

Results

The implementation of a continuous simulation pathway demonstrated a statistically significant improvement in key performance indicators for residents:

1. Performance on OSCE stations: The proportion of residents in the main group who successfully passed the second stage of the PSA on their first attempt was 96.8% (60/62) compared to 83.9% (47/56) in the control group ($p = 0.024$).
2. Quality of performance on emergency care stations: At the “Basic Cardiopulmonary Resuscitation” station, the average total checklist score in the main group increased from $78.4 \pm 4.2\%$ to $92.6 \pm 3.1\%$ ($p < 0.001$). A 3.4-fold reduction in the frequency of critical errors (ineffective compression depth, delayed defibrillation, and interruption of compressions for more than 10 seconds) was observed.
3. Clinical Stations and Communication: At the stations for initial history-taking and differential diagnosis, residents in the main group demonstrated a higher compliance score for aseptic/antiseptic practices (94.1% vs. 76.5%) and in patient-centered communication according to the Calgary-Cambridge guidelines (89.3% vs. 68.2%).
4. Time Management: The average time to complete the standardized scenario in the main group was 7 minutes and 15 seconds (including time for self-assessment), whereas in the control group, 28.6% of trainees did not meet the station’s time requirement.

Conclusions

1. The use of highly realistic simulation technologies combined with video debriefing significantly increases the success rate for primary specialized accreditation among internal medicine residents (up to 96.8%).
2. Systematic practice of standardized clinical scenarios transforms emergency care algorithms and communication skills into motor and verbal automatisms, mitigating the impact of exam-related stress.
3. The practical training model developed for the 2024–2026 period has proven to be reproducible and can be recommended for implementation at universities that train residents.

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“REVERSE MENTORING” + AI: SIMULATION-BASED TRAINING IN USING A MEDICAL INFORMATION SYSTEM USING CASE STUDIES OF OUTPATIENT MONITORING OF PATIENTS WITH TYPE 2 DIABETES

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Abstract. This article describes a “reverse mentoring” model (student–physician) utilizing AI for simulation-based training in medical information systems (MIS) using case studies from follow-up care for type 2 diabetes. The use of NLP and ML tools provided instant feedback. A pilot course (19 sessions) revealed a 34% reduction in errors and a twofold increase in work speed. This approach

bridges the gap between basic and clinical training, transforming computer science into an applied tool and ensuring synergy between digital and clinical expertise.

Scientific specialty: 3.2.3. Public Health and Health Care Organization, Sociology, and History of Medicine.

Relevance

The “Medical Informatics” course for first- and second-year students includes only a superficial introduction to office software and basic computer functions, which makes the study of informatics extremely abstract. For students, this discipline often seems either downright boring or, even when presented in an engaging way, incomprehensible in terms of its practical value: they do not see how working with data brings them closer to understanding clinical disciplines and aids in diagnosis or treatment. As a result, graduates struggle when working with medical information systems (MIS), and experienced physicians view electronic documentation as a bureaucratic burden, which leads to errors and financial losses.

At the same time, the departments that provide a foundational base in the first through third years and the clinical departments in the fourth through sixth years — where “real learning, necessary for future work,” begins — often operate in isolation from one another. This creates a “broken bridge” effect: the digital and foundational skills acquired early on do not find logical development or application during clinical practice.

The solution is a “reverse mentorship” model that combines students’ digital literacy with physicians’ clinical experience. This allows students to see the connection between algorithms and real patients, while enabling physicians to adapt their experience to the digital reality. Implementing this model requires AI tools that act as instant tutors and quality controllers. AI reduces cognitive load, creates personalized learning programs, and ensures that every digital skill is inextricably linked to a specific clinical task.

Objective

To evaluate the effectiveness of an interdisciplinary course in medical informatics for second-year medical students and internists, developed based on a project to improve follow-up care for patients with type 2 diabetes, implemented at the PCRB. The course is structured around collaborative “student — physician” pair learning using AI tools within the MIS learning environment.

Materials and Methods

An 8-hour practical course (4 modules) was developed and conducted as a pilot project. The study involved 19 “second-year student + general practitioner” pairs (38 participants in total). The training was structured around a comprehensive simulation case: from receiving an electronic discharge summary from the hospital regarding a newly diagnosed case of type 2 diabetes to the complete closure of the diabetes case in the MIS.

Three AI tools played a key role in the course:

1. NLP assistant (natural language processing): analyzed the text in the electronic medical record (EMR) and highlighted the absence of mandatory phrasing required by Ministry of Health Order No. 168n.

2. A generative model for creating scenarios: based on prompt engineering, the AI generated variable “glitches” in the process, training the pair of algorithms to respond to non-standard situations.
3. Machine learning-based analytical dashboard: automatically assessed the “accuracy” of case closure (correct linking of services to the diagnosis code, completeness of the outpatient appointment form fields, and correct completion of the Case Management Form) and assigned the pair a scoring score without human expert involvement.

Results

The following data were obtained following the pilot launch:

- Reduction in defects: The number of critical documentation errors (incorrect code, failure to link services to the DN, absence of a foot examination record) in the final testing decreased by 34% compared to the baseline.
- Time Efficiency: The average time spent by a pair on correctly documenting a single completed medical record case in the “sandbox” was cut in half — to 4 minutes — thanks to the use of AI templates and keyboard shortcuts mastered during the collaborative work.
- Synergy in Learning: 85% of physicians noted that the students helped them learn to navigate the Unified Health Information System more quickly and discover useful system features they were previously unaware of. This form of training allowed them to realize how digital hygiene affects the continuity of the patient’s care pathway and the efficiency of the entire healthcare organization. 92% of students indicated that working on a real clinical case under a doctor’s guidance radically changed their understanding of the importance of the discipline “Medical Informatics” and helped them develop foundational clinical thinking skills, clearly demonstrating the direct link between accurately completing an electronic medical record and the quality of actual medical care provided. The Role of AI: 95% of participants highly valued the instant, emotionally neutral feedback from the NLP assistant, noting that it reduced their fear of making mistakes and allowed them to focus on clinical logic rather than on searching for buttons in the interface.
- The real value also lies in creating a cycle of continuous, two-way exchange of expertise: the students’ digital flexibility and fresh perspective compensate for the rigidity in perceiving new interfaces, while the physician’s clinical expertise transforms abstract actions in the EHR into meaningful medical logic. In this process, AI tools do not serve as a replacement for a mentor, but rather as the “glue” that structures this exchange, transforming training in the use of MIS from a bureaucratic obligation into a collaborative solution to real clinical problems.

Conclusions

The pilot project demonstrated the high effectiveness of integrating a collaborative learning model with AI tools

into the teaching of medical informatics. This approach transforms the discipline from a theoretical course into a practical tool for lean production. AI does not replace the instructor but serves as a scalable “digital simulator” that ensures the standardization of documentation skills. The value of pair work lies in the transition from one-way “reverse mentoring” (where the student merely helps the physician “find the right button”) to a model of mutual professional enrichment. A lower-year student acts as a catalyst for the physician’s digital adaptation, breaking down stereotypes about the complexity of medical information systems, while the physician, in turn, imbues dry IT skills with deep clinical meaning. AI acts as the “third partner” in this partnership, providing a safe, non-judgmental environment for experimentation, where mistakes are not a reason for reprimand but rather a point of growth for both participants.

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A THREAT TO AUTHORITY THROUGH PARTNERSHIP

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Abstract. Resistance to communication training is a defense mechanism of professional identity, rooted in the tradition of sacralizing medicine and the perception of a partnership with the patient as a threat to the authority of the medical professional. This study, conducted by philosophers and clinical educators, identifies connections between the desire to learn and apply communication techniques and the worldviews that shape one’s attitude toward life in general.

Scientific specialty: 3.2.3. Public Health and Health Care Organization, Sociology and History of Medicine.

Relevance

For medical professionals, partnership within the framework of the informed voluntary consent model is often perceived as a threat to authority: there is a fear of losing control, doubts about one’s own competence, and a feeling that “now you can’t just tell them what to do.”

The perception of partnership as a manifestation of an anti-paternalistic attitude is determined largely not so much by objective working conditions as by the professional’s worldview.

This worldview shapes the lens through which doctors and nurses view patients in different ways and directly influences communication, the willingness to acquire effective communication skills, and the level of conflict in situations they themselves create.

The historical roots of Russian paternalism lie in Christian ethics of mercy and the “protective” concept of medicine. The contradiction lies in the fact that the legal environment of modern healthcare requires a transition to a collegial model of interaction — one that presupposes patient autonomy and the need to negotiate with patients — while simultaneously preserving the archaic, hierarchical framework of medicine with its long-standing culture of paternalism.