

СЕРІЯ «Педагогіка»

УДК 61:378.147:001.895

[https://doi.org/10.52058/2786-4952-2022-2\(7\)-18-22](https://doi.org/10.52058/2786-4952-2022-2(7)-18-22)

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MEDICAL EDUCATION: INNOVATIONS IN TEACHING METHODS

Abstract. Bringing national medical education to the principles declared in modern international education is extremely necessary and is possible only with the implementation of innovative teaching methods.

The purpose of this paper is an analytical review of modern methods of training health professionals to determine priorities in the latest strategies of medical education.

Now the primary task is to understand effective educational practices, the introduction of research as a theoretical basis, the implementation of better and more mixed research methods, behavioral and organizational changes, the transfer of wealth into practice. Mobile technologies have the potential to improve the quality of education in basic medical education of students at the place of residence and beyond. Medical educators should be informed about the underlying socio-theoretical concepts, as well as the practical possibilities and limitations of their use. The CASE-study pilot program was designed to create opportunities for teaching the necessary interviews, assessing skills, encouraging peer interaction between teachers and students, and determining the direction of curriculum development. With the development of education, there has been a shift from the use of traditional teaching methods, such as didactic or mechanical teaching, to non-traditional teaching methods, such as watching role-playing games, modeling, live interviews and the use of virtual environments. Virtual modeling is a particularly unique learning opportunity for students, as it allows you to learn without the use of real life resources. Thanks to the Internet, students have the opportunity to take courses, at least at the level of viewing demonstration materials. Unique surgical operations, demonstrations of the latest equipment can be viewed both online and in videos.

A synthetic approach to planning the content of medical education is needed, combining traditional, time-tested teaching methods, as well as innovative methods, modern tools (CASE-study, virtual modeling, simulation training, etc.), transfer of knowledge to patient-centered practice.

Keywords: mobile technologies, virtual modeling, distance learning, simulation trainings.

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МЕДИЧНА ОСВІТА: ІННОВАЦІЇ В МЕТОДАХ НАВЧАННЯ

Анотація. Приведення вітчизняної медичної освіти до принципів, задекларованих в сучасній міжнародній освіті, є вкрай необхідним та є можливим лише за умови імплементації інноваційних методів викладання.

Мета представленої роботи – аналітичний огляд сучасних методів підготовки медичних працівників для визначення пріоритетів в новітніх стратегіях медичної освіти.

Натепер першорядним завданням є розуміння ефективних освітніх практик, впровадження дослідження в якості теоретичної основи, імплементація більш якісних і змішаних методів досліджень, поведінкові та організаційні зміни, передача надбань в практику. Мобільні технології мають потенціал для підвищення якості навчання в базовій медичній освіті студентів за місцем проживання і за його межами. Медичні викладачі повинні бути інформованими про закладені в основу соціально-теоретичні концепції, а також практичні можливості та обмеження їх використання. Експериментальна програма CASE-study була розроблена, щоб створити можливості для навчання необхідному інтерв'юванню, оцінки навичок, заохочення до колегіальної взаємодії між викладачами та слухачами, визначення напрямку розробки навчальних планів. З розвитком освіти відбувся перехід від використання традиційних методів навчання, таких як дидактичне або механічне вчення, до нетрадиційних методів навчання, таких як перегляд рольових ігор, моделювання, інтерв'ю в прямому ефірі і використання віртуальних середовищ. Віртуальне моделювання є особливо унікальною можливістю навчання для учнів, оскільки дозволяє вчитися без використання реальних життєвих ресурсів. Завдяки інтернету, студенти мають можливість проходити курси навчання, хоча б на рівні перегляду демонстраційних матеріалів. Унікальні хірургічні операції, демонстрації роботи новітнього обладнання можна переглядати як в онлайн режимі, так і у відеозаписах.

Необхідний синтетичний підхід до планування змісту медичної освіти, що поєднує традиційні, перевірені часом методи викладання, а також інноваційні методики, сучасні засоби (CASE-study, віртуальне моделювання, симуляційний тренінг тощо), перенесення отриманих знань в практику, орієнтовану на пацієнта.

Ключові слова: мобільні технології, віртуальне моделювання, дистанційне навчання, симуляційні тренінги.

Formulation of the problem. Intensive growth of new information, changing requirements for the professional level of doctors highlight the problems of improving

medical education. Time requirements and objective conditions for practical training of a doctor require a radical revision of the ideology of learning [1]. The quality of medical care based on the introduction of its universal standardization and the principles of evidence-based medicine has not improved as much as expected. This discrepancy has progressed along with the existence of a persistent gap between clinicians and researchers: this gap prevents the full use of research and health resources, slows down the implementation of innovations and worsens the results. The gap can be bridged by creating a culture of cooperation between the two industries. To overcome this problem, it is necessary to support, strengthen and develop the infrastructure of the medical education system [2]. It is extremely necessary to bring domestic medical education to the principles declared in modern international education, which is possible only with the implementation of innovative teaching methods.

Analysis of recent research and publications. Important aspects of the formation and development of modern innovations in medical education are covered by such outstanding scientists as Alekseenko A.P., Lisovy V.M., Kapustnyk V.A., Markovsky V.D., Zavgorodniy I.V. However, the introduction of innovative teaching methods is a continuous process, so the system of creating new approaches is still insufficiently systematized and needs constant improvement.

The purpose of the presented work is an analytical review of modern methods of training health workers to determine priorities in the latest strategies of medical education.

Presenting main material. Evidence-based medical education is playing an increasingly important role in the choice of didactic methods and the development of medical curricula and assessments. Abroad, a growing number of educational research projects are accompanying the ongoing change in the process of medical education. Regular educational scientific meetings and cooperation of partners are among the most important as useful support structures for the future for the development of strategies and structures for further development of health education [3].

At present, the priority is to increase trust, enthusiasm and understanding of effective educational practices, the introduction of research as a theoretical basis, the implementation of better and more mixed research methods, behavioral and organizational changes, transfer of gains in practice [4].

Medical students must become specialists in various fields during their education. The educational project can use cognitive load theory for each of these competencies. It includes the following aspects. Task accuracy: from literature (lowest level) through simulated patients (middle level) to real patients (highest level). Task complexity: the number of information elements in the educational task. Training support: from working examples (highest) through completion tasks (average) to autonomous performance of tasks (lowest). It is necessary to integrate any competence into the medical curriculum so that learning facilitates the work of students, which begins with high educational support for low complexity and accuracy of reproduction of tasks to tasks of high complexity in high accuracy reproduction conducted autonomously [5].

Mobile technologies (including portable and devices) have the potential to improve the quality of education in basic medical education of students at the place of residence and beyond. In order to successfully use these technologies, health educators must be informed about the underlying socio-theoretical concepts that influence their use in preclinical and clinical educational environments in which educational activities take place, as well as practical opportunities and limitations of their use [6].

Collegial education has become a recognized and widespread method for improving the quality of student learning in university medical education. Evidence suggests that collegial learning provides learning benefits for both students and teachers. As the learning process helps to develop the tutor's knowledge and teacher skills, collegial learning should be supported [7]. Team-oriented learning is an active learning method designed to help students achieve the goals of the course while learning, working in a team. It is confirmed that team-oriented learning has a positive effect on exam grades and other learning outcomes, and students gain skills in professional activities in the team [8].

Good communication skills are important for interns undergoing postgraduate training. However, these skills vary widely among medical school graduates. The CASE-study pilot program was designed to provide opportunities for (1) training necessary interviews and communication skills for trainees, (2) assessing residents' skills, (3) improving the institute of training, (4) encouraging collegial interaction between teachers and students, (5) determining the direction of curriculum development for interns. This type of exercise provides powerful feedback and assessment of opportunities for instructors and course leaders [9].

Developed practical advice on writing CASE-cases to involve students in active learning and discussion. During the initial preparation of the case, the authors must (1) determine the goals and thematic objectives and (2) determine the level of students. When writing a case, authors should (3) use active and colorful language; (4) use one's own description of patients, not medical language; (5) allow students to interpret the data independently; and (6) be realistic during breaks in the treatment of patients. In addition, the authors should pay attention to methods that enhance the discussion: (7) creating barriers to diagnosis or treatment options; (8) facilitating questions and discussing most answers; (9) with the help of tips to provide discussion and evaluation of the acquired knowledge; and (10) omit parts or distracting information inserts. Finally, well-formulated questions engage students in a higher order of thinking; and (11) stimulate curiosity and thoughtfulness [10].

Medical universities and residencies are currently undergoing a shift in the pedagogical paradigm. An increasing amount of medical information and research is complicating medical education to stay within its curriculum. As patients become increasingly concerned about the fact that students and interns "practice" on them, clinical medicine pays more attention to the safety and quality of patient care than to learning "at the table" and education. Educators have faced these challenges in restructuring curricula, developing small group sessions, and increasing self-study.

However, there is still a gap between classroom learning and clinical settings. Many students feel that they are not well prepared in medical history, physical examination, diagnosis and management.

With the development of education, there has been a shift from the use of traditional teaching methods, such as didactic or mechanical teaching, to non-traditional teaching methods, such as watching role-playing games, modeling, live interviews and the use of virtual environments. If learning is not as effective as possible, students may not understand their concepts and interpret the results correctly, which can lead to serious consequences and subsequently affect the clinical care provided to patients. The evidence suggests that non-traditional teaching methods such as videotapes, virtual simulations, simulating patient symptoms in computer applications and displaying standardized patients better improve students' understanding and skills than traditional teaching methods such as lectures and materials reading. Virtual modeling is a particularly unique learning opportunity for students, as it allows you to learn without the use of real life resources. Videos are the most widely used and effective approach, as virtual modeling still has a high cost [11].

Simulation is defined as a method used to replace or enhance a real experience with a managed experience, evoking or replacing essential aspects of the real world in a fully interactive mode. The use of simulation in professional medical education began several decades ago using simulations of low precision reproduction and is evolving at an unprecedented rate. It is shown that in different areas of medical training modeling leads to improved medical knowledge, comfort during procedures, as well as improved performance during retesting in simulated scenarios. Numerous studies have shown the effectiveness of modeling in the teaching of basic science and clinical knowledge, procedural skills, teamwork, as well as assessment at the bachelor's and master's level in medical education [12]. Debriefing is considered by many to be an integral and important part of the modeling process.

Modern technologies have another additional positive moment. This is distance learning. Thanks to the Internet and the latest international programs, a student or intern has the opportunity to take training courses, at least at the level of viewing demonstration materials. Unique surgical operations, demonstrations of the latest equipment, including the emergence of new simulation technologies can be viewed both online and in videos. Thus, there is an opportunity for additional self-study, increase the level of their medical knowledge and awareness of innovation in their profession [12].

Technologization of communication between doctor and patient becomes one of the characteristic features of modern life. Saving time in collecting anamnesis during the conversation (communication replaces the computer), neglect of classical examination and manual examination and sometimes inability to perform examination (everything is transferred to devices and paraclinical methods of inspection), inability to formulate a working hypothesis and identify the leading syndrome. Therefore, it is impossible to completely abandon the traditional forms of teaching, which have stood the test of time and have their advantages [1, 13].

Learning for some students is essentially an observational experience, where students are actively involved in direct patient care activities. There is a need to identify effective mechanisms for mentors to balance patient care responsibilities with students' educational needs in order to fully prepare graduates for modern, patient-centered practice. Involving students in patient care and taking responsibility for the results of drug therapy is achievable in practice. In our opinion, this approach is mandatory for education, successful training of qualified professionals who can influence the results of drug therapy [14].

According to a comprehensive curriculum, namely problem-based learning, students must acquire a number of learning skills and abilities. This can be achieved not only by memorizing factual knowledge, but through the development of a wide range of cognitive and non-cognitive skills that enhance in-depth study. Developed 12 tips, organized on three topics. These tips (1) learn to ask good questions, (2) use analogy, (3) build mechanisms and conceptual maps, (4) join a temporary tutoring group, (5) develop critical thinking skills, (6) use self-reflection, (7)) use an appropriate range of learning resources, (8) use feedback, (9) apply prior knowledge, (10) practice modeling learning, (11) learn to work and service learning, and (12) learn from patients. For optimal productivity, it is recommended that students and teachers practice each of these approaches and apply them every day of study / teaching [15].

Heads of educational institutions must structure their own program based on the scope, context, needs and available resources. There is a need to implement a flexible curriculum design that can meet different levels of educational needs and interests, match formal and hidden curricula by recognizing the value of learning, support curriculum development, encourage evidence-based education and reward for all levels of teaching [16].

Conclusions. Thus a synthetic approach to planning the content of medical education is needed, combining traditional, time-tested teaching methods, as well as innovative methods, modern tools (CASE-study, virtual modeling, simulation training etc.), providing a psychologically safe learning environment to promote active interaction students and mentors, improving the student's ability to think independently, critically and comprehensively, the transfer of knowledge into patient-centered practice.

References:

1. Alekseenko, A.P. (2016). Filosofsko-etychni vyklyky symulyaciinomu navchannu v medycyni [Philosophical and ethical challenges to simulation training in medicine]. *Symulyaciine navchannya v systemi pidgotovky medychnykh kadriv – Simulation training in the system of medical training: Proceedings of the L educational and methodical conference dedicated to the 212th anniversary of the founding of KhNMU*, (pp. 9-12). Kharkiv: KhNMU [in Ukrainian].
2. Celi, L.A., Davidzon, G., Johnson, A.E., Komorowski. M., Marshall, D.C., Nair, S.S. et al. (2016). Bridging the Health Data Divide. *Journal of medical Internet research*, 18 (12), 325.
3. Prediger, S., Harendza, S. (2016). Analysis of educational research at a medical faculty in Germany and suggestions for strategic development – a case study. *GMS Journal for medical education*, 33 (5), Doc71.

4. Steinert, Y., Mann, K., Anderson, B., Barnett, B.M., Centeno, A., Naismith, L. et al. (2016). A systematic review of faculty development initiatives designed to enhance teaching effectiveness: A 10-year update: BEME Guide No. 40. *Medical teacher*, 38 (8), 769-786.
5. Leppink, J., Duvivier, R. (2016). Twelve tips for medical curriculum design from a cognitive load theory perspective. *Medical teacher*, 38 (7), 669-674.
6. Sisk, R.J. (2011). Team-based learning: systematic research review. *The journal of nursing education*, 50 (12), 665-669.
7. Boet, S., Pigford, A.A., Fitzsimmons, A., Reeves, S., Tribby, E., Bould, M.D. (2016). Interprofessional team debriefings with or without an instructor after a simulated crisis scenario: An exploratory case study. *Journal of interprofessional care*, 30 (6), 717-725.
8. Cohen, D.A., Newman, L.R., Fishman, L.N. (2016). Twelve tips on writing a discussion case that facilitates teaching and engages learners. *Medical teacher*, 26, 1-6.
9. Xie, H., Liu, L., Wang, J., Joon, K.E., Parasuram, R., Gunasekaran, J. et al. (2015). The effectiveness of using non-traditional teaching methods to prepare student health care professionals for the delivery of mental state examination: a systematic review. *JBIM database of systematic reviews and implementation reports*, 13 (7), 177-212.
10. Levett-Jones, T., Lapkin, S. (2014). A systematic review of the effectiveness of simulation debriefing in health professional education. *Nurse education today*, 34 (6), 58-63.
11. Lisovyi, V.M., Kapustnyk, V.A., Markovskyi, V.D., Zavgorodnii, I.V. (2016). Zagalni problem ta perspektyvy zastosuvannya symulyaciinykh metodiv osvity [General problems and prospects of application of simulation methods of education]. *Symulyaciine navchannya v systemi pidgotovky medychnykh kadriv – Simulation training in the system of medical training*: Proceedings of the L educational and methodical conference dedicated to the 212th anniversary of the founding of KhNMU, (pp. 3-7). Kharkiv: KhNMU [in Ukrainian].
12. Laschinger, S., Medves, J., Pulling, C., McGraw, D.R., Waytuck, B., Harrison, M.B. et al. (2008). Effectiveness of simulation on health profession students' knowledge, skills, confidence and satisfaction. *International journal of evidence based health care*, 6 (3), 278-302.
13. Rathbun, R.C., Hester, E.K., Arnold, L.M., Chung, A.M., Dunn, S.P., Harinstein, L.M. et al. (2012). Importance of direct patient care in advanced pharmacy practice experiences. *Pharmacotherapy*, 32 (4), 88-97.
14. Azer, S.A., Guerrero, A.P., Walsh, A. (2013). Enhancing learning approaches: practical tips for students and teachers. *Medical teacher*, 35 (6), 433-443.
15. Asad, M., Iqbal, K., Sabir, M. (2015). Effectiveness of problem based learning as a strategy to foster problem solving and critical reasoning skills among medical students. *Journal of Ayub Medical College, Abbottabad*, 27 (3), 604-607.
16. Ramani, S., Mann, K., Taylor, D., Thampy, H. (2016). Residents as teachers: Near peer learning in clinical work settings: AMEE Guide No. 106. *Medical teacher*, 38 (7), 642-655.

Література

1. Алексеєнко А.П. Філософсько-етичні виклики симуляційному навчанню в медицині / А.П. Алексеєнко // матеріали І навчально-методичної конференції присвяченої 212-й річниці від дня заснування ХНМУ «Симуляційне навчання в системі підготовки медичних кадрів» (30 листопада 2016 року). – Харків: ХНМУ, 2016. – С. 9-12.
2. Celi, L.A., Davidzon, G., Johnson, A.E., Komorowski, M., Marshall, D.C., Nair, S.S. et al. (2016). Bridging the Health Data Divide. *Journal of medical Internet research*, 18 (12), 325.
3. Prediger, S., Harendza, S. (2016). Analysis of educational research at a medical faculty in Germany and suggestions for strategic development – a case study. *GMS Journal for medical education*, 33 (5), Doc71.
4. Steinert, Y., Mann, K., Anderson, B., Barnett, B.M., Centeno, A., Naismith, L. et al. (2016). A systematic review of faculty development initiatives designed to enhance teaching effectiveness: A 10-year update: BEME Guide No. 40. *Medical teacher*, 38 (8), 769-786.

5. Leppink, J., Duvivier, R. (2016). Twelve tips for medical curriculum design from a cognitive load theory perspective. *Medical teacher*, 38 (7), 669-674.
6. Sisk, R.J. (2011). Team-based learning: systematic research review. *The journal of nursing education*, 50 (12), 665-669.
7. Boet, S., Pigford, A.A., Fitzsimmons, A., Reeves, S., Tribby, E., Bould, M.D. (2016). Interprofessional team debriefings with or without an instructor after a simulated crisis scenario: An exploratory case study. *Journal of interprofessional care*, 30 (6), 717-725.
8. Cohen, D.A., Newman, L.R., Fishman, L.N. (2016). Twelve tips on writing a discussion case that facilitates teaching and engages learners. *Medical teacher*, 26, 1-6.
9. Xie, H., Liu, L., Wang, J., Joon, K.E., Parasuram, R., Gunasekaran, J. et al. (2015). The effectiveness of using non-traditional teaching methods to prepare student health care professionals for the delivery of mental state examination: a systematic review. *JB I database of systematic reviews and implementation reports*, 13 (7), 177-212.
10. Levett-Jones, T., Lapkin, S. (2014). A systematic review of the effectiveness of simulation debriefing in health professional education. *Nurse education today*, 34 (6), 58-63.
11. Лісовий В.М. Загальні проблеми та перспективи застосування симуляційних методів освіти / В.М. Лісовий, В.А. Капустник, В.Д. Марковський, І.В. Завгородній // матеріали І навчально-методичної конференції присвяченої 212-й річниці від дня заснування ХНМУ «Симуляційне навчання в системі підготовки медичних кадрів» (30 листопада 2016 року). – Харків: ХНМУ, 2016. – С. 3-7.
12. Laschinger, S., Medves, J., Pulling, C., McGraw, D.R., Waytuck, B., Harrison, M.B. et al. (2008). Effectiveness of simulation on health profession students' knowledge, skills, confidence and satisfaction. *International journal of evidence based health care*, 6 (3), 278-302.
13. Rathbun, R.C., Hester, E.K., Arnold, L.M., Chung, A.M., Dunn, S.P., Harinstein, L.M. et al. (2012). Importance of direct patient care in advanced pharmacy practice experiences. *Pharmacotherapy*, 32 (4), 88-97.
14. Azer, S.A., Guerrero, A.P., Walsh, A. (2013). Enhancing learning approaches: practical tips for students and teachers. *Medical teacher*, 35 (6), 433-443.
15. Asad, M., Iqbal, K., Sabir, M. (2015). Effectiveness of problem based learning as a strategy to foster problem solving and critical reasoning skills among medical students. *Journal of Ayub Medical College, Abbottabad*, 27 (3), 604-607.
16. Ramani, S., Mann, K., Taylor, D., Thampy, H. (2016). Residents as teachers: Near peer learning in clinical work settings: AMEE Guide No. 106. *Medical teacher*, 38 (7), 642-655.