Dear Colleagues,

We welcome you from one of the oldest colleges in Georgia, Panacea, which has been collaborating in the field of pharmaceutical educational programs for two years. Articles by our faculty members have been published in your scientific journal. It should be noted that publishing a scientific journal in a college is a significant responsibility, and we are proud to acknowledge that you are successfully meeting this challenge. Your journal features news about medical achievements and scientific research not only from local scientists but also from those in other countries who are your partners. We wish you continued success in your dedicated and essential work. In this way, you make an invaluable contribution to the education of future medical professionals. Such cooperation between the two countries is very important. I want to wish you success, progress and strengthening of our countries!

Sincerely,
Director of Panacea College,
PhD in Medicine,

Vasil Kiknadze

Dear authors and editorial board members!

On behalf of Municipal state enterprise on the right of economic management «High Medical College» Public Health Department of Almaty, I express my gratitude to you for your valuable work and dedication. Medical science and education are the foundation of our future, which require high level of professionalism. Your scientific magazine is an important platform where practitioners and researchers meet, united by a common goal - improving people's health and quality of life. Its publications reflect current medical problems, offer innovative solutions and introduction of advanced technologies into practical healthcare and education. Your publications provide a good opportunity to share best practices, discuss unresolved issues and lines of research, stimulate professional growth of specialists.

We highly appreciate your willingness to share your knowledge and experience. We wish you to continue to join like-minded persons, inspire new discoveries and serve as a reliable source of information for all those who have dedicated themselves to medicine.

We wish you further creative success and prosperity of your scientific magazine.

Best regards,
Candidate of medical science, professor,
Director of Municipal state enterprise on the right of economic management
«High Medical College» Public Health Department of Almaty, Kazakhstan

Zhumakhan Moldakulov

ՀԱՅԱՍՏԱՆԻ ՀԱՆՐԱՊԵՏՈՒԹՅՈՒՆ

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РЕСПУБЛИКА АРМЕНИЯ

ВЕСТНИК

МЕДИЦИНСКОГО КОЛЛЕДЖА

ИМЕНИ МЕГРАБЯНА

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«**BULLETIN**» of the Medical College after Mehrabyan is the scientific and informational body of the Medical College, which presents theoretical and practical scientific and educational monographs, articles, works and proposals of Armenian and foreign scientists in the field of public health and medical education. All articles contain keywords, brief annotations in different languages for easy access by researchers.

Մեհրաբյանի անվան բժշկական քոլեջի «**ՏԵՂԵԿԱԳԻՐ**»-ը՝ բժշկական քոլեջի գիտական տեղեկատվական մարմինն է, որտեղ ներկայացվում են հանրային առողջապահության և բժշկական կրթության բնագավառներում հայ և օտարազգի գիտնականների տեսական և գործնական գիտակրթական մենագրությունները, հոդվածները, աշխատանքներն ու առաջարկությունները: Բոլոր հոդվածները պարունակում են հիմնաբառեր և կարճ տեքստեր տարբեր լեզուներով, նպատակ ունենալով թեթևացնել հետազոտողների օգտվելու հնարավորությունը:

ПРИМЕНЕНИЕ ВИРТУАЛЬНОЙ РЕАЛЬНОСТИ В ПРОЦЕССЕ ОБУЧЕНИЯ И ПЕРЕПОДГОТОВКИ МЕДИЦИНСКИХ СЕСТЕР В ВЫСШИХ УЧЕБНЫХ ЗАВЕДЕНИЯХ

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Аннотация. Технологии уже давно используются в обучении медсестер, и одним из распространенных методов является симуляция. Виртуальные симуляции предлагают преподавателям новые способы подготовки медсестер, повышая эффективность преподавания и обучения студентов для достижения ожидаемых результатов. Они позволяют студентам получить удаленный клинический опыт. Цель данной работы – определить отношение студентов и преподавателей к использованию технологий виртуальной реальности в обучении медсестер на основе качественного исследования, проведенного в Утенском высшем учебном заведении. Основной результат исследования показывает, что виртуальная реальность получила положительный отклик как у студентов, так и у преподавателей в связи с ее применением в образовании и обучении медсестер. Изучение контента в виртуальной реальности расширяет традиционные методы обучения и увеличивает разнообразие методов обучения. VR повышает вовлеченность студентов и мотивацию к обучению. Интеграция VR в учебную программу по сестринскому делу может быть ограничена имеющимися учебными ресурсами: количеством доступных 3D-очков, небольшим пространством, в котором проводится занятие, и техническими проблемами использования 3D-очков.

Ключевые слова: *виртуальная реальность, дополненная реальность, смешанная реальность, симуляция, обучение медсестер.*

APPLICATION OF VIRTUAL REALITY IN THE PROCESS OF EDUCATION AND TRAINING OF NURSES IN HIGHER EDUCATION INSTITUTIONS

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Abstract. Technology has long been used in nursing education, with simulation being a common method. Virtual simulations offer faculty new ways to prepare nurses, enhancing teaching and student learning to meet expected outcomes. They enable students to gain remote clinical experience. This paper aims to determine the attitudes of students and teachers toward using virtual reality technologies in nursing education, based on qualitative research conducted at Utena Higher Education Institution. The main outcome of the research shows that virtual reality has garnered a positive reception from both nursing students and lecturers for its application in Nursing education and training. Learning content in virtual reality extends traditional teaching methods and increases the variety of teaching methods. VR increases student engagement and motivation to learn. The integration of VR into the Nursing curriculum may be limited by available teaching resources: the number of 3D glasses available; the small space in which the session takes place; and the technical challenges of using 3D glasses.

Keywords: *virtual reality, augmented reality, mixed reality, simulation, nurses' education.*

ՎԻՐՏՈՒԱԼ ԻՐԱԿԱՆՈՒԹՅԱՆ ԿԻՐԱՌՈՒՄԸ ԲԱՐՁՐԱԳՈՒՅՆ ՈՒՍՈՒՄՆԱԿԱՆ ՀԱՍՏԱՏՈՒԹՅՈՒՆՆԵՐՈՒՄ ԲՈՒԺՔՈՒՅՑԵՐԻ ՈՒՍՈՒՑՄԱՆ ԵՎ ՎԵՐԱՊԱՏՐԱՍՏՄԱՆ ԳՈՐԾԸՆԹԱՑՈՒՄ

Ռուտա Յուրգելիոնիենե
«Ուտենա» քոլեջի միջազգային հարաբերությունների բաժնի վարիչ,
Բժշկական ֆակուլտետի պրոֆեսոր,
Ուտենի կիրառական գիտությունների համալսարան
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Ամփոփագիր: Տեխնոլոգիաները երկար ժամանակ օգտագործվել են բուժքույրական ուսուցման մեջ, և սիմուլյատորների կիրառումը այդ գործընթացում սովորական մեթոդ է: Վիրտուալ սիմուլյատորները մանկավարժներին առաջարկում են բուժքույրեր պատրաստելու նոր եղանակներ` բարելավելով ուսանողների դասավանդման և ուսման որակը` ակնկալվող արդյունքների հասնելու համար: Դրանք ուսանողներին հնարավորություն են տալիս հեռակա կարգով ձեռք բերել կլինիկայում աշխատելու փորձ: Այս հոդվածի նպատակն է որոշել ուսանողների և ուսուցիչների վերաբերմունքը վիրտուալ իրականության տեխնոլոգիաների օգտագործման նկատմամբ բուժքույրական ուսուց-

man մեջ՝ հիմնվելով Ուտենայի բարձրագույն ուսումնական հաստատությունում իրականացված որակական ուսումնասիրության վրա: Ուսումնասիրության հիմնական արդյունքը ցույց է տալիս, որ վիրտուալ իրականությունը դրական արձագանք է ստացել: Ինչպես բուժքույրական ուսանողների, այնպես էլ ուսուցիչների կողմից՝ բուժքույրական ուսուցման մեջ դրա կիրառման համար: Վիրտուալ իրականության ուսուցման բովանդակությունը ընդլայնում է ուսուցման ավանդական մեթոդները և մեծացնում դասավանդման մեթոդների բազմազանությունը:Վիրտուալ իրականությունը մեծացնում է ուսանողների ներգրավվածությունը և սովորելու մոտիվացիան: Վիրտուալ իրականության ինտեգրումը բուժքույրական վերապատրաստման ծրագրում կարող է սահմանափակվել առկա ուսումնական ռեսուրսներով՝ առկա 3D-ակնոցների քանակով. փոքր տարածքով, որտեղ անցկացվում է դասը և 3D-ակնոցների օգտագործման հետ կապված տեխնիկական մարտահրավերներով:

Հիմնաբառեր՝ *վիրտուալ իրականություն, ընդլայնված իրականություն, խառը իրականություն, սիմուլյացիա, բուժքույրական ուսուցում:*

Relevance of the article, research problem. Globalisation, innovation, digitalisation, and the COVID–19 pandemic have transformed industries, including education. The pandemic forced higher education institutions to adopt new teaching methods rapidly, such as urgent distance learning [5], often without adequate preparation and planning.

During the crisis, digital technologies helped to organize synchronous and asynchronous online lessons. In response to global trends, the training of health professionals is changing rapidly. Teachers no longer have and do not pass on all the knowledge. Now they are important coaches who show students how to meaningfully select, work with information, supplement and apply it. Teachers and students became collaborators in the study process. Virtual reality allows for improved quality and safety as allows students to experience patient care situations demanded for professional practice which is difficult to offer during clinical training. The use of technology is an opportunity, but sometimes it is a challenge for teachers and students. Scientists, talking about technologies that change the field of health [11] propose to study this topic from two different perspectives:

1. How to make the use of technology more attractive to learners by promoting the teaching and learning process.

2. How can we promote the acquisition of digital skills for learners who will be healthcare professionals in the digital world in the future?

The aim of the study is to determine the attitude of students and teachers to the application of virtual reality technologies in the process of training and education of nurses. **The research problem** is how are virtual reality technologies applied in the process of training and education of nurses evaluated by the students and teachers. **Research methods:** the analysis of scientific literature is combined with quantitative research at Utena College.

1. Virtual reality, augmented reality, mixed reality

According to Gerup et al. [6], modern training programs aim to effectively train trainees in a safe environment to put them in a clinical context.

Virtual reality (VR) is defined as a computer-generated 3D simulated environment that users can fully immerse themselves in. VR incorporates some real-world materials and elements into the virtual space so that people feel the existence of the real world [15]. Over the past few decades, many practitioners and researchers have developed theories and applications for the application of VR in an academic environment.

Based on these studies, some VR innovations have been developed and applied to improve the effectiveness of education and training for pupils and students [9, 13].

Augmented reality (hereinafter – AR) describes screen-based systems that combine real and virtual images, are interactive in real-time and capture the real-world environment, which is supplemented with virtual images [6]. AR adds a certain number of virtual components and elements to the real space so that people feel like they have entered the virtual environment [16]. In the scientific literature, AR technology is studied from various angles, mainly by foreign authors who analyze the development of the concept of VR itself and the sectors of application [1–3, 7–8, 12–13]. Several authors also explored the benefits and application possibilities of AR technology in the education sector [4, 15]. Lithuanian scientists have also made a significant contribution to the research on this topic [13–14].

Mixed reality (hereinafter – MR) is defined as the fusion of the real and virtual worlds. Mixed reality (hereinafter – MR) is the fusion of real and virtual space and artificial interaction in the real and virtual worlds [16]. The term «mixed reality» was introduced in 1994 by Paul Milgram and Fumio Kishino. MR forms a hybrid technology in which VR and AR functions are combined. In the case of MR, virtual objects are projected into the real environment of the subject, involve a combination of AR and VR of any degree (e.g., the presentation of real images in a simulated virtual environment), and are less commonly used compared to VR or AR). An example of an MR-supporting headset would be HoloLens2© [6] MRI is also widely used in healthcare training in areas such as anatomy or anaesthesia.

In the last decade, and more recently in the context of the COVID–19 pandemic, the challenges of training nurses have led to an increase in the use of innovative technologies such as virtual reality (VR). The potential of VR is seen as one way to digitize and make the training of medical professionals more attractive. 360-degree videos can provide an immersive educational experience related to otherwise accessible real-world environments. Emphasis is often placed on VR qualities such as immersion and additional motivation, as it allows you to learn in an environment that is often difficult or even impossible to achieve. This includes also different scenari-

os of the subject of study. In addition, VR can offer realistic configurations to safely and economically conduct various experiments, medical operations, or physics experiments that can be repeated as many times as desired or necessary. With the recent advancement of technology with the release of inexpensive head-mounted displays for consumers (HMD) and the emergence of the possibility of using smartphones as a device for the VR experience, VR has again attracted more attention [10]. However, the use of real VR to provide a live learning experience in the classroom is still rare. Especially in times of lockout and pandemic, when remote and online teaching issues have become more important than ever before, the need for motivating and realistic learning environments that are easy to use for potential learners and that allow educators to quickly create content has once again come to the fore [10].

VR innovations have been developed and applied to increase the efficiency of students' education and training, and their motivation is significantly higher when using VR technology. The learning process becomes much more pleasant and effective when the learner could visualize concepts that are difficult to understand using augmented reality technology [4]. Using VR technology, students can manipulate virtual, realistically existing equipment and materials by conducting experiments in the classroom, trying dangerous experiments in a traditional classroom, as well as conducting experiments that are impossible to implement due to financial conditions [15]. Based on the scientific insights of the authors, one can notice a trend in the improvement of the application of technologies, which indicates that with the development of these technologies, as many ways as possible are being sought to apply them in educational activities. Although the number of solutions is increasing, where and how can VR be applied in the field of education? The application of this technology is superior to conventional teaching methods. The positive aspects are described in *Figure 1*.

VR technology can change the way education is delivered because it assumes that it is possible to create a virtual world, real or imaginary, that allows students not only to imagine content but also to interact with it Thanks to several positive advantages of VR, this technology is included in the training programs of nurses. But despite this, for many nursing students and teachers, especially in Europe, this technology remains a relatively new experience.
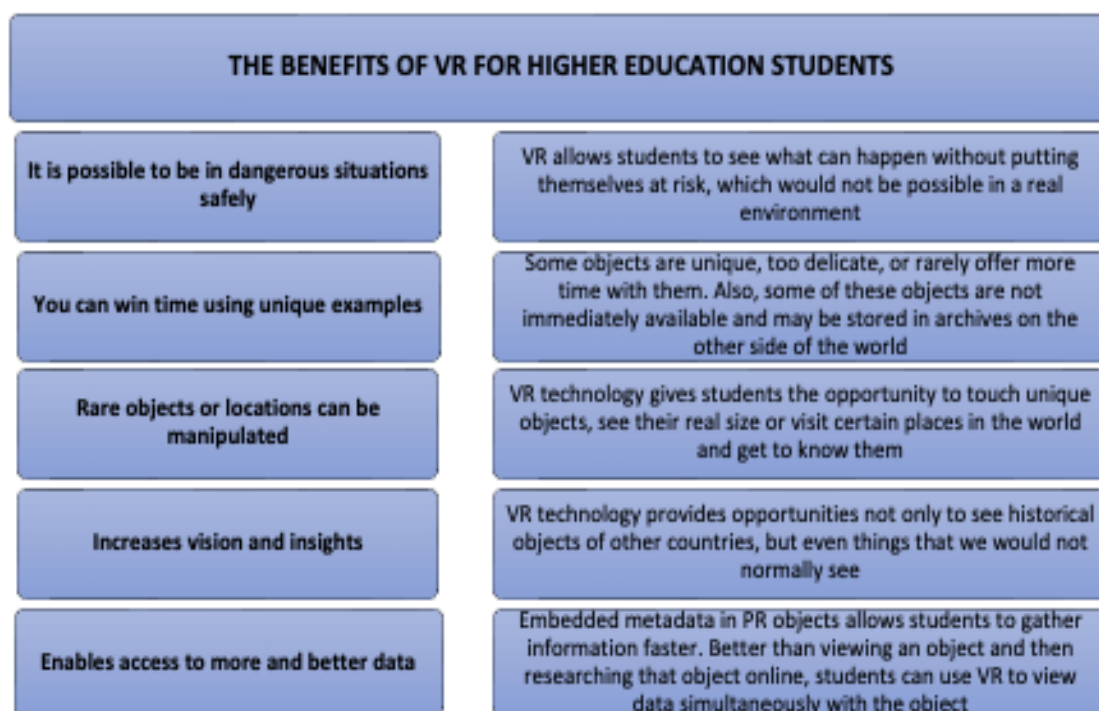
Figure 1. Benefits of VR for Higher Education Students (compiled by authors Thomas et al., 2019)

2. Overview of VR-related research and the application of VR in different areas of education

Analyzing various studies of the application of VR in the cognitive, teaching and educational process in Europe and elsewhere, among other examples of experience, the authors of the article analyzed the research experience of projects implemented by the VR-Dynamix GmbH agency (based in Germany, at the Munich Technology Center) related to the adaptation of VR reality to various purposes The agency in question researched how VR can be applied in the medical field. As one of the possibilities of training, it is proposed to teach medical students anatomy using 3D visualization, rather than static 2D pictures, examining human organs or tissues. It is noted that VR technologies provide an opportunity to view them from all sides, without compromising the health and safety of real patients. An example is given that with the help of technology, the future surgeon can learn the sequential steps of the operation and prepare even for the operation of an artificial hip. It is claimed that in the created virtual world it is possible to interact with different types of patients, with another doctor, physician assistant or nurse learning how to manage crises. According to researchers at this agency, the Virtual Reality Medical Center in the U.S. specializes in applying VR technologies to overcome patient phobias, such as fear of flight, altitude, claustrophobia, panic attacks or post-traumatic disorders. Another example of the agency's application of VR in healthcare is research conducted at King's College Institute of Psychiatry in London using VR technology for paranoia therapy. Here patients go to a virtual

bar, where they interact with avatars. Through avatars, psychologists communicate with the patient. Against the background of virtual reality, other visitors to the virtual bar talk to each other and make fun of the patient. Overcoming such situations in the virtual world, the patient must prepare for real life and overcome social fears.

According to the description of the experiences provided by the German VR-Dynamix agency, augmented reality (Augmented Reality) can serve as an opracist for medical professionals. IT specialists of the Technical University of Munich, together with surgeons of the University Surgical Clinic, collaborate to apply augmented reality in the field of medicine – they are developing a computer system for visualization and navigation for minimally invasive surgery.

The application of VR technologies in the training of specialists in the field of medicine is also studied and analyzed by the University of Heidelberg (Germany). According to the website of the Faculty of Medicine of this university, from the end of 2021, the newly established VR laboratory will provide opportunities for medical students to practice according to real scenarios of daily medical practice while still studying. University researchers see the application of VR technologies in teaching surgery, emergency medical care and intensive care, medical rehabilitation and psychological therapy, and health prevention. An example of the application of VR in the training process is given as follows: «Divided by two, students enter a virtual training environment, where, according to the recommendations, they have to treat virtual patients according to various emergency scenarios. To this end, all diagnostic and therapeutic equipment of emergency medical services is virtually restored, which students can manage by collaborating in a team with virtual hands».

An article in the e-newsletter Healthcare Digital entitled «Virtual reality in medical training» (2022), states that medical personnel can be quickly trained using VR technologies. It is noted that neuroscientific research also shows the effectiveness of learning in a virtual reality environment. Emphasizing the positive side of the application of VR technologies in the teaching process, the article draws on the statistics of a study conducted by Accenture Consulting: the application of VR during training improved the involvement of medical students by as much as 70% and students better remembered the learned material; With the use of VR technologies, the time spent on training has been reduced by 29%, while the cost of training facilities and tools has decreased. It is claimed that the application of VR helps a novice medical student learn and repeat things that require practical experience and acquire certain skills in a safe virtual space that corresponds to reality. «In this way, a sense of presence is created, so what is learned is absorbed better than just reading or watching. It is called autobiographical memory and is a very effective process of coding and remembering knowledge».

The Rhön Foundation (Germany, Rhön Stiftung), which supports science, research and practical work in the field of health care, organized a round table discussion in 2020 entitled «Virtual reality in the health care slurry. What are the options? ». It discussed the possibilities of applying VR to teaching medical students, conducting oppression, and improving patient care and treatment. There was a discussion about the fact that the use of VR for learning purposes probably would not cause any problems for medical students, they would be interested in inspecting the body of a person who died in a virtual environment.

The application of VR technologies in the process of medical studies is also studied and analyzed by the Research Institute of Medical Training and Training in Würzburg. At the University Hospital of Würzburg, a VR-based emergency modelling STEP-VR (Simulation-based Training of Emergencies for Physicians using Virtual Reality – simulation emergency training for doctors using Virtual Reality – simulation of emergency training for doctors using virtual reality) was developed in conjunction with the Munich 3Dee visualization company ThreeDee. Scientists of the institute are studying under what conditions VR training programs can be successfully used in medical training. It is observed how VR content is used during a clinical workshop, learning internal medicine. The simulation of virtual cases is followed by a detailed discussion of the case with the tutors. The evaluative study looks at the degree of reality (immersion), possible side effects (Simulation Sickness – simulation disease and the tensions that have arisen) and the subjective success of learning. The question is, what is the effectiveness of VR simulation-based learning? VR-based teaching proposals are said to be receiving broad support from students. But for university researchers, it's still unclear whether the use of VR brings learning benefits. Therefore, a study is carried out and a study is prepared on the competencies acquired and their sustainability, as well as possible factors influencing learning (e.g. the challenges experienced by the learner during the simulation).

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3. Pilot study at Utena Higher Education Institution

Utena HEI in 2021–2023 together with higher education institutions in Austria, Latvia, Germany and Finland (Private Universität für Gesundheitswissenschaften, Medizinische Informatik und Technik GmbH, Latvijas Universitātes P. Stradiņa medicīnas kolegijaa, INTAMT Internationale Akademie für Management und Technologies, Umeå Universitety) implemented the international project «Digital Technologies for Nursing Education & Training DTNET». The project aimed to help higher education institutions carry out a digital transformation at a time when existing gaps and needs related to wider digitalisation and the challenges to education posed during the COVID–19 pandemic have become even more important than ever.

To find out the opinions of Utena HEI's students about the applicability of VR scenarios to teaching, students of the General Practice Nursing study program participated in a pilot study. The study was conducted in April-May 2023, in three stages.

In the first phase, nursing students were informed about the project and the expected results, emphasizing what the students' contribution to testing the developed VR teaching content can be, and why their opinion on the development of VR products for teaching is important. Students were invited to participate in a pilot study by testing the VR training scenarios developed in the project and to express their opinions on the use of VR in the nursing study process.

Considering the results of the study obtained, at the further stage of the implementation of the project, it was planned to improve the developed training products in terms of technology and content. It turned out that all the students had heard about the use of VR for games, some of whom knew about the use of VR for games, and some of the media reports knew about the modern application of virtual technologies in modern operations. However, the offer to test the applicability of VR for learning in the here and now was completely unexpected and promised a completely new experience.

18 full-time students volunteered to take part in the study and verbal consent was obtained. The second phase of the study was to test the VR training scenarios and collect data from the participants using a standardised questionnaire. Before testing, participants received verbal instructions on how to use and operate the VR technology themselves. The testers used HMDs,

i.e. head-mounted displays (HMDs) acquired during the project, popularly known as 3D glasses. Participants tested 2 VR training scenarios. It is important to note that as the learner turns his/her head with the HMD or moves around in the real world (taking a step), the visible image or space in the virtual world changes. The virtual world replicates the real world – the hospital environment with the patient ward, nurses' lounge, etc., the equipment, and some of the medical instruments used in the virtual environment. While trying out the new technologies, students explored the virtual environment independently, walking around the different spaces, examining and touching objects and medical equipment, and the patient. The students found it preferable to move around in the virtual space by taking a step in the real space rather than teleporting with the help of the technological equipment, as the sudden teleportation caused negative sensations such as dizziness or even mild nausea for some. To be able to take one or more steps in real space, a safe space must be chosen for VR training.

A standardised anonymous questionnaire was administered to each participant immediately after the test. The questionnaire was completed by all students who participated in the test. The questionnaire was designed to obtain information about the student's perceptions of nursing education using the VR tool and the content of the training.

The questionnaire contained a total of 9 questions, 8 closed and 1 open. Closed questions are pre-defined answer options from which the respondent can choose the most appropriate one. The open-ended questions allowed the participants to express their opinions on what was not asked in the closed questions, and to express their thoughts or feelings after the VR experience. The third stage of the research was to process the data obtained from the survey. All the survey data was analysed and summarised.

The students felt that the use of VR in nursing education would help them to understand complex medical concepts more effectively than traditional methods.
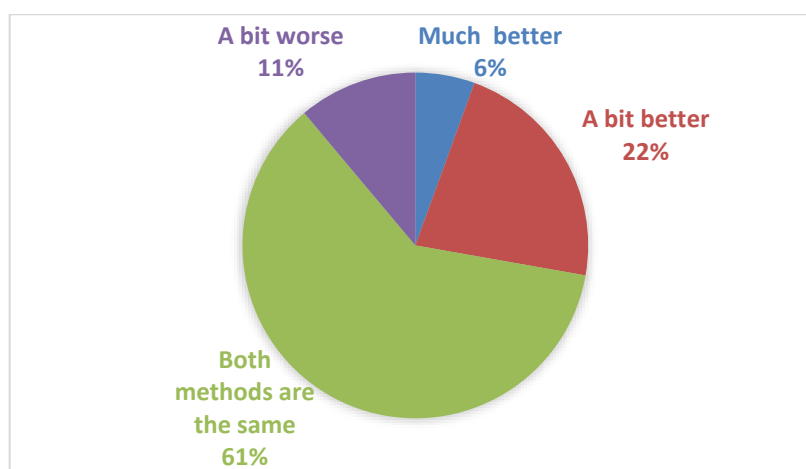

Figure 2. Evaluation of teaching/learning with VR compared to traditional teaching/learning methods

The possibility of using VR teaching/learning applications as a regular part of medical education, such as those developed in the DTNET project, would currently be considered by 50% of students in the study, while 1 in 18 would not.

Most students were positive about the opportunity to learn playfully and inclusively, to achieve the best possible results. This kind of learning gives good emotions and the opportunity to try something new.
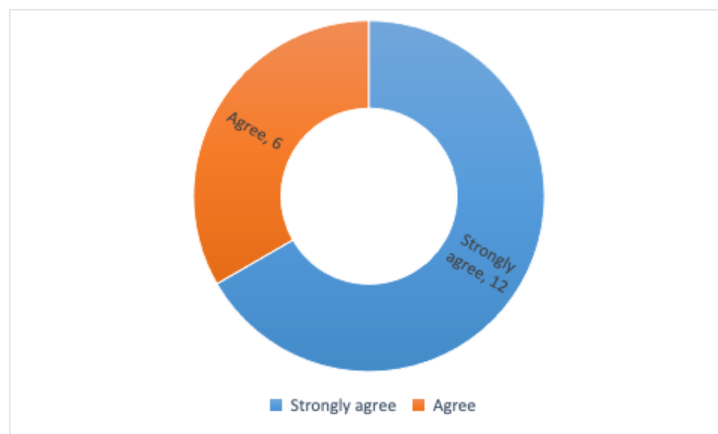

Figure 3. VR increases the attractiveness of learning

Learning through VR and manipulation in a virtual space provides a sense of security for the future nurse. Knowing that the patient is virtual and will not «die» because of a possibly incorrect procedure takes the emotional burden off the learner.
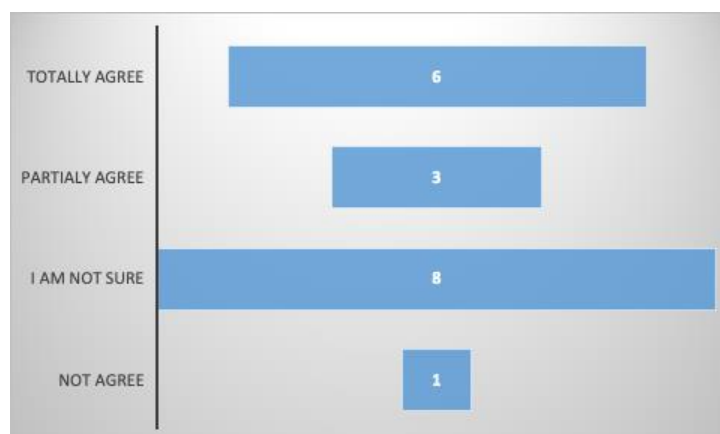
Figure 4. Feeling of safety performing VR applications

72% of students agree that the immersive VR environment improved their understanding of medical procedures.

Students grouped views on their experience of trying out VR scenarios for learning (open-ended questions) are shown in *Table 1*.

Table 1

The opinion of students about the application of VR in the nursing study process

Positive

A very good opportunity to learn a certain sequence of actions and algorithms. Especially how to deal with emergencies: resuscitating a choking person, resuscitating a drowning person, etc.

Takes the emotional strain off the nurse-in-training during the procedure, because the patient is virtual and will not "die".

In the future, such programmes can help to improve the professional competencies of existing nurses, as the training tool can be used to practise independently.

Increases engagement, motivation and good humour. "The excitement of repeating VR tasks until they are done as well as possible, like beating yourself in a game".

Negative/ to be improved

There is a lack of feedback to the students in the here and now, after every action they take in VR.

The teleportation caused negative sensations such as dizziness.

Using joysticks is difficult because of inexperience with virtual technologies.

The VR challenge was very emotional for the students. After completing the questionnaire, they shared their impressions with the authors.

In May 2023, a pilot survey of nursing lecturers' opinions was carried out in 2 phases. In the first phase, nursing lecturers were informed about the project and the expected outcomes of the project, and it was explained why nursing lecturers' opinions on the integration of VR content into the nursing curriculum or the curricula of a specific subject are important to achieve the best possible outcomes of the project, which will be used by the Utena HEI. Lecturers are invited to participate in the survey. 5 lecturers volunteered to take part in the survey. A standardised questionnaire was used to collect the survey data and was sent to the participants by e-mail. The survey aimed to obtain information on the opinion of nursing lecturers on the possibility of integrating VR content into the nursing curriculum or the subject they teach. The survey contained a total of 9 questions, 7 closed and 2 open. The closed questions were pre-formulated multiple-choice questions from which the respondent could choose the most appropriate answers. The open-ended questions allowed us to identify in which nursing subjects and topics lecturers would see the use of the VR application for teaching/learning purposes.

The second stage of the pilot study was the processing of the survey data. Lecturers teaching different subjects in the nursing curriculum answered the questions. Once they are familiar

with the teaching scenarios developed by VR, they will see the possibility of using VR to teach topics such as team communication, rehabilitation, immobilisation, mass casualty care, wound care, and palliative care. So far, the trainers surveyed mainly use textbooks and videos for teaching, as well as training materials developed by the trainers themselves. As technological tools for teaching, all of them use multimedia (photos, videos, etc.), most of the lecturers use social media/platforms in the teaching process, and 1 respondent uses online applications and software. 4 of the respondents think that VR would make it easier for students to learn their subject, and 1 agrees that it would make it somewhat easier. Lecturers consider that VR scenarios would be attractive for students to learn and would increase their motivation, playfulness and independence. At the same time, it would be a challenge for the lecturer as he/she would first have to learn how to use the new technologies.

Findings

1. Despite being an emerging technology, virtual reality has garnered a positive reception from both nursing students and lecturers for its application in Nursing education and training.
2. Well-developed professional scenarios can be a good tool for the professional education of nurses as they connect the virtual world with the real world.
3. Virtual reality gives the student a sense of security, allowing him/her to get rid of the fear of harming the patient, of the death of the patient due to inadequate medical care, of causing pain to the patient, or of the misuse of medical devices. It is therefore useful for students, especially those who have not yet been employed in a healthcare institution, to experience their first contact with patients in a virtual environment. A virtual scenario included in the nursing curriculum can be an excellent way to learn emergency algorithms for situations that are not encountered during the course, such as choking, etc.
4. Learning content in virtual reality extends traditional teaching methods and increases the variety of teaching methods.
5. VR increases student engagement and motivation to learn.
6. The integration of VR into the Nursing curriculum may be limited by available teaching resources: the number of 3D glasses available; the small space in which the session takes place; and the technical challenges of using 3D glasses.
7. The exploratory study showed that the VR applications that have been tested with students need to be further improved in terms of technology and content. Following this pilot study, feedback from students and lecturers led to the next stage of the project.

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