created an educational game with the capabilities of the Kahoot platform. The game is created in the form of a quiz using questions that can be asked to students, specialty Midwives, on the exam.

Figure 2 presents the educational platform and illustrates the work process of creating an educational game.

Figures 3 and 4 show some of the 12 questions included in the created game.

If you select the correct answer, the selected field is colored green and all other fields are colored red. Below the question appears a green bar (Figure 3), which indicates "correct" and visualizes the points that the game gives for the correct answer to this question. The number of points awarded for a given correct answer depends on the pre-set maximum number of points for a correct answer and decreases depending on the time used to answer the question.

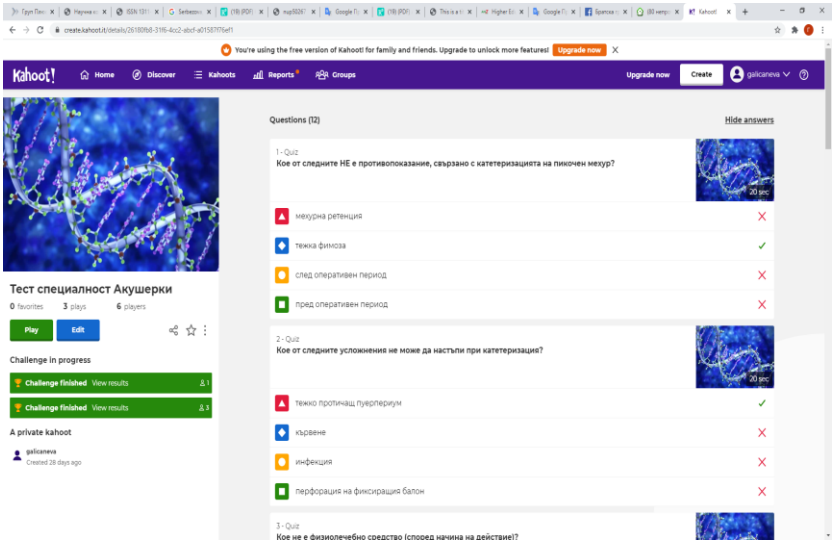

Fig. 2. The process of creating the game

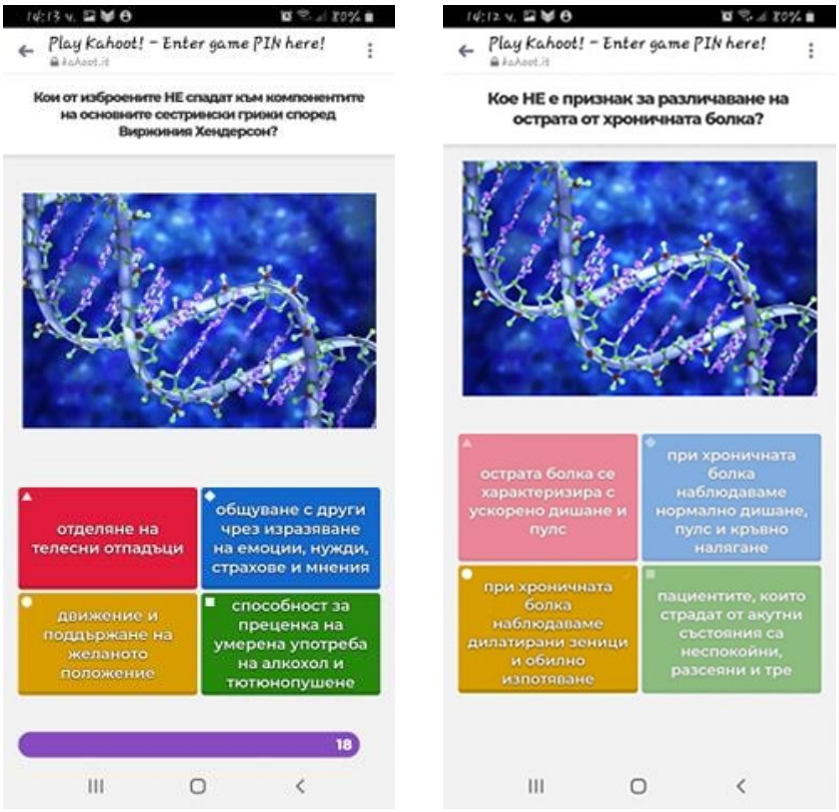

Fig. 3. Presentation of questions from the created game

Fig. 4. The view when choosing the correct answer

CONCLUSION

The current generation of students often find traditional teaching methods abstract, dry, boring, and too quickly lose interest in this way of presenting learning content. The use of modern technological innovations in education is a method that provokes and retains the interest of students, leading a very good academic performance and high motivation to learn. Serious educational games are an innovative tool for increasing students' knowledge and an interesting, well-accepted way to establish the level of knowledge. At the same time, serious educational games can be an alternative method of teaching and testing students in periods of epidemic situations.

The quarterly closure of universities and schools in 2020 in Bulgaria and around the world has provoked teachers to look for new teaching methods. Modern innovations are entering medical education, this is a path that needs to be followed and confirmed. The positive attitude of students to the use of new technologies, including serious games in education, shows that this method will give the necessary results in the educational process. The serious game presented in the report, created through the educational platform Kahoot, can be used in the process of preparing nursing students for their university exams.

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