European Journal of Interdisciplinary Research and Development
Volume-17 July 2023
Website: www.ejird.journalspark.org ISSN (E): 2720-5746

IMITATIONAL METHOD OF TEACHING FOR CARDIO-PULMONARY RESUSCITATION TRAINING IN MEDICAL EDUCATION

Akhmadaliev Shokhrukh Shukhratovich
Assistant of the Department of Facultative and Hospital Surgery,
Fergana Medical Institute of Public Health

Sidikov Akmal Abdikaxarovich
Scientific Supervisor: Prof.
Tel.: +998905633006 E-mail: sh.sh.ahmadaliyev@gmail.com
150100 Fergana, Uzbekistan

Abstract
The spread of cardiopulmonary resuscitation (CPR) skills is essential for surviving cardiac arrest. Virtual Reality (VR) pulmonary resuscitation training is the cheapest and easiest method for medical students to learn how to apply chest compressions at the right speed and depth. The study examined the compliance of cardiopulmonary resuscitation with quality criteria performed using virtual reality.

Keywords: Virtual reality, virtual patient, cardiopulmonary resuscitation.

Introduction

Reforming the education and training system in our republic and bringing it up to the level of developed countries is among the priorities of state policy. Since the quality of the system of continuous education and training is a decisive and important factor in the development of any country in accordance with the requirements of the time, it is necessary to recognize the need for innovative changes in modern vocational education [1].

People of this century cannot imagine our life without mobile phones, tablets, computers and new gadgets connected to the Internet. Students can improve their knowledge by effectively using the multimedia audio and video technologies of these devices. According to scientists, educational and methodological multimedia materials form communicative competence, increase motivation to study science, and provide an interactive effect [2]. Traditional medical education is based on lectures and didactics and requires the student to attend and memorize information [3]. The traditional education system has a number of limitations. They are boring, monotonous, standardized, and the lack of a realistic model can lead to the fact that many students do not fully master practical skills [4].

At present, the rapid development of science, technology and science makes it possible not only to see events, but also to feel them and participate in them virtually. The technology that gives us this opportunity is virtual reality.

Virtual Reality (VR) is a real-time simulation based on computer graphics that uses the user's gestures and verbal commands to create real life [5]. Virtual reality provides interactivity by incorporating user changes into a virtual object. Such a remarkable feature of the method is of

great importance in the theoretical and practical part of medical education [6]. This technology is widely used in the fields of education and training, entertainment, military, medicine and surgery [7].

Virtual reality appears with the help of a specially computerized helmet with glasses, a headset, a handbag or a special remote control. When a user puts on a helmet, they feel comfortable in a virtual entity that appears on the computer screen, touches objects in the environment with a remote control or hand bag, or performs an action [8].

From simulators previously used in medical education, virtual reality stands out for its safety, realism and reusability. Over time, clinical research involving new technologies of virtual reality and simulation has served to create more versatile and effective models of this method.

Due to the rapid development of virtual reality in the context of medicine, its use is rapidly expanding due to its interesting and promising learning [9]. Using this technology, users feel like real actors (performers), and not just observers. Virtual reality can be widely used in both undergraduate and postgraduate education. Virtual reality interacts with the user contextually and factually. When teaching using virtual reality, it can be used over and over again, and at the same time, it can be controlled due to its flexibility, which makes it an interesting medium. Through technical skills, virtual reality can increase the overall effectiveness of learning [10].

In medical education, students cannot practice invasive practical skills directly on patients. They face limitations in performing invasive practical skills. The anesthesiology and resuscitation curriculum also includes such invasive practical skills as placing a spinal catheter on a patient, performing cardiopulmonary resuscitation in case of clinical death, performing tracheal intubation, and applying defibrillation. Therefore, it is important to learn how to perform invasive procedures such as cardiopulmonary resuscitation in a safe virtual reality.

Purpose of the Study

Evaluation of the effectiveness of cardiopulmonary resuscitation conducted by 5th year students of the Fergana Medical Institute of Health using virtual reality.

Materials and Methods

5th year students of the Faculty of Medicine of the Ferghana Medical Institute of Public Health performed cardiopulmonary resuscitation for 20 minutes, first on a simple mannequin, and then in Hoco "VR" DGA 03 virtual glasses using the Lifesaver VR smartphone application. There are 44 men and 24 women among the students.

During training, experts measured the depth and speed of chest compressions, and also assessed compliance with the criteria for cardiopulmonary resuscitation.

To perform cardiopulmonary resuscitation in virtual reality, students downloaded the Lifesaver VR program from the Play market of their mobile phones (Fig. 1, 2).

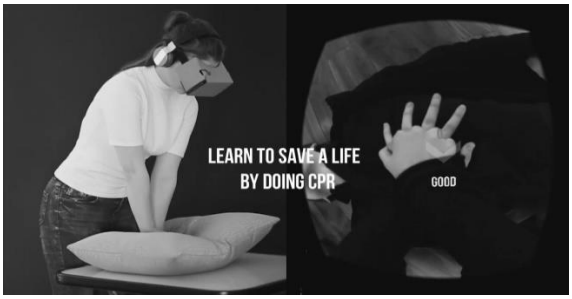

Figure 1. The Lifesaver VR app is displayed on mobile devices

Figure 2. Lifesaver VR software shows CPR on mobile devices.

The purpose of using the virtual eyepiece Hoco "VR" DGA 03 is that this device differs from other analogues in the presence of a high-quality optical system and headset, good fixation.

Figure 3. Appearance of virtual reality Hoco "VR" DGA 03.

When providing virtual reality, the display of a mobile phone is divided into two equal parts for each eye, but we see one image (Fig. 4). It allows you to observe the environment 360 degrees in the virtual world.

Figure 4. Representation of plates in virtual reality.

When students log into Lifesaver VR, they first watch a 15-minute interactive video. List continues to guide students step by step through 23 questions about the principles of first aid (Figure 5).

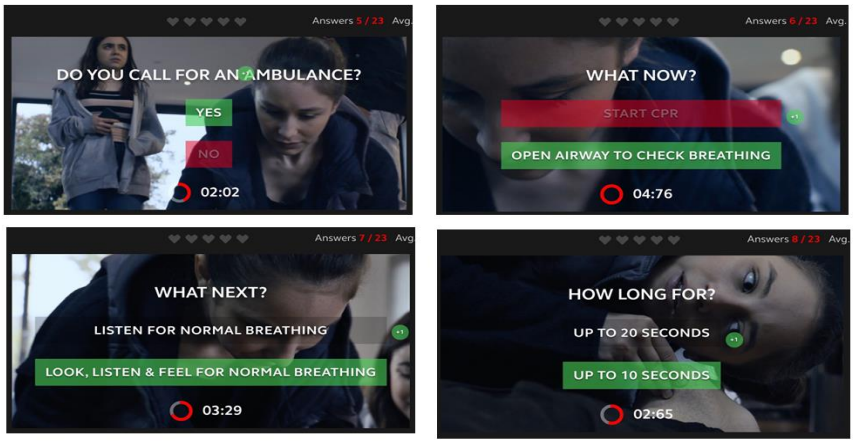

Figure 5. Questions are answered one by one in interactive videos.

Simple dummies are used for students to practice CPR in the virtual world. Even a pillow can be used for self-study at home (Figure 6).

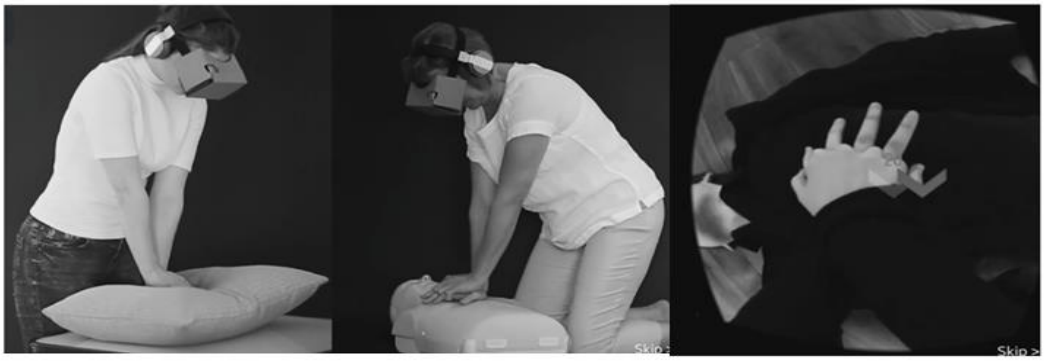

Figure 6. Mutual integration of moniken and virtual reality.

Students should perform cardiopulmonary resuscitation in accordance with WHO criteria. According to him, chest compressions should be performed 30 times at a rate of 100-120 chest compressions per minute. This corresponds to 1 heart beat every 3 seconds. In addition, the Lifesaver VR software itself communicates with you verbally. If you do compression slowly, then it says to speed up, if you do it fast, then you need to do it at a slower speed, if you do it at a normal pace, then the word good will appear before your eyes (Figure 7).

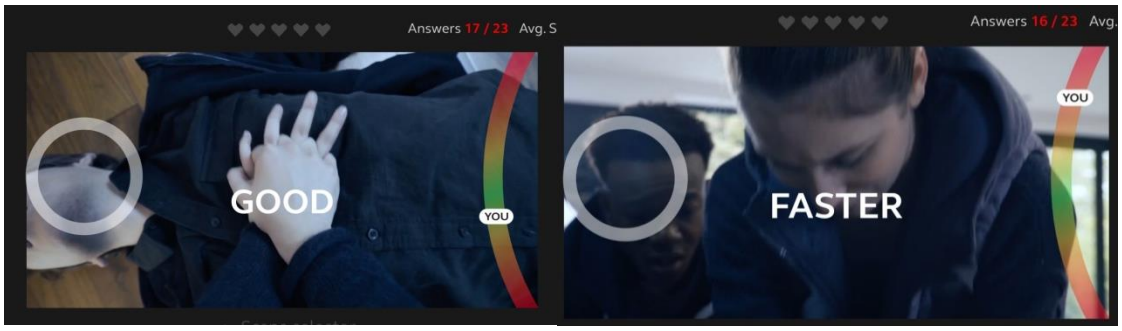

Figure 7. Mutual integration of mannequin and virtual reality.

The video board is an interactive game that evaluates student responses to questions about the principles of first aid and the effectiveness of cardiopulmonary resuscitation. The effectiveness of cardiopulmonary resuscitation is assessed by the frequency of chest compressions. The evaluation is performed by the Lifesaver VR software itself, and the results are announced at the end of the game (Figure 8).

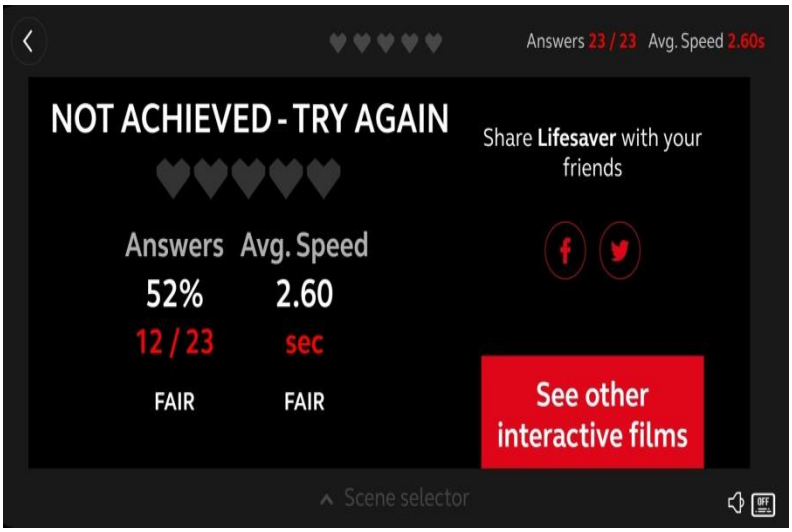

Figure 8. Student results window after an interactive game.

Results

According to the results of the study, 43 students (63%) were able to positively answer questions about the principles of first aid during an interactive game (on average 19±2 out of 23 questions). 25 students (36%) were unable to fully answer the questions (average 11 ± 2 out of 23 questions) on the first attempt. Students who could not answer the questions at all were not identified.

We collected results from the Lifesaver VR student assessment point to evaluate the rate of chest compressions. According to him, 47 students (69%) who performed 20-minute CPR successfully performed chest compressions in 2.9±0.2 seconds using virtual reality. 12 students (18%) performed compression 2.3±1.0 slower than the criteria for cardiopulmonary resuscitation, and the remaining 9 students (13%) performed compression 3.3±0.8 faster than normal.

Conclusion

According to the results of the study, cardiopulmonary resuscitation performed using virtual reality was evaluated more effectively than that performed in the usual way. Software built for virtual reality can display information about chest compressions, heart rate, depth of chest compressions, and the ability to correctly place the hand on the chest when interacting with the manikin. This integrated feedback improved the quality of CPR delivery.

In conclusion, virtual reality as a new pedagogical technology can be considered the most optimal method of medical education with its high efficiency and ease of use in acquiring the skills to perform invasive procedures that students cannot perform directly with patients.

References

1. Кадирова. М.Р. Тиббиёт таълимида инновацион ёндашув асосида тиббий таълим электрон платформасини жорий этиш технологияси// НамДУ илмий ахборотномаси 2021 йил 6-сон. С622.
2. Гузун С. А. Инновационные технологии как фактор повышения эффективности обучения студентов медицинского училища по дисциплине «анестезиология и реаниматология»//Журнал науковий огляд № 4 (25), 2015
3. Kamei RK, Cook S, Puthucheary J, et al. 21st Century Learning in Medicine: Traditional Teaching versus Teambased Learning. Med Sci Educ 2014;22:57-64.
4. Izard SG, Juanes JA, Garcia Penalvo FJ, et al. Virtual Reality as an Educational and Training Tool for Medicine. J Med Syst 2018;42:50.
5. Gaddis T. Using Virtual Reality to Bring Your Instruction to Life. Paper presentes at the League for Innovation Conference on Information technology (Atlanta, GA, Okt. 12–15,1997); 1997. p. 25.
6. Fan M. [и др.]. The comparison of teaching efficiency between virtual reality and traditional education in medical education: a systematic review and meta-analysis // Annals of Translational Medicine. 2021. № 3 (9). С. 252
7. Schwebel DC, Gaines J, Severson J. Validation of virtual reality as a tool to understand and prevent child pedestrian injury. Accid Anal Prev 2008;40:1394-400.
8. Mantovani F. VR Learning: Potential and Challenges for the Use of 3D Environments in Education and Training; 2001.
9. Semeraro F, et al. Virtual reality cardiopulmonary resuscitation (CPR): comparison with a standard CPR training mannequin. Resuscitation. 2019; 135:234–5.
10. Padilha JM, et al. Clinical virtual simulation in nursing education: randomized controlled trial. J Med Internet Res. 2019;21(3):e11529.