IMPROVEMENT OF METHODOLOGIES FOR THE USE OF 3D AND VIRTUAL TECHNOLOGIES IN THE TEACHING OF FOREIGN LANGUAGES IN MEDICAL EDUCATION

Kakhorova Tursinoy Ulugbek kizi
Fergana Medical Institute of Public Health
Department of Uzbek and Foreign Languages
Email: tursunoysolihabonu@gmail.com

Abstract. *This article explores innovative methodologies for integrating 3D and virtual technologies into the teaching of foreign languages in medical education. The growing need for effective communication in global healthcare has elevated the role of language proficiency among medical professionals. Virtual reality (VR) and 3D simulation offer immersive learning environments that enhance linguistic and clinical competence simultaneously. This paper reviews current literature, identifies gaps in traditional teaching practices, and proposes a framework for incorporating virtual tools into language education tailored for medical contexts.*

Keywords: *Medical education, virtual reality, 3D technologies, foreign language teaching, immersive learning, communication skills, simulation.*

Introduction. In the 21st century, the integration of advanced technology in education has become increasingly necessary. In medical education, proficiency in foreign languages, particularly English, is vital due to the internationalization of medicine. However, traditional language teaching often fails to provide students with context-based learning opportunities, especially in professional settings. This paper investigates how 3D and virtual reality (VR) technologies can be employed to overcome this challenge and enhance the teaching of foreign languages in medical institutions.

Medical students must not only acquire vocabulary and grammar but also develop communicative competence for patient interactions, case presentations, and collaboration with international peers. The traditional methods of language instruction—textbooks, lectures, and rote memorization—do not sufficiently prepare students for real-life professional scenarios.

Recent years have seen a growing body of research on the application of VR and 3D technologies in education:

- Mikropoulos and Natsis (2011) highlighted how VR enhances spatial skills and cognitive development in science-based education.

- Burden and Kearney (2017) discussed mobile and immersive learning environments, emphasizing their motivational potential.

- Qian, et al. (2020) found that medical simulations improved both diagnostic skills and English-language communication for non-native speakers.

In foreign language teaching specifically, Godwin-Jones (2014) emphasized that digital tools provide interactive environments that promote autonomous and situated learning, which is especially useful in vocational language training.

Despite these developments, relatively few studies have examined how these technologies can be systematically integrated into medical language instruction. Most implementations remain experimental or lack pedagogical structure.

This paper proposes a multi-phase methodology to effectively integrate 3D and VR technologies into foreign language instruction for medical students:

Needs Analysis- Identify specific communicative situations medical students are likely to encounter (e.g., taking patient history, explaining procedures).

Scenario-Based Design-Develop 3D and VR scenarios that replicate these interactions in realistic hospital settings, focusing on both medical knowledge and language usage.

Immersive Language Practice- Use VR headsets or desktop simulations to allow students to interact with virtual patients and colleagues. This supports both verbal and non-verbal communication skills.

Feedback and Assessment- Include AI-driven feedback mechanisms for pronunciation, vocabulary usage, and fluency. Peer and teacher evaluations should also be incorporated.

Integration with Curriculum- Ensure the virtual modules align with both the language curriculum and clinical training objectives, reinforcing interdisciplinary learning.

Benefits:

- Contextual learning through realistic simulations.
- Improved engagement and retention.
- Opportunities for repeated practice without risk to real patients.
- Safe environment to make and learn from mistakes.

Challenges:

- High initial cost of VR equipment and software.
- Need for teacher training.
- Potential resistance from institutions accustomed to traditional methods.

As a conclusion, 3D and VR technologies hold significant promise for transforming foreign language teaching in medical education. By creating immersive,

interactive, and contextualized learning environments, these tools can bridge the gap between language knowledge and practical application. With thoughtful methodological integration and institutional support, virtual technologies can enhance not only language skills but also the overall clinical competence of future healthcare professionals.

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