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SIMULATION TECHNOLOGIES IN TEACHING PROFESSIONAL FOREIGN LANGUAGE COMMUNICATION TO MEDICAL STUDENTS

Abstract. The relevance of the research is determined by the growing need to improve the professional foreign language communication of future physicians in the context of the internationalization of medical education, academic mobility, and the widespread use of English-language clinical protocols and scientific resources. Traditional approaches to foreign language teaching do not always ensure the formation of practical communication skills required in authentic professional situations. Therefore, simulation technologies are becoming an effective means of integrating language learning with clinical training.

The purpose of the article is to substantiate the pedagogical potential of simulation technologies in teaching professional foreign language communication to medical students and to determine the methodological features of their implementation in the educational process.

The research employed theoretical analysis, synthesis, generalization and systematization of scientific literature, structural-functional analysis, pedagogical modelling, and interpretation of contemporary educational practices.

The article characterizes the educational potential of role-playing, standardized patients, Objective Structured Clinical Examination, clinical scenarios, team-based simulation, debriefing, digital simulators, and virtual patients. It is established that simulation technologies contribute to the integrated development of linguistic, communicative, clinical, intercultural, and reflective competencies. Particular attention is paid to the methodological organization of simulation-based foreign language instruction, including the stages of preparation, implementation, debriefing, and assessment.

The study concludes that simulation technologies provide effective conditions for integrating language and professional training, enhance students' communicative confidence, develop clinical reasoning, and prepare future physicians for professional interaction in an international medical environment.

Keywords: simulation technologies; medical education; professional foreign language communication; medical students; English for Medical Purposes; Objective Structured Clinical Examination.

СИМУЛЯЦІЙНІ ТЕХНОЛОГІЇ У НАВЧАННІ ПРОФЕСІЙНОЇ ІНШОМОВНОЇ КОМУНІКАЦІЇ СТУДЕНТІВ-МЕДИКІВ

Анотація. Актуальність дослідження зумовлена необхідністю вдосконалення професійної іншомовної комунікації майбутніх лікарів в умовах інтернаціоналізації медичної освіти, академічної мобільності та широкого використання англомовних клінічних протоколів і наукових ресурсів. Традиційні підходи до навчання іноземної мови не завжди забезпечують формування практичних комунікативних умінь, необхідних у реальних професійних ситуаціях. У зв'язку з цим симуляційні технології розглядаються як ефективний засіб інтеграції мовної та клінічної підготовки.

Метою статті є теоретичне обґрунтування педагогічного потенціалу симуляційних технологій у навчанні професійної іншомовної комунікації студентів-медиків та визначення методичних особливостей їх використання.

У дослідженні використано методи теоретичного аналізу, узагальнення, систематизації наукових джерел, структурно-функціонального аналізу, педагогічного моделювання та інтерпретації сучасного педагогічного досвіду.

Охарактеризовано освітній потенціал рольових ігор, стандартизованих пацієнтів, об'єктивного структурованого клінічного іспиту, клінічних сценаріїв, командних симуляцій, дебрифінгу, цифрових симуляторів і віртуальних пацієнтів. Встановлено, що симуляційні технології забезпечують комплексний розвиток мовленнєвої, комунікативної,

клінічної, міжкультурної та рефлексивної компетентностей. Запропоновано методичні рекомендації щодо організації симуляційного навчання професійної англійської мови майбутніх лікарів.

Зроблено висновок, що використання симуляційних технологій забезпечує інтеграцію мовної та професійної підготовки, сприяє розвитку клінічного мислення, професійної комунікації та готовності студентів до ефективної діяльності в міжнародному медичному середовищі.

Ключові слова: симуляційні технології; медична освіта; професійна іншомовна комунікація; студенти-медики; медична англійська мова; об'єктивний структурований клінічний іспит.

INTRODUCTION

The problem formulation. Contemporary medical education is oriented toward a competency-based model of training future physicians, in which professional foreign language communicative competence constitutes an essential component. The internationalization of medical education, academic mobility, the use of English-language clinical guidelines, international scientific publications, and digital resources necessitate the preparation of specialists capable of communicating effectively in English with patients, colleagues, and representatives of the international medical community.

Traditional foreign language instruction does not always ensure a sufficient level of professional communicative competence, as it is often separated from authentic clinical practice. Under these conditions, simulation technologies acquire particular importance, as they enable the modelling of professional situations by integrating language training with the development of clinical reasoning, professional behaviour, and teamwork skills.

The use of role-playing, standardized patients, clinical scenarios, simulation centres, and digital platforms creates a safe educational environment for practising professional foreign language communication. These approaches contribute to the development of communicative skills, professional confidence, and readiness to work in an international medical environment.

Despite the active implementation of simulation-based education in medical training, the use of simulation technologies specifically for developing the professional foreign language communication of medical students has not yet been sufficiently investigated. This determines the relevance of the present study. Its scientific novelty lies in substantiating the pedagogical potential of simulation technologies in teaching professional foreign language communication to medical students and identifying the methodological features of their implementation. The practical significance of the study is associated with the possibility of applying the proposed approaches in teaching the courses Foreign Language for Professional Purposes, Medical English, and in the educational activities of simulation centres.

Analysis of recent research and publications. Simulation-based education has been widely investigated in contemporary international research. The theoretical foundations of standardized patients and simulation methods have been developed in the studies of Barrows, 1993; Cleland, Abe, Rethans, 2009; Nestel, Bearman, 2015. The significance of the Objective Structured Clinical Examination (OSCE) as an instrument for assessing clinical competence was substantiated by Harden, Stevenson, Downie, Wilson, 1975.

The effectiveness of simulation-based learning and its influence on the development of future physicians' professional competence have been demonstrated by Issenberg et al., 2005; Lateef, 2010; McGaghie et al., 2010; Motola et al., 2013; Elendu et al., 2024. The application of digital simulations, virtual patients, and web-based educational technologies has been analysed by Cook, Erwin, Triola, 2010; Cook et al., 2013; Cant, Cooper, 2017; Kononowicz et al., 2019.

The communicative aspect of medical education has been explored by Silverman, Kurtz, Draper, 2013, while interprofessional education has been investigated by Reeves et al., 2017, and the role of debriefing has been highlighted by Cheng et al., 2016. Contemporary requirements for the quality of medical education are reflected in the WFME Global Standards (2023). At the same time, the methodological principles of integrating simulation technologies into the teaching of professional English to future physicians remain insufficiently investigated.

THE PURPOSE OF THE RESEARCH

The purpose of the research is to substantiate the pedagogical potential of simulation technologies in teaching professional foreign language communication to medical students and to identify the methodological features of their implementation in the process of professional language training. To achieve this purpose, the following research objectives were formulated:

1. To analyse contemporary approaches to the use of simulation technologies in medical education.
2. To reveal the essence of professional foreign language communication in the training of future physicians.
3. To characterize the didactic potential of the main types of simulation-based learning.
4. To determine the methodological conditions for the effective implementation of simulation technologies.
5. To develop practical recommendations for integrating simulation technologies into the teaching of professional English in medical education.

RESEARCH METHODS

The study employed a set of complementary research methods to ensure a comprehensive analysis of the problem under investigation. Theoretical analysis, synthesis, generalization, and systematization of scientific literature were applied to determine the current state of research on simulation-based learning and professional foreign language communication in medical education. Structural-functional analysis was used to identify the components of professional foreign language communicative competence and to determine their interrelationships within the educational process. The method of pedagogical modelling was applied to develop methodological recommendations for integrating simulation technologies into the teaching of professional English to medical students. Generalization

of contemporary pedagogical experience made it possible to systematize the educational potential of role-playing, standardized patients, clinical scenarios, team-based simulation, debriefing, digital simulators, and virtual patients.

The interpretation and generalization of research findings were used to formulate the conclusions and identify перспективні directions for the further development of simulation-based foreign language instruction in medical education.

RESULTS OF THE RESEARCH

Simulation-based learning has become one of the leading directions in the modernization of medical education because it effectively combines theoretical instruction with the practical development of professional competencies. It creates a safe educational environment in which students can repeatedly practise clinical procedures, make professional decisions, and improve their communication skills without posing any risk to patients (McGaghie et al., 2010; Elendu et al., 2024).

One of the principal advantages of simulation-based learning is its ability to facilitate the active development of professional communication. During simulated clinical situations, students not only reproduce linguistic material but also apply it to solve authentic professional tasks. Such an approach promotes the development of clinical reasoning, communicative confidence, and readiness for professional interaction in an international medical environment (McGaghie et al., 2010).

Modern simulation technologies include task trainers, high-fidelity manikins, standardized patients, digital simulators, virtual patients, and team-based clinical scenarios. Each of these educational tools contributes to the development of specific components of future physicians' professional competence (Issenberg et al., 2005).

Simulation technologies are particularly valuable in teaching Medical English because they enable students to participate in authentic professional communication, including history taking, patient counselling, interprofessional interaction, participation in multidisciplinary case discussions, and clinical handovers. Consequently, language learning becomes closely integrated with future professional practice, increasing students' motivation and ensuring the practical application of foreign language knowledge.

The competency-based value of simulation-based learning lies in students' active involvement in solving professional problems, making clinical decisions, and reflecting on their own performance. The systematic implementation of simulation technologies contributes to the development of clinical reasoning, professional communication, teamwork, and self-confidence, which are essential components of contemporary medical education.

Professional foreign language communication constitutes an integral component of contemporary medical education. Proficiency in English enables future physicians to communicate effectively with patients, participate in international educational and scientific projects, use up-to-date clinical guidelines, and cooperate within multidisciplinary healthcare teams (O'Dowd, 2018; World Federation for Medical Education, 2023).

In educational research, professional foreign language communication is interpreted as an integrated ability to perform professional interaction in a foreign language in accordance with linguistic, professional, and ethical standards. It encompasses linguistic, communicative, clinical, sociocultural, interprofessional, and reflective components that ensure the effective performance of professional tasks (Nestel et al., 2011; Cant & Cooper, 2017).

The central element of professional foreign language communication is interaction within the doctor–patient relationship. Future physicians should be able to obtain a patient's medical history, explain diagnostic findings, discuss treatment options, demonstrate empathy, and take intercultural aspects of communication into account. At the same time, professional practice requires continuous interaction with other healthcare professionals, which demands accurate use of medical terminology and adherence to internationally accepted standards of clinical communication (Silverman, Kurtz, & Draper, 2013; Reeves et al., 2017).

Simulation technologies play a decisive role in developing these competencies. Unlike traditional language instruction, they provide authentic professional contexts in which English functions as a means of clinical communication rather than merely an academic subject. During simulation activities, students analyse clinical situations, conduct professional dialogues, apply medical terminology, and justify clinical decisions, thereby integrating language learning with professional training.

The diversity of modern simulation technologies makes it possible to achieve different educational objectives depending on the stage of medical training. Some simulation tools primarily develop practical clinical skills, whereas others focus on professional foreign language communication, teamwork, clinical reasoning, and reflective practice. Their combined use ensures the comprehensive development of future physicians' professional competence by integrating language and clinical training. The main types of simulation technologies and their educational potential are presented in Table 1.

Table 1

Types of Simulation Technologies in Medical Education and Their Educational Potential

Type of Simulation Technology	Characteristics	Educational Potential	Example of Use in Teaching Medical English
Task Trainers	Practice of individual clinical procedures and technical skills	Development of procedural and psychomotor skills	Describing and commenting on clinical procedures in English
Standardized Patients	Simulation of authentic doctor–patient interaction	Development of communicative competence	Taking a patient's medical history, explaining diagnosis and treatment
High-Fidelity Manikins	Simulation of physiological responses in realistic clinical scenarios	Development of clinical reasoning and decision-making	Team-based clinical decision-making and emergency communication

Team-Based Simulation	Collaborative performance of multidisciplinary clinical tasks	Development of teamwork and leadership skills	Clinical handovers and interprofessional communication in English
Virtual Reality (VR) and Virtual Patients	Computer-based simulation of clinical situations	Independent learning and digital competence	Virtual consultations and interactive clinical communication
Debriefing	Structured analysis and reflection following simulation activities	Development of reflective competence	Analysis of communication performance and language-related errors

As shown in Table 1, different simulation technologies perform specific educational functions; however, their greatest effectiveness is achieved when they are implemented in combination. The integration of task trainers, standardized patients, team-based simulations, digital platforms, and structured debriefing promotes the simultaneous development of clinical, communicative, and foreign language competencies. Consequently, the comprehensive nature of simulation-based education significantly enhances the professional training of future physicians.

The effectiveness of developing professional foreign language communication largely depends on the use of instructional methods that closely reproduce authentic clinical practice. For this reason, simulation technologies are considered one of the most effective educational approaches in contemporary medical education (Motola et al., 2013).

Role-playing is among the most frequently used simulation methods because it reproduces typical clinical situations, including history taking, patient counselling, explanation of diagnoses, and discussion of treatment recommendations. Such activities foster spontaneous professional speech, clinical reasoning, empathy, and communicative confidence (Nestel & Bearman, 2015).

Another highly effective approach is the use of standardized patients, which provides students with opportunities to practise professional communication under conditions that closely resemble real clinical practice (Barrows, 1993; Cleland et al., 2009).

An important component of contemporary medical education is the Objective Structured Clinical Examination (OSCE), which is widely used to assess the clinical competence of future physicians. OSCE consists of a series of standardized stations, each designed to simulate a specific professional task, such as history taking, physical examination, patient counselling, interpretation of diagnostic findings, or interaction with members of the healthcare team.

In teaching Medical English, OSCE should be regarded not only as an assessment tool but also as an effective instructional strategy. By completing standardized clinical tasks in English, students develop professional medical vocabulary, improve their clinical communication skills, strengthen their ability to justify clinical decisions, and practise professional interaction in situations that closely resemble authentic clinical practice. Furthermore, standardized assessment criteria provide objective evaluation of students' professional foreign language communicative competence and help identify areas requiring further improvement (Harden et al., 1975).

The increasing complexity of contemporary healthcare highlights the importance of team-based simulation. During collaborative simulation activities, students from different medical disciplines coordinate their actions, distribute professional responsibilities, exchange clinical information, and make collective clinical decisions using English as the language of professional communication. Such learning experiences contribute to the development of communicative leadership, professional responsibility, teamwork, and the ability to apply internationally recognized communication frameworks, particularly the SBAR (Situation–Background–Assessment–Recommendation) protocol (Reeves et al., 2017).

An essential component of every simulation session is debriefing. During this stage, students analyse their clinical performance, discuss communication challenges, evaluate the appropriate use of medical terminology, and identify more effective strategies for professional interaction. Debriefing promotes reflective thinking, self-assessment, and self-correction, thereby substantially increasing the educational effectiveness of simulation-based learning (Cheng et al., 2016).

Rapid advances in digital technologies have considerably expanded the possibilities of simulation-based education. Digital simulators enable educators to recreate a wide variety of clinical situations through multimedia resources, interactive learning tasks, and automated feedback. These technologies support individualized learning, repeated practice of clinical scenarios, and objective assessment of students' learning outcomes. Their educational value has become particularly evident with the widespread implementation of blended and distance learning (Cook et al., 2010).

Another promising direction in simulation-based medical education is the use of virtual patients. Interactive digital platforms allow students to complete the entire clinical consultation process—from the patient's initial presentation to diagnosis and treatment planning. While working with virtual patients, future physicians use English in authentic professional contexts, improve clinical dialogue, strengthen professional argumentation, and develop proficiency in international medical terminology. Moreover, these technologies support individualized learning pathways and enable students to accumulate professional experience regardless of the availability of real clinical placements (Kononowicz et al., 2019).

Therefore, contemporary simulation technologies create an integrated educational environment in which professional foreign language communication develops under conditions that closely resemble authentic clinical practice. The combination of traditional simulation methods with digital technologies promotes the integration of linguistic, clinical, and communicative training, fully corresponding to contemporary international standards of medical education.

The effectiveness of developing professional foreign language communication depends not only on the availability of simulation facilities but also on the methodological organization of the educational process. Simulation sessions should integrate linguistic, clinical, and communicative training, ensuring that English functions as a practical tool for professional interaction rather than solely as a subject of study (Motola et al., 2013; McGaghie et al., 2010).

Based on the analysis of contemporary research, a methodological framework for organizing simulation-based Medical English instruction is proposed. The first stage involves defining the learning objectives and selecting an appropriate clinical scenario according to the professional competencies to be developed. Authentic clinical guidelines, international protocols, medical records, and up-to-date medical terminology should be incorporated to ensure the professional relevance of learning activities.

The second stage focuses on preparing students for the simulation. At this stage, learners revise essential medical vocabulary, practise key communicative patterns, and complete short preparatory language activities. Such preparation enables students to participate confidently in subsequent professional interactions conducted in English.

The third stage, which represents the core of the learning process, involves the implementation of the clinical scenario through role-playing, standardized patients, team-based simulations, or OSCE stations. Students communicate in English, justify clinical decisions, interact with patients and healthcare professionals, and apply appropriate medical terminology in realistic professional situations. During this stage, the instructor acts primarily as a facilitator and observer, assessing both professional performance and the level of foreign language communicative competence (Nestel & Bearman, 2015).

The final stage is debriefing, during which students analyse their performance, discuss communicative and clinical difficulties, evaluate the accuracy of professional terminology, and identify strategies for improving both language proficiency and professional communication. This reflective stage plays a crucial role in consolidating learning outcomes and promoting continuous professional development (Cheng et al., 2016).

The educational effectiveness of simulation-based instruction increases considerably when clinical scenarios gradually become more complex. During the early years of medical education, simulations should focus on history taking, primary patient consultations, and explaining treatment recommendations. At senior stages of training, students should participate in multidisciplinary case discussions, clinical handovers, delivery of difficult news, and collaborative clinical decision-making.

Assessment of learning outcomes should be comprehensive and should evaluate students' command of medical terminology, logical organization of professional dialogue, communicative appropriateness, linguistic accuracy, adherence to professional ethics, and effectiveness of interaction with standardized patients and healthcare team members.

The practical implementation of simulation technologies makes it possible to formulate several recommendations for teachers of Medical English in higher medical education institutions. Language instruction should be closely integrated with future professional practice through the use of authentic clinical scenarios, international clinical guidelines, and English-language medical documentation. Clinical simulations should gradually increase in complexity according to students' level of training. Regular debriefing should follow every simulation session, while digital simulators and virtual patients should be actively incorporated into the educational process. Furthermore, interdisciplinary collaboration between language instructors and clinical educators significantly enhances the formation of future physicians' integrated professional competence and prepares them for effective communication in international healthcare settings.

The successful implementation of simulation technologies in teaching professional foreign language communication requires a systematic methodological approach. Each simulation session should be organized according to clearly defined stages that ensure the gradual development of students' linguistic, communicative, and clinical competencies. Such an approach promotes the integration of language learning with professional training, increases the effectiveness of simulation-based instruction, and creates favourable conditions for reflective learning. The proposed methodological framework for organizing simulation-based Medical English instruction is presented in Table 2.

Table 2

Methodological Framework for Organizing Simulation-Based Instruction in Medical English

Stage	Students' Activities	Instructor's Role	Expected Learning Outcomes
Defining learning objectives	Familiarization with learning outcomes and clinical scenario	Formulates learning objectives and selects simulation tasks	Motivation and understanding of learning objectives
Preparatory stage	Revises medical terminology, practises communicative patterns, completes preparatory language tasks	Provides methodological guidance and language support	Readiness for professional communication
Simulation activity	Performs clinical tasks, communicates with patients and healthcare professionals, applies medical terminology	Facilitates learning, observes students' performance, provides support when necessary	Development of professional foreign language communicative competence
Debriefing	Analyses performance, identifies communication difficulties, reflects on learning outcomes	Moderates discussion, provides constructive feedback	Development of reflective skills and self-assessment
Assessment	Evaluates personal achievements and identifies areas for improvement	Assesses clinical performance and communication competence according to established criteria	Planning of further professional development

CONCLUSIONS AND PROSPECTS OF FURTHER RESEARCH

The findings of the study confirm that simulation technologies represent an effective pedagogical tool for developing the professional foreign language communicative competence of medical students. Their implementation ensures the integration of language, clinical, and communicative training by creating authentic educational situations in which English is used as a means of professional interaction. Such an approach enhances students' communicative confidence, promotes clinical reasoning, and prepares future physicians for professional practice in an international healthcare environment.

The study substantiates the pedagogical potential of simulation-based learning, identifies the structural components of professional foreign language communicative competence, systematizes the principal simulation methods used in medical education, and proposes a methodological framework for organizing simulation-based Medical English instruction. The proposed recommendations may be applied in teaching Foreign Language for Professional Purposes, Medical English, and other professionally oriented language courses in higher medical education institutions, as well as in the educational activities of simulation centres.

Further research should focus on the experimental verification of the proposed methodology, the development of digital simulation courses, the integration of virtual and augmented reality technologies into Medical English instruction, and the use of generative artificial intelligence for creating adaptive clinical scenarios, personalized learning environments, and intelligent systems for assessing students' professional foreign language communicative competence. These directions correspond to current international trends in the digital transformation of medical education and open new opportunities for improving the quality of future physicians' professional training.

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