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Original research article

VIRTUAL REALITY AS AN INNOVATIVE METHOD IN TEACHING HEALTHCARE COMMUNICATION

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Abstract

Introduction: Effective communication between healthcare professionals and patients is key to quality care. Nursing staff are in frequent contact with patients and should have strong communication skills. Case studies, role-playing, simulation with actors, and peer training are traditionally used. Virtual reality offers an innovative way for students to experience realistic scenarios in a safe, controlled environment.

Objective: The aim of this study was to analyse students' perceptions of virtual reality in teaching communication in healthcare, identify the advantages and disadvantages of virtual reality, and obtain feedback from students.

Methods: The study focused on pilot qualitative research involving content analysis of interviews with students who had completed a seminar in communication in healthcare using virtual reality.

Results: Thanks to the qualitative data collection from participants ($n = 7$), it was found that virtual reality in teaching communication in healthcare is perceived by students as an effective and attractive teaching tool that holds attention, activates each student, can provide a safe environment for training, and creates realistic scenarios. However, during training, there is a lack of physical contact with the patient, the virtual patient does not fully correspond with reality, there is a lack of sophisticated facial expressions and gestures, the technology limits the student's movement, and there are time constraints.

Keywords: *Communication; Healthcare; Teaching; Virtual reality*

INTRODUCTION

In educational settings, virtual reality (VR) represents an innovative tool with the potential to become a valuable – if not essential – component of contemporary learning. VR forms an important element of effective experiential learning (Kraus et al., 2023). According to Kraus et al. (2023), technologies used in VR share three core features: immersion, a sense of reality, and interaction with the environment, enabling students to actively engage in simulated situations and learn through direct experience.

A number of studies have already examined the use of VR in education, particularly in the training of healthcare professionals. Gladysz et al. (2019) describe VR as a transformative innovation in medical education and emphasize its adaptability across various medical disciplines. VR is also frequently integrated into simulation centers, where it complements or replaces traditional simulation methods.

According to Afriyie (2020), effective communication forms the foundation of high quality nursing care and contributes to patient trust, satisfaction, and positive outcomes. However, communication with patients remains one of the major challenges in Czech healthcare (Ministry of Health of the Czech Republic, 2024). Healthcare professionals often struggle to explain complex medical issues in an understandable way, while patients may reject unpleasant information or express frustration toward staff, mak-

ing these interactions emotionally demanding for clinicians (Ministry of Health of the Czech Republic, 2024). For this reason, it is essential to prepare future nursing professionals for a wide range of situations they may encounter in practice, including those that may be unexpected or emotionally challenging.

According to Decree No. 39/2005 Coll., minimum requirements for study programs leading to professional qualification in non medical healthcare professions include knowledge and skills in communication with patients and their relatives (Decree No. 39/2005 Coll.). The Ministry of Health of the Czech Republic (2024) identifies several general barriers to communication, such as perceptual and speech disorders, lack of concentration, distraction, indifference, apathy, unconscious behavioral causes, incompatible lifestyles and value systems, communicative awkwardness, and insensitivity.

At the Third Faculty of Medicine, Charles University, VR was introduced this year as a pilot tool for teaching communication in healthcare to undergraduate nursing students. Although the use of VR in education is well documented in the literature – most commonly in the context of simulation training in nursing and medicine – its application in communication training remains limited. Unlike traditional methods such as case studies, role play, or peer exercises, VR relies on technology and independent student engagement, offering new potential for communication training.

Ropponen et al. (2025) report that VR simulations are highly promising for strengthening nursing students' competencies, particularly in acquiring knowledge and developing clinical skills. Bragard et al. (2018) suggest that VR could serve as a supplement or even an alternative to standardized patients for teaching and assessing communication skills and empathy, including clinical reasoning and managing highly emotional situations such as breaking bad news.

Kraus et al. (2023) summarized the advantages and disadvantages of VR. Among the advantages, they highlight the potential to replace simulation centers, efficiency, repeatability and standardization of clinical training, easy access to clinical experiences, availability, speed and flexibility, unrestricted participation, safety, support for autonomous learning, low time and space requirements, and customizable scenarios. Reported disadvantages include unsuitability for all types of education, limited applicability to certain situations, challenges in processing language and facial expressions, the risk of perceiving VR as a game rather than an educational tool, and health related limitations for some users.

According to Kraus et al. (2023), the WHO supports the development and implementation of VR, augmented VR, and mixed VR in education. Mendez et al. (2020) argue that VR offers an opportunity to revolutionize nursing education and enhance learning. Pottle (2019) notes that VR is advantageous for educators in terms of time and space efficiency and allows the use of customized simulation curricula. However, he emphasizes that AI driven systems are not yet suitable for all learning objectives and that VR should not fully replace the educator.

The aim of this pilot study was to analyze students' perceptions of virtual reality in communication training in healthcare, identify the advantages and disadvantages of VR, and obtain feedback from students.

Description of the pilot seminar

Hosting a seminar in virtual reality requires time-consuming technical preparation (power supply, calibration, sufficient space) and the presence of an IT technician for technical support, which was provided by ComGuide (2025). This company specializes in virtual training programs for healthcare and owns the scenarios used.

The pilot seminars were designed for 13 students and lasted 45 minutes. A total of 78 first-year students of the Nursing study programme participated. Students chose from three scenarios of communicating with patients (death of a partner, fatal diagnosis, postponed examination). There were two versions of the scenarios: *Solo*, where the student conducts the conversation independently with minimal information, and *Guided*, where the guide advises the student and teaches basic communication procedures. The seminar proceeded in the following order: Solo version (independent handling of a difficult situation under the supervision of a teacher), followed by the Guided version (teaching optimal conversation management), and a repetition of the Solo version (with previous experience).

The seminar ended with a discussion and summary of recommended practices. All VR interviews were recorded for subsequent evaluation by the teacher and preparation for the follow-up lecture.

MATERIALS AND METHODS

This pilot study used qualitative research with inductive content analysis of interviews with bachelor's nursing students who completed a pilot seminar on communication in healthcare. All answers were translated into English.

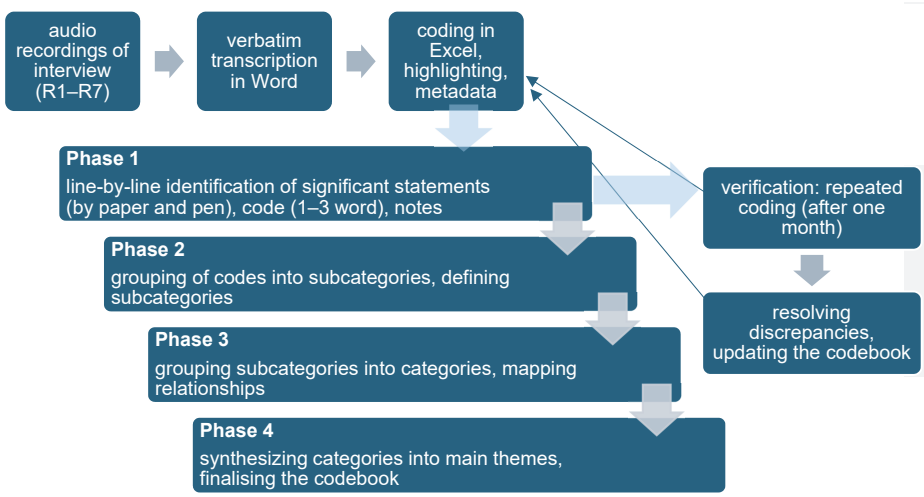
A semi-structured interview was developed, piloted, and then modified to meet the study's needs. The pilot interview was excluded. A total of 7 interviews lasting 30–45 minutes were conducted. Based on digital recordings of the interviews, verbatim transcripts were prepared using Microsoft Word and then manually coded using pen and paper. The coding process (Scheme 1) was documented in Microsoft Excel. All anonymized interviews were labelled according to the sequence of data collection and processing (R1–R7).

The coding process consisted of four phases. First, significant statements or words were identified line by line in each transcript. Based on these, codes (1–3 words) were generated. The codes were colour-coded, annotated with notes, and organized into subcategories according to overarching concepts. Subsequently, the subcategories were grouped into broader categories based on hierarchical relationships and conceptual connections. These categories were then synthesized into main themes according to their focus. The coding process was discussed and verified. Coding was conducted repeatedly with a time interval.

Sample, data collection, limits, ethics

Seven students ($n = 7$) participated in the pilot research, including six women and one man aged 19–21, who attended a pilot seminar on Communication in Healthcare as part of their bachelor's degree in Nursing, where a simulation teaching method using VR was used (Table 1). Data collection took place in July 2025. All participants were familiarized with the research process. Each of them agreed to participate, signed an informed consent, and was assured that their responses would be anonymized.

The research was limited by the low number of participants, who were selected on the basis of voluntary participation in an interview. At the same time, all participants were influenced by their education and experience in the healthcare environment. Six participants had completed secondary education in Practical Nursing (a four-year secondary school program in Czech Republic, preparing students for supervised nursing care in healthcare facilities) and one participant had completed secondary education at a Healthcare Lyceum.



Scheme 1. Coding map

Table 1. Demographics of interview participants

Demographic data	Values (*n*)
Gender	
Female	6
Male	1
Age	
19 years old	1
20 years old	5
21 years old	1
Education	
Practical nursing	6
Healthcare lyceum	1
Year of Bachelor's Program	
1st year	7
VR Experience	
Yes	3
No	4
Selected VR Scenario	
Patient death	0
Fatal diagnosis	2
Postponed examination	5

RESULTS

Main topic: Evaluation and impact of virtual reality on education

It is clear that VR technology has significant potential as well as limitations. Participants view VR as an innovative and engaging teaching tool that enables safe practice of patient communication without fear of failure. Students especially valued the realism of the simulation, which helped prepare them for challenging situations. However, they noted technical issues, limited graphic realism, and the lack of physical contact. Despite these drawbacks, VR was perceived as a motivating and confidence-building educational tool.

1. Category: Impressions

- *Subcategory: Practical experience*

All respondents had patient communication experience from education or practice and considered education foundational. *"... I think that the more these stereotypes and procedures are instilled in us, the better it is"* (R1). They also stressed the need for basic common sense. *"I think that people should have some kind of common sense about what they can afford to say"* (R4).

- *Subcategory: Choice of scenario*

Three scenarios were offered; most students chose the postponed examination case (n = 5) as the most familiar and less intimidating. *"I deliberately chose a situation with which I have a lot of experience"* (R1). Some chose familiar scenarios to avoid the unknown. *"I was just stressed about saying something I didn't know"* (R6).

- *Subcategory: Differences between the completed versions*

Each scenario had Solo and Guided versions. Running Solo first exposed independent reactions and made the Guided session more instructive. *"First, try it completely on your own... and then with help... and then on your own again..."* (R2).

- *Subcategory: Virtual patient's reactions*

The virtual patient's responses followed grief stages and sometimes surprised or frightened students, producing mixed impressions. *"It was very realistic... it was so uncomfortable not being able to say, 'Please sit down,' because you felt threatened..."* (R3).

- *Subcategory: Expectations*

Students reported initial anxiety about VR and peer comments, which eased after explanations; some feared being overheard, which proved unfounded. *"I was afraid... But it was totally fine. I actually enjoyed it"* (R1).

2. Category: Evaluated positives

- *Subcategory: Experience and practical benefits*

Even experienced students found VR useful for linking theory to practice and reported applying techniques in clinical placements. *"These are things you know you've learned... and here it just clicked for me, how to do it, step by step"* (R1).

- *Subcategory: Fun format*

All participants described the format as enjoyable and engaging due to new technology and active practice. *"I really enjoyed it... virtual reality is really interesting. For me, it was the best form of teaching I've experienced so far"* (R6).

- *Subcategory: Motivation*

VR motivated students to practise and face communication fears; the solo nature in-

creased responsibility and engagement. *"You are there on your own, you cannot escape from it"* (R7).

- *Subcategory: Stress and safety*

Students valued practising without risking harm to real patients and appreciated privacy and the option to stop if distressed. *"We feel safe knowing if it becomes too uncomfortable for us, we can take it off..."* (R7).

- *Subcategory: Practical training in real life simulation*

Feedback on virtual responses was positive; some experienced intense emotions for the first time, aiding learning. *"I think it was realistic... it was very realistic"* (R3).

3. Category: Evaluated negatives

- *Subcategory: Restricted movement and technology*

Common complaints included restricted movement (cables, seating), headset weight, and slow program pace. *"When the patient stood up, I would have preferred to stand, too..."* (R1). Absence of nonverbal recognition and touch reduced authenticity. *"I couldn't go to him and take his hand... so it seemed cold..."* (R2).

- *Subcategory: Unnaturalness of the virtual character*

Some found the avatar cartoonish with limited facial expressions and gestures, which hindered communication. *"It bothered me the person was cartoonish and didn't look real..."* (R3).

- *Subcategory: Fear of the unknown*

Initial anxiety and disorientation were common; a few reported claustrophobic feelings or panic until accustomed. *"Before I got used to it at first, I was so confused that I had this feeling of panic..."* (R3).

- *Subcategory: Irreplaceable reality*

Participants agreed VR cannot yet replace real people due to graphical and interactional limits and lack of physical contact. *"It felt very unnatural to me, like I had to speak into space and there was no one around me..."* (R3).

- *Subcategory: Time constraints*

Opinions on session length varied, but all wanted more frequent sessions rather than a single end of semester trial. *"I would definitely choose to try it more..."* (R5).

Main topic: Subjective experience and innovative potential

Based on interviews with participants, it can be said that VR is perceived as an innovative tool that represents a promising addition to theoretical teaching and traditional teaching methods. Students appreciated the use of this activating method as effective and attractive, allowing them to maintain their attention for longer period of time without distractions and having to remember more. Despite some limitations, such as physiological reactions, students recommend using VR more often in teaching in combination with other teaching methods.

1. Category: Comparison with traditional teaching

- *Subcategory: Traditional teaching*

VR was contrasted with lectures and role play; it was seen as experiential and better for long term retention. *"Because it was enriching, we remembered it better... This is something new, it's like wow..."* (R1).

- *Subcategory: Concentration*

Students reported higher attention during VR sessions compared with passive seminars. *"In this seminar... we were more attentive with the glasses. Which is a big advantage for me"* (R6).

- *Subcategory: Combination of teaching methods*

The 45 minute seminar combined lecture, computer assisted teaching and discussion; students found this mix effective. *"I liked it this way, having these three sections..."* (R2).

- *Subcategory: Staging methods*

Previous role play experiences were mixed; VR avoided some problems of peer skits (distraction, laughter). *"When we were in character, it had a greater effect than when we did skits among ourselves..."* (R1).

2. Category: Virtual reality experience

- *Subcategory: Gaming experience and interaction with AI*

Only a few had prior VR experience (mainly gaming); using VR for learning was new for most. *"It's a strange feeling... I was playing a game... so it's a bit confusing, but it's a different experience"* (R6).

- *Subcategory: Side effects*

Some reported discomfort, dizziness, or sweating; VR may be unsuitable for those prone to motion sickness or claustrophobia. *"I was afraid it would make me sick..."* (R3).

3. Category: Innovation

- *Subcategory: Frequency of communication training*

Participants favored repeated VR training integrated into courses rather than one off sessions. *"It would be really nice... if it was included directly in the teaching..."* (R2).

- *Subcategory: Combining VR with Traditional Methods*

Students recommended supplementing VR with live role play using actors to restore physical contact and linking scenarios to prior theory. *"I would really like to combine it with real contact with people..."* (R4).

- *Subcategory: Graphics and program modification*

Improvements should focus on avatar realism, facial expressions, and program responsiveness. *"I would like it to look like a human being"* (R4).

Main topic: Possibilities and extended use

Based on participant feedback, it is clear that VR goes beyond communication skills training and appears to be attractive for use in other areas. Everyone appreciated the possibility of visual and experiential learning and suggested further possibilities for the development of teaching scenarios.

1. Category: Other uses

- *Subcategory: Utility in other subjects and fields*

Participants proposed VR for anatomy, pathology, nursing and other health fields, with appropriate formats. *"It should definitely be used in other subjects, too..."* (R5).

- *Subcategory: Multiple versions and new scenarios*

All expressed interest in more scenarios, collaborative exercises, and complex situations (e.g., delirium, institutional simulations). *"I think it would be nice to have more simulations, with more people appearing..."* (R7).

DISCUSSION

The pilot study shows that VR could offer many benefits for communication training in nursing, including a safe learning environment, support for independent practice, personal engagement, and student activation through innovative technology, though some limitations exist.

The integration of artificial intelligence (AI) and machine learning (ML) into healthcare communication training represents a growing and promising area, with the potential to make education more efficient, affordable, and widely accessible (Stamer et al., 2023). Similarly, Dong et al. (2024) confirmed that VR offers students the chance to practice communication in a secure and low-pressure environment that enables remote supervision and repeated practice.

Lampropoulos et al. (2025) highlighted that VR provides immersive and safe learning environments where students and professionals can practice clinical skills, decision-making, and empathy without risk to patients. Their study showed that VR enhances critical thinking, empathy, and supports diverse pedagogical approaches (Lampropoulos et al., 2025). Similarly, Meany et al. (2024) emphasized that VR offers hands-on, experiential learning that promotes active engagement, problem-solving, and long-term knowledge retention. An additional advantage is the ability to record interactions for later analysis and reflection.

A major didactic advantage of VR is its ability to reduce the fear of failure. Students practise privately, without peer observation, and their interactions can be recorded for feedback and reflection. However, several weaknesses remain. Lampropoulos et al. (2025) pointed out that current VR systems are unable to fully reproduce real-life interpersonal dynamics, which can lead to overconfidence or a lack of genuine empathy. Similarly, Stamer et al. (2023) noted that the technological capabilities of virtual patients still fall short of human authenticity, especially in terms of facial expressions and responsiveness. Therefore, VR should be regarded not as a replacement for in-person teaching, but as a valuable complementary tool (Lampropoulos et al., 2025).

The results of this pilot study confirm that VR should not replace personal teaching or standardized patients but rather complement them. Incorporating structured debriefing and reflection is essential to help bridge the gap between simulated experiences and real-world clinical practice (Lampropoulos et al., 2025).

Students in this research also recommended combining VR with role-play using live actors, which would help restore the human element and physical proximity. Rutherford-Hemming et al. (2024) found that standardized patients promoted knowledge and skills, whereas virtual patients produced more pronounced effects on attitudes. Meany et al. (2024) also noted that VR ensures consistency and replicability for all participants, which live role-play cannot guarantee. On the other hand, a study by Shorey et al. (2020) reported that virtual patients were unable to evoke appropriate emotional responses in students.

Some participants proposed the potential use of VR for independent study at home; however, this approach appears less effective because it lacks the unique authenticity and immediacy of face-to-face instruction, particularly when it comes to interpreting nonverbal cues (Dong et al., 2024).

Finally, as proposed by Chou et al. (2024), communication training in VR should be integrated early into nursing education – ideally before clinical placements – to strengthen interpersonal understanding and prepare students for real-world communication with patients.

We are currently developing the use of VR with senior students in the Nursing program, specifically third-year students in the Palliative Care course, and with second-year students in the Nutritional Therapy program (patient education). Based on this pilot study, it will be necessary to expand the study to include a larger sample. For follow-up studies, it will be interesting to compare the insights of students at the beginning and end of their studies, after gaining more clinical experience, as well as those of students from another non-physician healthcare program.

CONCLUSION

This pilot study focused on a seminar on Communication in Healthcare, during which VR was used as an innovative teaching tool. The aim of the pilot study was to analyze students' perceptions of VR in teaching communication in healthcare, identify the advantages and disadvantages of VR, and obtain feedback from students. Thanks to qualitative data collection from participants ($n = 7$), it was found that VR in teaching communication in healthcare is perceived as an effective and attractive teaching tool that holds attention, activates students, provides a safe environment for training, and creates realistic scenarios. However, VR also has its pitfalls. During training, there is a lack of physical contact with the patient, the virtual patient does not fully correspond to reality, there is a lack of sophisticated facial expressions and gestures, the technology limits the student's movement, and there are time constraints. We therefore recommend expanding the study to include a larger sample, integrating VR into the existing curriculum, focusing research on eliminating shortcomings and fostering development.

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Ethical aspects and conflict of interest
The authors have no conflict of interest to declare.

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