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Editorial

Evolving challenges and solutions in medical education from professional identity formation to the era of artificial intelligence

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Medical education, as a dynamic and living discipline, is constantly in a state of flux, adapting to the evolving needs of society, the advancements in science, and the changing profiles of learners. In the contemporary landscape, the focus has shifted from a mere transmission of knowledge to the holistic molding of a professional who is knowledgeable, resilient, ethical, and technologically adept. The current issue of the Journal of Medical Education Development captures this broad spectrum, offering a complete range of research that addresses the internal psychological world of the learner, the structural complexities of the clinical learning environment, the pressing need for faculty well-being, and the transformative potential of digital technologies. The articles in this issue form a coherent storyline, a 'curriculum of experiences', that mirrors the journey of medical students and the ecosystems supporting them. From the initial formation of a professional identity amidst the chaos of clinical wards to the use of artificial intelligence in resource-constrained settings, these studies highlight critical pivot points where educational interventions can alter the trajectory of learning outcomes.

Faculty well-being and clinical competence

Medical education begins with the profound and often turbulent metamorphosis of a layperson into a medical professional—a transformation that reshapes not only skills but the very core of one's identity and sense of self within the world. Soltani Arabshahi et al. [1] explore the nuances of professional identity formation, showing how immersive clinical experiences fundamentally shape the internal world and professional persona of medical students. Parallel to this identity formation is the critical need for psychological endurance. Saki et al. [2] show that academic resilience among medical students is significantly bolstered by extracurricular activities. This suggests that student support mechanisms must go beyond the formal curriculum to encourage well-rounded individuals capable of withstanding the rigors of medical training.

The quality of medical education is inextricably linked to the well-being of its teachers. Faculty members are the bedrock upon which the educational system stands, yet they are often burdened by the triad of clinical practice, research, and teaching. The study by Ghahramanian et al. [3] looks at the critical issue of work-life balance and its impact on faculty intention to leave. The finding that 'Work Interference with Personal Life' (WIPL) is the strongest predictor of intention to leave is a stark warning that institutions can no longer afford to ignore. High turnover rates disrupt continuity in teaching and mentorship. This study advocates for a systemic approach to workload management; if we expect faculty to act as role models of

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professionalism for students, the institution must model the same care for its faculty.

Moving from the educators to the clinical outcomes of learners, two studies focus on clinical competence in nursing, offering valuable insights from Southeast Asia. The study by Nguyet et al. [4] in Vietnam and the research by Yoeum et al. [5] in Cambodia both find that self-efficacy and the clinical learning environment are key drivers of competence. The Vietnamese study's emphasis on 'self-directed learning readiness' as the strongest correlate reinforces the shift towards student-centered learning. Similarly, the Cambodian study highlights the foundational role of self-efficacy. These findings confirm that, regardless of the resource setting, the psychological preparedness of the student and the quality of the clinical placement are universal drivers of success.

Ethics and professionalism

No discussion on medical education is complete without addressing the ethical dimensions of student behavior. The study by Krishnan et al. [6] on self-medication practices among final-year medical students serves as a relevant reminder of the gap between what students know and what they actually do. Students know about adverse drug reactions — and yet self-medication rates remain alarmingly high. This paradox shows a critical lapse in the application of professional ethics. Such behavior may normalize a culture of bypassing professional consultation, potentially affecting the students' future clinical counseling. This study underscores the need for educational interventions that go beyond pharmacological knowledge to directly address attitudes regarding responsible medication use.

Assessment and learning styles

Assessment drives learning. As we move towards competency-based medical education (CBME), the tools we use to evaluate learners must evolve accordingly. Two studies in this issue challenge the traditional 'Viva Voce' examination, proposing the Objective Structured Viva Examination (OSVE/OSVV) as a superior alternative. Gurjar et al. [7] and Rajani et al. [8] provide compelling evidence from Community Medicine and Microbiology, respectively. Both studies show that the OSVE yields higher scores, reduces examiner bias, and is perceived as fairer by students. The consistency in findings across two different disciplines strengthens the argument for moving away from the traditional, subjective viva format toward standardized assessments that align with CBME principles.

While assessment focuses on output, understanding the input, namely, how students learn, is equally important. A study on anatomy learning preferences [9] sheds light on the enduring value of 'Tactile-Kinesthetic' learning. In an era increasingly dominated by digital screens, the finding that kinesthetic learners do better in practical assessments confirms the continued necessity of cadaveric dissection. It cautions against an over-reliance on purely digital methods and supports a blended learning approach that honors diverse learning styles.

Technology in education

Perhaps the most exciting contributions in this issue lie in the realm of educational technology, a space where the boundaries of what is possible are being redrawn with remarkable speed. The rapid advancement of Artificial Intelligence (AI) presents both unprecedented opportunities and important questions that the field must answer. The study by Benazzouz et al. [10] offers a timely evaluation of next-generation Large Language Models (LLMs), including GPT-5 Pro, Gemini 2.5 Pro, and DeepSeek V3, on real medical examination questions. The finding that these models achieved accuracies above 89% is remarkable, showing that AI has moved beyond a mere novelty to become a potent tool for medical education. In resource-constrained settings, these AI models could serve as powerful formative assessment tools, giving students timely feedback. However, this editorial must echo the authors' caution: the impact on real-world learning outcomes remains uncertain, and there is a risk that students might rely on AI for answers without developing the underlying clinical reasoning they truly need.

Complementing the AI discussion is the exploration of Virtual Reality (VR) in specialized training. Ikhsan et al. [11] look at the use of VR-based training for Assisted Reproductive Technologies (ART) in Indonesia. Procedures like intrauterine insemination (IUI) and embryo transfer are high-stakes, low-volume interventions, making traditional training difficult to carry out effectively. The study finds a strong need for VR to bridge this gap, providing a safe and standardized environment for skill acquisition. Together, the AI and VR studies [10, 11] paint a picture of a future where education

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is augmented by intelligent, immersive technologies to create superior learning experiences.

Conclusion

The articles assembled in this issue provide a panoramic view of the current state of medical education. They tell a story of a discipline in transition—grappling with the timeless challenges of human identity and resilience, while simultaneously embracing the futuristic possibilities of AI and VR. The narrative arc moves from the internal formation of the physician [1] to the external support systems required to maintain them [3, 12], navigates the complexities of clinical training [4, 9], refines the tools of assessment [6, 7], and finally looks to the horizon of technology [10, 11].

The collective message for educators is clear: we must adopt a holistic approach that combines the psychological, social, and technological dimensions of learning. We must cultivate learning environments that foster positive professional identities and resilience. We must support our faculty and embrace assessment methods that are fair. By addressing these factors in concert, we can hope to create an educational system that produces physicians who are competent clinicians, resilient individuals, and ethical practitioners ready for the future.

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