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Review Article

Modern techniques of teaching and learning in medical education: A descriptive literature review

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ABSTRACT

Medical education has witnessed significant advancements in recent years, driven by technological advancements and a growing emphasis on learner-centered approaches. This descriptive literature review aims to explore modern techniques of teaching and learning in medical education. The review synthesizes relevant literature to provide an overview of innovative instructional methods, such as simulation-based training, flipped classrooms, problem-based learning, and digital platforms. Furthermore, it discusses the benefits and challenges associated with these techniques and highlights the need for faculty development to effectively implement and integrate them into medical curricula. The findings underscore the importance of embracing modern teaching approaches to enhance the learning experience and prepare medical students for the complex healthcare landscape.

1. Introduction

Medical education plays a critical role in producing competent and compassionate healthcare professionals. With the rapid advances in medical knowledge and technology, traditional teaching methods are being complemented or replaced by advanced techniques. This article provides a descriptive review of the contemporary approaches to teaching and learning in medical education.

1.1. Simulation-based training simulation-based training (SBT)

SBT has emerged as a valuable tool in medical education. It allows learners to practice clinical skills in a safe and controlled environment, providing realistic scenarios that cope with the real-life situations. SBT encompasses a range of modalities, including virtual reality, high-fidelity models, and standardized patients. This part explores the advantages, challenges, and evidence supporting the efficacy of SBT in enhancing experimental skills, teamwork, and decision-making capabilities among medical students (Al-Elq, 2010).[1] SBT also allows learners to practice procedures repeatedly, receive immediate feedback, and develop confidence in their abilities (Gordon, Wilkerson, Shaffer, & Armstrong, 2001).[2] One of the key advantages of simulation-based training is its ability to recreate complex scenarios that may be difficult or expensive to replicate in real life. Similarly, medical professionals can train for surgical procedures, patient management, and diagnostic assistances in virtual healthcare environments. This allows learners to gain hands-on experience, build memory, and develop expertise in a controlled setting. Moreover, simulation-based training fosters collaboration and teamwork. It can be designed to involve multiple

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participants who work together to address complex challenges. This promotes communication, coordination, and effective teamwork skills, which are crucial in fields where professionals often work in high-pressure situations. By facilitating realistic scenarios, learners can develop effective communication strategies, leadership skills, and the ability to make coordinated decisions as a team. Research has shown that simulation-based training can lead to improved learning outcomes compared to traditional classroom-based or theoretical instruction. Learners who engage in simulation-based training demonstrate increased confidence, competence, and performance in real-life situations. They are better prepared to handle emergencies, make knowledgeable decisions, and adjust to unexpected events (Dieckmann, P., et al., 2017).[3] Simulation-based training is a powerful educational tool that offers a safe and controlled environment for learners to acquire and refine their skills. By replicating real-world scenarios and applying advanced technologies, simulation-based training enhances learning outcomes, encourages teamwork cooperation, and prepares individuals for the challenges they may encounter in their respective fields. As technology lasts to advance, simulation-based training is likely to play an increasingly significant role in professional development and education.

1.2. Flipped Classrooms

The flipped classroom model has expanded popularity in medical education. In this approach, students are assigned pre-class materials to review independently, while classroom time is dedicated to active learning, discussions, and problem-solving activities (Bergmann & Sams, 2012).[4] This section examines the benefits of the flipped classroom model, such as promoting self-directed learning, critical thinking, and partnership. It also discusses strategies for successful implementation and potential challenges.

Flipped classrooms offer several advantages compared to traditional instructional approaches. One significant benefit is enhanced student engagement and active learning. By unstable the delivery of content outside the classroom through pre-recorded lectures or readings, students can access the material at their own pace, allowing them to review and digest the information before class. This method fosters a learner-centered environment where students can arrive in class prepared and ready to engage in meaningful discussions and collaborative activities (Strayer, 2012).[5] Research has shown that this active engagement leads to increased student participation, higher motivation, and a deeper understanding of the subject matter (Mason, Shuman, & Cook, 2013).[6] Furthermore, the flipped classroom model promotes personalized learning experiences as students have the flexibility to revisit content as needed, catering to their individual learning styles and preferences (Herreid & Schiller, 2013).[7]

1.3. Problem-based learning (PBL)

Problem-based learning is an inquiry-based instructive approach that encourages students to actively explore clinical problems and apply knowledge to solve them. PBL promotes self-directed learning, critical thinking, and problem-solving skills. This part reviews the literature on the implementation and outcomes of PBL in medical education, including the facilitator's role, student engagement, and assessment methods.

PBL fosters self-directed learning, critical thinking, and problem-solving skills (Dochy, Segers, Van den Bossche, & Gijbels, 2003).[8] Research has shown that PBL enhances knowledge acquisition, clinical reasoning, and communication skills among medical students. PBL also promotes the development of lifelong learning skills, which are crucial in a rapidly changing healthcare landscape (Dornan, Boshuizen, King, & Scherpbier, 2007).[9]

1.4. Digital platforms and e-learning

Advances in technology have transformed medical education, offering various digital platforms and e-learning tools. This part discusses the use of online resources, mobile applications, virtual patient cases, and interactive multimedia to enhance medical learning. It highlights the benefits of digital platforms, such as accessibility, flexibility, and modified learning experiences, while also addressing concerns related to quality assurance, learner engagement, and information overwork.

1.5. Faculty development for modern teaching approaches

Successful implementation of modern teaching techniques requires faculty members to adapt and develop new skills. This part highlights the importance of faculty development programs that focus on enhancing instructional strategies, incorporating technology, and promoting learner-centered approaches. It explores effective faculty development models and strategies to support educators in embracing innovative teaching methods.

Digital platforms provide flexibility, accessibility, and the ability to integrate multimedia elements, which enhance engagement and knowledge retention (Ruiz, Mintzer, & Leipzig, 2006).[10] However, it is important to ensure the quality of digital resources (Wong, Greenhalgh, & Pawson, 2010).[11]

2. Challenges and Future Directions

Although modern practices of teaching and learning in medical education offer frequent benefits, they also come with certain challenges and require careful consideration for future directions. One of the key challenges is the need for faculty development and training to successfully implement

these innovative approaches. Faculty members may require support and resources to adjust their teaching methods, create engaging content, and efficiently apply technology-enhanced tools (McLean et al., 2008).[12] Moreover, the integration of technology in medical education necessitates infrastructure support, including reliable internet access, appropriate hardware, and software resources (Maloney et al., 2012).[13] Another challenge is ensuring the validity and reliability of assessments in these new instructional models. Traditional assessment methods may not align with the skills and competencies developed through modern techniques, calling for the development and validation of new assessment strategies that accurately measure student performance (Ruiz et al., 2006).[10]

Looking towards the future, it is vital to continue exploring the effectiveness of these techniques in improving learning outcomes and clinical performance. Further research is needed to assess the long-term impact of technology-enhanced approaches on student knowledge retention, clinical skills, and patient outcomes (Ellaway et al., 2008).[14] Additionally, efforts should be made to address the digital divide, safeguarding equitable access to technology and educational resources for all students (Ventola, 2014).[15] Cooperative partnerships between medical schools, educational institutions, and technology developers can facilitate the development and sharing of best practices, instructional resources, and standardized guidelines for implementing these techniques (Kamin et al., 2015).[16] By addressing these challenges and focusing on future directions, medical education can continue to evolve and embrace the potential of modern teaching and learning techniques.

3. Conclusion

Modern techniques of teaching and learning in medical education have transformed the way knowledge is imparted and skills are developed. These approaches, including technology-enhanced methods, simulation-based training, flipped classrooms, and active learning strategies, offer numerous assistances. They promote active student engagement, personalized learning experiences, and the development of critical thinking and clinical reasoning skills. Furthermore, these techniques provide opportunities for collaborative learning, fostering effective communication and teamwork among future healthcare professionals. However, the application of these modern techniques also comes with challenges. Faculty development, infrastructure support, and the development of valid and reliable assessments are critical areas that need attention. Furthermore, addressing the digital divide and ensuring equitable access to technology and educational resources are important considerations to ensure inclusivity in medical education. To move forward, further research is needed to assess the long-term impact of these techniques on learning outcomes, clinical performance, and patient outcomes. Cooperative efforts among medical schools, educational institutions, and technology developers are essential to share best practices, resources, and standardized guidelines. By addressing these challenges and focusing on future directions, medical education can continue to evolve, keeping pace with advancements in technology and pedagogy, ultimately producing competent and compassionate healthcare professionals equipped to meet the needs of the ever-changing healthcare landscape.

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5. Conflict of Interest

None.

References

1. Al-Elq AH. Simulation-based medical teaching and learning. *J Family Community Med*. 2010;17(1):35–40.
2. Gordon JA, Wilkerson WM, Shaffer DW, Armstrong EG. Practicing" medicine without risk: Students' and educators' responses to high-fidelity patient simulation. *Acad Med*. 2001;76(5):469–72.
3. Dieckmann P, Patterson M, Lahlou S, Mesman J, Nyström P, Krage R. Variation and adaptation: learning from success in patient safety-oriented simulation training. *Adv Simul*. 2017;2. doi:10.1186/s41077-017-0054-1.
4. Bergmann J, Sams A. Flip Your Classroom: Reach Every Student in Every Class Every Day. 1st ed. United States: International Society for Technology in Education; 2012.
5. Strayer JF. How learning in an inverted classroom influences cooperation, innovation and task orientation. *Learn Environ Res*. 2012;15(2):171–93.
6. Mason G, Shuman TR, Cook KE. Comparing the effectiveness of an inverted classroom to a traditional classroom in an upper-division engineering course. *IEEE Transactions on Education*. 2013;56(4):430–5.
7. Herreid CF, Schiller NA. Case studies and the flipped classroom. *J Coll Sci Teach*. 2013;42(5):62–6.
8. Dochy F, Segers M, Bossche PVD, Gijbels D. Effects of problem-based learning: A meta-analysis. *Learn Instruction*. 2003;13(5):533–68.
9. Dornan T, Boshuizen H, King N, Scherpbier A. Experience-based learning: A model linking the processes and outcomes of medical students' workplace learning. *Med Educ*. 2007;41(1):84–91.
10. Ruiz JG, Mintzer MJ, Leipzig RM. The impact of E-learning in medical education. *Acad Med*. 2006;81(3):207–12.
11. Wong G, Greenhalgh T, Pawson R. Internet-based medical education: A realist review of what works, for whom and in what circumstances. *BMC Med Educ*. 2010;10(1):12. doi:10.1186/1472-6920-10-12.
12. Mclean M, Cilliers F, Van Wyk JM. Faculty development: yesterday, today and tomorrow. *Med Teach*. 2008;30(6):555–84.
13. Maloney S, Haas R, Keating JL, Molloy E, Jolly B, Sims J, et al. Breakeven, cost benefit, cost-effectiveness, and willingness to pay for web-based versus face-to-face education delivery for health professionals. *J Med Internet Res*. 2012;14(2):e47.
14. Ellaway R, Masters K. AMEE Guide 32: e-Learning in medical education Part 1: Learning, teaching and assessment. *Med Teach*. 2008;30(5):455–73.
15. Ventola CL. Mobile devices and apps for health care professionals: uses and benefits. *Pharm Ther*. 2014;39(5):356–64.
16. Kamin C, Souza KH, Heestand D, Moses A, O'Sullivan P. Educational technology infrastructure and services in North American medical

schools. *Acad Med*. 2006;81(7):632–7.

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