

Teaching methods fostering enjoyment and creativity in medical education

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ABSTRACT

The journey towards becoming a physician has always been a test of diligence and patience in perfecting the science and art of treating patients. This learning continues well-beyond medical school, requiring a life-long pursuit for acquiring and refining medical knowledge with advances in science and technology. After completing medical school and residency, however, many clinicians report feelings of dissatisfaction and disillusionment with their career path citing lack of autonomy, increased government regulations, and long hours. Although a complex challenge, encouraging creativity and enjoyment during medical education can provide future physicians new skills to advance their medical knowledge while maintaining their personal satisfaction and enjoyment. In this article, we examine examples of how empowering medical education to be enjoyable provides the foundation for producing healthier and more engaged clinicians in the workforce and beyond.

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1. The challenges of medical education

The journey towards becoming a physician has always been a test of diligence and patience in perfecting the science and art of treating patients. This learning continues well-beyond medical school, requiring a life-long pursuit for acquiring and refining medical knowledge with advances in science and technology. As the late Sir William Osler observed, ‘The hardest conviction to get into the mind of a beginner is that the education upon which he is engaged is not a college course, not a medical course, but a life course, for which the work of a few years under teachers is but a preparation’ [1]. Currently, the first two years of medical school requires learning a significant amount of medical knowledge while succeeding through a long series of examinations, including the National Board Medical Examinations (NBMEs), and the USA Medical Licensing Exams (USMLE). After which, medical students spend long hours in several clinical departments learning medical language, skills, culture, and expectations demanded in managing the variety of complicated clinical cases seen in a busy hospital setting. Through this process, the medical student gains sufficient knowledge and skill to handle a wide range of clinical and social challenges. All the while, medical students incur more debt, have increasing professional and personal demands, and experience various stages of mental and physical exhaustion.

After completing medical school and residency, clinicians report feelings of dissatisfaction and disillusionment with their career path citing lack of

autonomy, increased government regulations, and long hours [2–5]. Despite efforts to improve the medical process, the process towards becoming a physician is demanding with many hours working in the clinic, administrative tasks, and teaching [6]. The long hours required to train physicians are a significant public expense in time, effort, and money [6]. Furthermore, the reduction in physician satisfaction and burnout reduce the level of commitment physicians have for treating patients [6]. A survey given to UK physician found that although most physicians enjoyed their work, a significant majority reported feeling dissatisfied with their leisurely activities with family, hobbies, and other creative pursuits [6]. This is not surprising since ‘most aspiring physicians themselves, when applying to medical school, place little emphasis on the opportunity to be creative and original’ [7]. Although a complex challenge, encouraging creativity and enjoyment during medical education can provide future physicians new skills to advance their medical knowledge while maintaining their personal satisfaction and enjoyment.

2. Teaching methods and enjoyment in medical education

Many medical students feel overwhelmed by the large amounts of information required to be learn. In general, learning in medical school includes two types of knowledge: factual and procedural knowledge [8]. Factual or conceptual knowledge includes all the

basic science foundation for understanding the pathophysiology of disease, such as anatomy, physiology, and pharmacology [8]. In contrast, procedural knowledge includes the clinical and communication skills learned during clinical rotations [8]. These include skills such as taking a history and physical exam, inserting intravenous lines, and communicating with family members. Together, the “factual or conceptual knowledge covers ‘what’ information, whereas procedural knowledge covers ‘how’ and ‘why’ information [8]. In most cases, medical students learn through reading, summarizing, and testing to prove successful mastery in a given specialty [8]. To manage the large amount of information required, most medical students rely on a combination of taking multiple practice tests, active recall, and spaced repetition to maximize their retention [8]. In recent years, several schools have incorporated novel methods for improving memory retention in medical students during the preclinical and clinical years.

Specifically, several medical programs have begun introducing novel methods for teaching, such as interactive lessons and games, to engage and teach important clinical and communication skills [9–13]. The Redcliffe-Caboolture Health Services in Australia uses interactive multiple choice exams, team based problem solving, and hospital debates on current health controversies to encourage participation, application of knowledge, and informal presentation [9]. Similarly, Ross University School of Medicine in the West Indies employed an interactive assessment consisting of a competitive interactive quiz game, called Skinquiztion, to gauge their exam readiness through team based questions related to dermatology [11]. The interactive assessments improved the

average scores of students in Microbiology, Pharmacology, Pathology and clinical medicine through their pre-clinical years [11]. At Texas Tech University Health Sciences Center (TTUHSC), a hands-on activity, called the Cardiovascular Carnival, uses a variety of stations that are aimed to teach basic physiological principles of cardiac physiology and hemodynamics, including the energetic demands on the heart against normal and high afterloads, the influence of vessel radius on blood flow, and the effects of vessel compliance on the arterial wave form. Students interact in groups as they investigate the effect of vessel compliance and blood flow using simple demonstrations and instruments. In this manner, students are provided tangible examples to reinforce complex physiological topics that will appear in the in-house exams and NBME examinations Figure 1.

Beyond pre-clinical years, medical schools have begun incorporating interactive games and simulations to improve communication and clinical skills in clinic [10,13]. McGill University has developed a new method for improving a medical student’s ability to perform home visits during their geriatrics rotation using an instructional video game [10]. The video game includes a simulation of a patient’s home in which the student explores and identifies risk factors for falling or other hazards within a specific period of time. After completing the game, students receive feedback on what they missed and are provided further instruction on performing a proper home visit. Overall, student’s reported an improved understanding and appreciation for home visits and the importance of being thorough when evaluating elderly patient’s home environment and living situation [10]. Similar to the hands-on stations at



Figure 1. Cardiovascular Carnival at TTUHSC.

TTUHSC, Boston University Medical Center taught advanced clinical anatomy to third-year medical students using hands on activities that require an interactive, team-based approach to help recall, comprehension, and reinforcement of first year anatomy [13]. Each station focuses one anatomical region of the body, such as the skull, pelvis, heart, where three-dimensional models, computer simulations, ultrasound images, and posters are used to visualize and incorporate this knowledge to real-world diseases [13].

Beyond improving preclinical and clinical studies, medical schools have started incorporating humanities-based organizations or projects to help students address complex social and ethical situations. Specifically, some medical institutions can provide seminars and grand rounds to facilitate religious dialogue between caregivers and patients to learn the spiritual, psychosocial, and ethical principles underlying patient care. For example, Texas Tech University Health Sciences Center offers medical school students the opportunity to participate in a humanities and spirituality course, which addresses a wide range of topics ranging from literature to ethical cases reported in the literature. Through this process, students gain a broader perspective on the ethical dilemmas physicians face in context of the social, political, and religious of their patient population.

However, many of the modalities referenced are during medical school and run by the school, which may not be easily transferable to a practicing physician. Studies that examine different modalities physicians or physician groups could easily begin and utilization could deepen the enjoyment in medical education. A recent study by the University of Toronto showed that game-based learning compared with traditional case-based learning improved long-term retention of essential skills on stroke prevention and management [14]. A similar study by the Stanford University Department of Emergency Medicine showed that the 360 Virtual Reality (360 VR) platform for disaster event decision-making was received well by attendings, residents, and medical students and provided a novel method for immersive educational experiences [15]. Overall, interactive simulations and team-based learning through unique scenarios and tools provide students the opportunity to directly apply principles learned in lecture to clinical rotations and patient interactions.

3. Conclusion

Despite efforts to increase engagement and student enjoyment, medical education contains moments of boredom and monotony interrupted by stress and excitement. As future physicians, medical students learn coping mechanisms, skills, and tricks to help alleviate these moments while focusing on managing patients

with complicated illnesses. Although memorization and organization are essential skills for clinicians, providing students opportunities to find unique ways to engage and learn material is associated with better performance in work and exams, higher self-esteem, greater course satisfaction, and better clinical experience [16]. In this manner, entertainment helps engage the mind and enhance working memory and recall while enjoyment increase deep learning [7]. However, fear and struggle can also be an effective tool for medical education, particularly in the training of young physicians [7].

Therefore, exposing students to creative and engaging methods for learning encourages them to adopt personal and unique methods to study, learn, and handle challenging situations in the clinic. Furthermore, students learn to face the inevitable failures and mistakes all medical students and physicians will make treating patients and confronting their own imperfections. Through promoting creative learning techniques, students learn to see failures or mistakes as opportunities for improvement and teaching lessons to future physicians in handling similar situations. This process allows students to be emotionally prepared for the inevitability of failure in treating sick and dying patients while developing personal resilience [7]. Overall, incorporating novel teaching techniques allows for medical students to improve, 'analysis, decision-making, critical reflection, and intuition—essential skills for the effective practice of medicine . . . Such eye-opening activities can be a useful counterbalance to the kind of linear thinking that is commonplace in medical education' [7].

Disclosure statement

The authors whose names are listed immediately below report the following details of affiliation or involvement in an organization or entity with a financial or non-financial interest in the subject matter or materials discussed in this manuscript. Please specify the nature of the conflict on a separate sheet of paper if the space below is inadequate.

Author contributions

Jonathan Kopel PhD and Gregory Brower PhD DVM participated in the critical review, drafting, and submission of the final manuscript. All authors have given final approval to the manuscript.

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References

- [1] Osler W. *Aequanimitas*. Philadelphia (PA): Blakiston's Son & Co; 1932.
- [2] Shanafelt TD, Boone S, Tan L, et al. Burnout and satisfaction with work-life balance among US

- physicians relative to the general US population. *Arch Int Med.* 2012;172(18):1377.
- [3] The electronic medical record is spawning depression and burnout. *Back Lett.* 2016;31(11):123.
- [4] Shanafelt TD, Dyrbye LN, Sinsky C, et al. Relationship between clerical burden and characteristics of the electronic environment with physician burnout and professional satisfaction. *Mayo Clin Proc.* 2016;91(7):836–848.
- [5] Reith TP. Burnout in USA healthcare professionals: a narrative review. *Cureus.* 2018;10(12). e3681–e3681.
- [6] Surman G, Lambert TW, Goldacre M. Doctors' enjoyment of their work and satisfaction with time available for leisure: UK time trend questionnaire-based study. *Postgrad Med J.* 2016;92(1086):194–200.
- [7] Green MJ, Myers K, Watson K, et al. Creativity in medical education: the value of having medical students make stuff. *J Med Humanities.* 2016;37(4):475–483.
- [8] Augustin M. How to learn effectively in medical school: test yourself, learn actively, and repeat in intervals. *Yale J Biol Med.* 2014;87(2):207–212.
- [9] Howarth-Hockey G. Can medical education be fun as well as educational? *BMJ.* 2002;325(7378):1453–1454.
- [10] Duque G, Fung S, Mallet L, et al. Learning while having fun: the use of video gaming to teach geriatric house calls to medical students. *J Am Geriatr Soc.* 2008;56(7):1328–1332.
- [11] Schlegel EFM, Selfridge NJ. Fun, collaboration and formative assessment: skinquization, a class wide gaming competition in a medical school with a large class. *Med Teach.* 2014;36(5):447–449.
- [12] Ang ET, Chan JM, Gopal V, et al. Gamifying anatomy education. *Clin Anat.* 2018;31(7):997–1005.
- [13] Arya R, Morrison T, Zumwalt A, et al. Making education effective and fun: stations-based approach to teaching radiology and anatomy to third-year medical students. *Acad Radiol.* 2013;20(10):1311–1318.
- [14] Telner D, Bujas-Bobanovic M, Chan D, et al. Game-based versus traditional case-based learning: comparing effectiveness in stroke continuing medical education. *Can Fam Physician.* 2010;56(9):e345–351.
- [15] Lowe J, Peng C, Winstead-Derlega C, et al. 360 virtual reality pediatric mass casualty incident: a cross sectional observational study of triage and out-of-hospital intervention accuracy at a national conference. *J Am Coll Emerg Physicians Open.* 2020;1(5):974–980.
- [16] Gifford H, Varatharaj A. The ELEPHANT criteria in medical education: can medical education be fun? *Med Teach.* 2010;32(3):195–197.