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# Debate-Based Learning in Postgraduate Medical Education: A Narrative Review of the Evidence Base, Challenges, and Future Directions

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## Abstract

Debate is an active pedagogical practice in which learners must evaluate evidence, defend positions within a topic, and respond to criticism from the opposing view. Within the postgraduate medical education environment, traditional didactic teaching methods such as lectures have traditionally constituted the principal educational approach despite growing recognition of the value of active and learner-centred educational strategies. Debate-based learning represents an active learning and drives self-directed learning through intrinsic motivation and preparation. In the postgraduate medical education context, debate offers an opportunity for learners to engage with critical thinking and evidence appraisal within a clinical setting. This narrative review critically examines the theoretical foundations, existing evidence base, practical considerations, and limitations of debate-based learning in a postgraduate medical education setting, highlighting the potential of debate as a learner-centred approach to developing critical appraisal, clinical reasoning, and professional communication skills required for a modern clinician.

**Categories:** Medical Education
**Keywords:** debate, debate-based learning, medical education, pedagogy, postgraduate medical education

## Introduction And Background

The aim of postgraduate medical education is to equip clinicians with a strong foundation of knowledge, skills, and professional behaviours required to deliver high-quality patient care in increasingly complex healthcare environments. Beyond the acquisition of factual knowledge, modern clinicians must also develop competencies in critical appraisal, clinical reasoning, evidence-based decision-making, communication, and collaborative problem-solving [1]. Traditional didactic teaching methods, such as lecture-based approaches, may be effective for knowledge sharing, but the ability to foster higher-order cognitive skills and active learner engagement can be limited.

Consequently, there has been growing interest in learner-centred educational strategies that encourage active participation and higher-level learning. Approaches such as case-based discussions, gamification, and debate-style learning have gained prominence within postgraduate medical education [2-4]. Debate is a valuable pedagogical strategy that promotes effective learning by actively engaging participants, fostering critical exploration of complex issues, and developing the ability to articulate and defend viewpoints clearly and concisely [2]. Moreover, debate-based learning complements traditional didactic teaching methods by encouraging learners to engage in collaborative discourse and practice critical thinking skills commonly used in clinical medicine. Unlike many active learning approaches that focus primarily on the application of knowledge, debate explicitly promotes evidence appraisal, argument construction, and consideration of multiple perspectives, all of which are fundamental components of clinical reasoning and shared decision-making [2].

Despite increasing interest in active learning methodologies within medical education, the role of debate-based learning in postgraduate training has received comparatively limited attention. A clearer understanding of the educational value, practical considerations, and limitations of debate-based learning may help educators determine its place within contemporary postgraduate medical education curricula. This narrative review aims to examine the theoretical foundations, educational benefits, practical applications, and limitations of debate-based learning in postgraduate medical education and to explore its potential role as an innovative learner-centred teaching strategy.

## Review

### Historical development of debate in medical education

Early iterations of what could now be construed as modern debate are often attributed to Socrates and his methods in Ancient Greece [5]. Following from the Socratic methods of argumentative dialogue, formal debate was reported as a teaching method in the early 12th century as scholastic disputation or *quaestio disputata*, which described a structured method for investigating difficult questions through logic, debate, objections, and reasoned responses [6]. In the context of medical education, disputation was used as a sophisticated form of active learning. This pedagogical approach played an important role in the development of academic medicine and arguing in *utramque partem* (for both sides of a question) [6]. Similarly, the application of debate and active learning to medical education continued in the form of medical societies such as the Medical Society of London, which was founded in 1773 for physicians, surgeons and apothecaries to exchange medical news and confer about difficult cases [7].

This led to the development of the journal club, which represents a forum for critical argument and the main institutional link between medical societies and modern postgraduate debate forums. The earliest recorded journal club format resembling the modern academic model was organised by Sir William Osler at McGill University in 1875 [8]. By the early 1900s, journal clubs were routine in many medical departments and became a forum for continuing medical education and later redesigned to teach critical appraisal skills to doctors in training [8]. Debate as a deliberate postgraduate teaching method was reported by Ganguli and Rancurello in 1990 in the postgraduate psychiatric education setting [2]. During a one-year experiment in postgraduate psychiatric education, residents took part in live debates instead of attending traditional lectures and seminars. This experiment is often cited as an early example of active learning in postgraduate medical education as structured debate fostered deeper learning through evaluation of evidence, defending positions, and responding to criticism.

## Educational benefits of debate-based learning

Debate-based learning offers several educational advantages that align with the objectives of contemporary postgraduate medical education. Unlike traditional lecture-based teaching, debates require learners to actively engage with evidence, formulate coherent arguments, and defend positions in response to challenge [3,9]. This process promotes deeper learning by encouraging critical appraisal, analytical thinking, and the application of knowledge to complex and often controversial clinical issues.

The educational benefits of debate-based learning can be understood through the lens of established learning theories that underpin contemporary medical education. One such foundational principle of adult learning is posited by the model of andragogy, whereby self-directed learning, active participation, and innovative ways to learn are at the centre of developing understanding of a topic for the adult learner [1]. Debate-based learning aligns closely with the principles of adult learning by promoting self-directed knowledge acquisition, active participation, and experiential learning [1]. Learners are encouraged to independently explore and appraise relevant evidence to construct and defend arguments, while engaging in a range of roles, including speaker, chair, and respondent. The inherently interactive nature of debating, combined with the motivation associated with defending a position and engaging in constructive competition, fosters deep engagement with the learning process. Moreover, debates enable learners to draw upon their existing clinical experiences and knowledge [1], reinforcing their relevance as an educational strategy for adult learners in postgraduate medical education. Andragogy is not the only method by which debate-based learning can be validated; the core principles of Lev Vygotsky's social constructivism [10] describes the use of interaction with others (a 'more knowledgeable other') and communication skills to enhance one's learning and knowledge in a way that would be impossible for a learner to achieve alone. Within debate, social constructivism theory can be applied as there is obligate interaction with others, which is supported by the structure and delivery of the session. The inherent structure of debate provides the scaffolding and interaction described by Vygotsky as essential for optimal learning [10].

A fundamental principle of clinical medicine is the critical appraisal and application of high-quality evidence to inform patient care, a concept which underpins much of modern medicine practice. Debate-based learning nurtures the learner's interpretation of information by forcing them to critically evaluate their positions, either to defend an argument from rebuttals or to attack the opposing argument with counterpoints [11]. Likewise, debate-based learning may improve by proxy physician's clinical practice understanding through appraisal and evaluation of the existing literature. Debating not only requires the understanding of the topic but also effective communication skills. Effective communication is a fundamental component of clinical practice and patient care, and its importance has become increasingly recognised in both professional interactions and doctor-patient relationships [12]. Moreover, there is a growing emphasis on patient empowerment and shared decision-making within healthcare. Doctors must feel comfortable and confident responding to questions or challenges from patients and able to explain complex information in a clear manner. For example, the ability to critically evaluate opposing perspectives, formulate coherent arguments, and deliver information with clarity and precision under pressure reflects the communication challenges encountered during patient consultations, multidisciplinary discussions, and difficult clinical conversations [13].

## Debate-based learning in postgraduate medical education

*Debate as a Replacement for Lectures and Seminars*

Traditional formats of didactic teaching delivered in the form of lectures and seminars have been the cornerstone of postgraduate medical education [14]. However, lecture or seminar-based learning has generally been considered to have poor engagement levels due to its focus on a one-way transfer of knowledge and less opportunity for audience participation, leading to passive learning [9]. Seminar learning is usually defined as small-group teaching with an opportunity for group discussion with multi-directional interaction between the teacher and learners, with similarities to debate-based learning with regard to the set-up and application of active learning [9].

In a comparative study by Koklanaris et al., 12 residents experienced both a debate-style lecture and a didactic lecture and were assessed with a pre- and post-teaching quiz [15]. The debate-based learning cohort demonstrated significantly greater knowledge attainment and retention than the lecture cohort [15]. Averaged across both sessions, mean pre-test and post-test scores were substantially higher among debaters (78.3% and 85.5%) than lecture participants (52.5% and 61.7%) [15], suggesting an educational advantage associated with debate preparation and participation. This study also highlighted that learners may have improved engagement in active learning due to guided self-directed learning, with the debate acting as the motivation. In the undergraduate medical education setting, a meta-analysis analysing 16 randomised controlled trials (n=1122 medical students) by Zeng et al. reported that the seminar teaching method significantly improved knowledge scores ($p$<0.001) and skill scores ($p$<0.001) compared to lecture-based learning [16]. Secondary outcomes such as learning interest, independent thinking ability, and clinical thinking ability also showed a significant improvement compared to lecture-based learning [16]. However, the authors noted that some of the limitations in interpreting results included differences in pre-learning preparation and heterogeneity in examination methods, which may result in small-study effect bias [16].

Debate-based learning has been explored in several studies [2-4]. In an educational intervention study, Ganguli and Rancurello [2] replaced conventional didactic teaching sessions with structured debates on controversial topics in psychiatry for one year and collected evaluation and perception feedback from psychiatry residents and faculty members. At the end of the study, both residents and faculty judged debate as a highly effective education tool and stimulated critical thinking [2], suggesting that debate may be a valuable active-learning strategy in postgraduate medical education. In a similar evaluative study with psychiatry residents from 2015 to 2019, Chew et al. [3] surveyed 80 residents who attended a debate-based session on the neurobiology of psychosis. Path analysis of respondents (n=66) showed that the link between preferring debate and rating the session highly was partly explained by better engagement, relevance to learning needs and understanding of the topic [3]. These results suggested that the effectiveness of debate was consistent with self-determination theory through pre-session learning through research and preparation for debate, resulting in active learning. The findings of these studies in psychiatry residents were also reflected in a study with emergency medicine residents [4], demonstrating the adaptability of debate-based learning to multiple specialties. Mamtani et al. [4] implemented a novel curriculum with mock clinical cases, which was debated by two teams for 42 emergency medicine residents, designed to teach patient safety, systems-based management and practice-based performance improvement. Each team presented opposing views for the diagnosis and treatment of an emergency medicine presentation, such as atrial fibrillation, based on contemporary literature to eventually reach a consensus regarding a clinical pathway or protocol [4]. A qualitative survey sent to residents (n=30 respondents, 71% response rate) commented on the engaging aspect of discussing opposing management strategies of controversial topics, while others valued the detailed literature review [4]. The authors also used the debates to meet assessment criteria and specific competencies according to the emergency medicine curriculum [4], with the majority of residents meeting clinical competencies on patient safety and performance improvement methodologies after the implementation of debate-style learning and discussion. Equally, debate may encourage learners to develop a more nuanced understanding of the subject and, in turn, result in greater levels of motivation to pursue further inquiry, critically appraising different perspectives through an iterative process of questioning, reflection, and self-evaluation.

*Debate-style Journal Clubs*

Traditional journal clubs are ubiquitous in postgraduate medical education programs, with some of the first recorded formal journal clubs formed in 1875 [8]. The aims of journal clubs for learners are to develop critical appraisal skills, promote the translation of published evidence into clinical decision-making and to cultivate habits of self-directed lifelong learning [8]. The traditional format centres on the presentation of a single article's background, methods and results by a trainee, followed by a faculty-led critique.

In a pilot study by Luc et al., a novel debate-style curriculum was implemented for four cardiothoracic surgery trainees over 10 monthly sessions. Trainees completed a summative written assessment at the end of the pilot study, which assessed knowledge on the debate topics [17]. The authors showed that written test scores improved more on debated topics than on non-debated ones on assessment (+9.8% versus −4.2%), but the observed difference was not statistically significant ($p$=0.105) [17]. Moreover, trainees' ability to sway the audience correlated strongly with their use of supporting literature ($r$=0.853), which suggested that the debate format rewards learner engagement with the literature and evidence rather than rhetoric alone [17]. These results highlight that the greatest educational benefit from debate derives from the preparation and review of the literature to generate a succinct argument, rather than the task of debating. Similarly, the preparation for debate requires the learner to be self-motivated and refine existing knowledge alongside new

knowledge gained through research. Extending the pilot study by Luc et al. [17], a multi-institutional follow-up study over four years was performed [18]. Across six institutions, 30 trainees participated in 10 monthly debates each year following the same protocol as the pilot study. The study protocol also outlined that trainees were required to know the literature for both sides of the argument [18]. Trainees' scores on evidence-based medicine and critical appraisal rose over the academic year from 55.2% to 76.3% ($p$=0.040) [18]. This study represents the largest quantitative data for postgraduate medical education and shows the effect of debate-style journal clubs on knowledge over a sustained period [18]. Trainees and faculty reported preference for the debate format compared to the traditional journal club due to increased familiarity with seminal literature, practice of oral presentation skills and application of evidence in a clinical scenario [18]. In this setting, debate-style journal clubs represented a sustainable curriculum implementation with demonstrated objective quantitative improvement in written examination scores.

Debate-style learning with clinical scenarios in this context promotes active learning, which in turn promotes greater acquisition and retention of knowledge. However, it is important to recognise the limitations of the study, which include small cohort size, lack of randomisation and possible confounding factors of expected training progression and complementary teaching alongside the debate journal clubs [18]. Likewise, there is a paucity of evidence for the translation of knowledge to changes in clinical practice or patient outcomes. Whilst debate-style journal clubs may improve written knowledge scores, the evidence suggests that it is a valuable adjunct alongside a robust postgraduate medical education programme.

*Case-based Gamified Debates*

Gamification, defined as the use of game attributes in a non-game context, has been used in medical education to increase engagement, motivation and learner participation through outcome-orientated tasks and focused decision-making [19]. In a similar way, debate also implements several core game attributes, such as competition, adjudication and team work. The combination of gamified debates in the postgraduate medical education setting remains an emerging and novel area with a few reported studies. An example of gamified debates was described in a study by Jhaveri et al., which used case-based debate sessions and gamified the task by dividing participants into teams and rewarding teams for correct answer [19]. Overall, the participants rated the sessions as entertaining, thought-provoking and supportive of self-directed learning. This format of teaching was subsequently implemented at a national nephrology training event [19]. Most gamification in postgraduate medical education is quiz-based and targets recall, which predominantly targets the lower levels of Bloom's taxonomy [20]. Debate uses the same motivating mechanics (competition, scoring) but applies them to higher-order skills such as appraisal, argument and judgement [13]. However, competition can disadvantage less confident learners. Extrinsic rewards may also undermine intrinsic motivation, which is a recognised concern within self-determination theory [1,10]. Case-based gamified debates may therefore represent a form of 'high-order gamification', which shifts the focus from knowledge retention alone towards application and evaluation of knowledge in the correct application. Gamified debate may offer a mechanism through which the motivational benefits of gamification can be harnessed to promote deeper learning and the development of higher-order thinking skills required for clinical practice.

## Challenges and limitations

Despite the purported educational benefits of debate-based learning, there are also limitations and challenges associated with the implementation of debate in the postgraduate medical education setting. The main challenge highlighted is that effective debate requires substantial preparation time by both learners and faculty [2-4]. Preparation for debate includes review of the literature, appraisal of the evidence and critical analysis and synthesis of the argument as well as anticipating the counter-argument. Compared to traditional methods of teaching (lectures, small-group teaching or journal clubs), introducing debate as an educational tool increases the pre-session workload for learners [2]. Similarly, the educational value of debate-based learning is dependent on the quality of preparation from learners and faculty [3]. Whilst debate promotes active learning through preparation and delivery of a cohesive argument, it requires participants to engage in public speaking. Engagement with this method of learning may be reduced if learners experience performance pressure or anxiety [1]. In environments with more confident learners who may dominate the debate, the educational gains may not be distributed evenly across the group. Some methods of mitigating this challenge include having a more structured debate session, allocated roles for each participant, and incorporating mandatory audience participation.

The evidence base for debate-based learning remains small. Studies that investigated the role of debate in postgraduate medical education report on participant satisfaction and self-reported confidence, which represents Kirkpatrick's hierarchy level one or two [17-19]. Moreover, the current literature is dominated by specific specialties such as psychiatry and primarily based in North America. Whilst the general consensus is that the greatest educational benefit derives from preparation of the topic, there is lack of evidence comparing the educational outcomes of preparation for debate versus the format of adversarial exchange, or being assigned a side. Although debate-based learning has demonstrated positive effects on engagement, critical thinking, communication and learner satisfaction, the overall evidence base remains relatively small compared with more established educational approaches.

## Future directions

Postgraduate medical education is undergoing a period of significant transformation, driven by advances in technology, evolving healthcare systems and competency-based training frameworks. As educational approaches shift away from passive knowledge acquisition towards active [21], there is growing interest in teaching strategies that can support learner-centred models and competencies. Within this changing educational landscape, debate-based learning may represent a valuable approach for preparing clinicians to navigate the complexities of modern medical practice. Whilst debate-based learning has traditionally relied on faculty facilitation and learner-directed evidence appraisal, the intersection of debate-based learning and artificial intelligence (AI) represents a particularly promising area for educational innovation [22].

With the exponential use and implementation of AI, it is inevitable that AI will play a supporting role in the future of medical education and act as the interplay between traditional teaching methods and more novel learning model developments. For example, the collaborative role of debate requires at least two participants; however, the sparring partner need not necessarily be a human counterpart. Novel research has shown that debates between two AI agents can push human observers to a more unbiased and evidence-based analysis of a problem [22]. Despite the inherent systematic bias and calibration of human error from input data associated with large language models and AI, AI-guided debate has been shown to achieve higher factual accuracy compared to human-led debates [22]. Indeed, there is also evidence to support non-inferiority of a debate moderated by an AI compared to a human [23]. The role of AI has evolved from a knowledge provider and search engine to a digital cognitive sounding board and the creation of a debate bot that can act as a sparring partner to students has been shown to improve divergent thinking and comprehensive analysis [24,25].

Alongside ongoing technological advancements in medical education, debate-based learning is no longer constrained by geographical location or in-person participation. The widespread adoption of virtual communication has enabled debates to be conducted across institutions and international borders, expanding the educational potential and opportunities of debate-style learning [23,26]. This increased accessibility to debate has the potential to broaden participation, promote inter-institutional collaboration and enhance learner engagement through active discussion and critical appraisal, compared with more passive educational modalities. Another way for debate to be integrated into the postgraduate medical education curricula is the classic Grand Round format [27]. Grand Rounds have traditionally centred on the presentation of clinical cases, with audience participation typically limited to a question-and-answer format. However, the established structure of Grand Rounds presents an opportunity for innovation through the incorporation of debate-based learning. At our institution, monthly debate sessions have been introduced in place of selected conventional presentations, creating a more interactive forum for discussion. Topics such as the role of AI in medicine and the use of social media among physicians have generated considerable engagement and stimulated critical discussion surrounding contemporary issues in healthcare. These sessions have encouraged participants to examine evidence from multiple perspectives, articulate and defend positions, and engage constructively with opposing viewpoints. Such experiences align closely with the educational benefits discussed throughout this review. The successful integration of debate formats into an established educational platform such as Grand Rounds suggests a practical and scalable model for incorporating active learning strategies into postgraduate medical education.

## Practical recommendations for educators

Several considerations should be taken into account to ensure that debates integrated into postgraduate medical education are meaningful in enhancing learning for clinicians. This begins with selecting debate topics that are already controversial or contested, thereby lending to engaging discussion. More straightforward questions may not garner as much interest, learning points nor self-reflection. Participants must then be informed in advance of the topic being discussed, allowing for sufficient time to read up on the subject and should be assigned positions to argue prior to the session. This encourages the learners to focus on learning points for both sides of the argument and be adequately engaged for the debate. In the process of engaging in pre-session learning and then applying these points during the group debate, the popular pedagogy of the flipped classroom is followed [21].

Upon starting the debate, setting ground rules for participants and the audience (including making it clear that roles are assigned and may not reflect individuals' beliefs) will uphold a secure sense of psychological safety. This fosters an environment where non-traditional opinions can be voiced, and opposing ideas can be challenged via critical thinking. Psychological safety has been shown to be essential for effective healthcare teamwork and enables judgement-free open communication and learning [28]. A defined structure for the debate may also be considered. Suggested structures, such as the pilot study by Luc et al. [18], consist of a timed format of an opening argument, followed by rebuttal and a closing argument. Cole et al. suggest using a predefined assessment rubric to emphasise the learning objectives of the debate with a focus on literature identification, analysis and application [29]. Irrespective of the debate structure, the presence of a moderator is essential for timekeeping, encouragement of contribution from quieter members, and keeping discussions focused on the main topic. Likewise, audience participation through voting both before and after listening to the debate is a simple way of demonstrating the sway of the arguments presented, whilst promoting active listening and critical thinking from observers. After the final audience

vote, it is important to have a faculty-led closing statement covering final reflections, learning points, and feedback. For case-based debates, an expert faculty member who specialises in the topic can be utilised to clarify any queries and summarise take-home messages [19].

The application of debate-style learning to postgraduate medical education is feasible and practical in the context of established traditional learning formats. When thoughtfully designed and facilitated, debate-based learning represents a practical and scalable educational strategy that can be readily incorporated into established postgraduate teaching programmes.

## Conclusions

Debate-based learning is an active educational strategy in which learners research, construct, defend and challenge arguments on a controversial clinical or academic topic. Unlike traditional lecture-based teaching, debates require participants to engage critically with evidence by considering alternative viewpoints, and justifying their conclusions. Indeed, studies have shown that debate promotes learner engagement, deeper understanding of complex topics, critical thinking, communication skills, and evidence appraisal. These educational benefits align closely with the goals of postgraduate medical education and modern educational theory, where clinicians must evaluate evolving evidence and make informed decisions in situations of uncertainty. Moreover, debate has been shown to be particularly valuable in discussing situations where clinical uncertainty is common. In an era characterised by rapidly evolving evidence, increasing clinical complexity, and widespread access to AI-assisted information retrieval, the ability to critically evaluate evidence and justify clinical decisions has become more important than ever, further underscoring the potential educational value of debate-based learning. However, robust and comprehensive medical education requires a multi-modal learning approach to integrate problem-based learning, patient care-focused communication and professionalism. Debate-based learning should therefore be viewed not as a replacement for traditional teaching modalities but as a complementary educational strategy. Future research should evaluate objective educational outcomes of debate-based learning using longitudinal studies and explore the long-term impact on clinician competency and patient care, especially in the context of AI as a potentially transformative tool in medical education.

## Additional Information

### Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

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## References

1. Taylor DC, Hamdy H: Adult learning theories: implications for learning and teaching in medical education: AMEE Guide No. 83. Med Teach. 2013, 35:e1561-72. 10.3109/0142159X.2013.828153
2. Ganguli M, Rancurello M: Starting fights: the debate as teaching tool . Acad Psychiatry. 1990, 14:39-43. 10.1007/BF03341851
3. Chew QH, Seet XY, Sim K: Use of debate as a pedagogical tool in psychiatry residency teaching: a cross-sectional study. Adv Med Educ Pract. 2021, 12:871-7. 10.2147/AMEP.S320614
4. Mamtani M, Scott KR, DeRoos FJ, Conlon LW: Assessing EM patient safety and quality improvement milestones using a novel debate format. West J Emerg Med. 2015, 16:943-6. 10.5811/westjem.2015.9.27269

5. Crombie IM: Socratic Problems - Gerasimos Xenophon Santas: Socrates. Philosophy in Plato's Early Dialogues. (The Arguments of the Philosophers.) Pp. xiii + 343. London, Boston and Henley: Routledge and Kegan Paul, 1979. £10.50. The Classical Review. 2009, 30:217-9. 10.1017/S0009840X00235385
6. Lawn B: The Rise and Decline of the Scholastic Quaestio Disputata: With Special Emphasis on Its Use in the Teaching of Medicine and Science. E. J. Brill, Leiden; 1993.
7. Hunting P: The Medical Society of London. Postgrad Med J. 2004, 80:350-4. 10.1136/pgmj.2003.017319
8. Linzer M: The journal club and medical education: over one hundred years of unrecorded history . Postgrad Med J. 1987, 63:475-8. 10.1136/pgmj.63.740.475
9. Warner S, Williams DE, Lukman R, Powell CC 2nd, Kundinger K: Classroom lectures do not influence family practice residents' learning. Acad Med. 1998, 73:347-8. 10.1097/00001888-199803000-00029
10. Vasileva O, Balyasnikova N: (Re)introducing Vygotsky's thought: from historical overview to contemporary psychology. Front Psychol. 2019, 10:1515. 10.3389/fpsyg.2019.01515
11. Toor R, Samai K, Wargo R: Debate as an alternative method for medical literature evaluation. Curr Pharm Teach Learn. 2017, 9:427-32. 10.1016/j.cptl.2017.01.009
12. Ferreira-Padilla G, Ferrández-Antón T, Baleriola-Júlvez J, Braš M, Đorđević V: Communication skills in medicine: where do we come from and where are we going?. Croat Med J. 2015, 56:311-4. 10.3325/cmj.2015.56.311
13. Hall D: Debate: innovative teaching to enhance critical thinking and communication skills in healthcare professionals. Internet Journal of Allied Health Sciences and Practice. 2011, 9:
14. Sawatsky AP, Zickmund SL, Berlacher K, Lesky D, Granieri R: Understanding resident learning preferences within an internal medicine noon conference lecture series: a qualitative study. J Grad Med Educ. 2014, 6:32-8. 10.4300/JGME-06-01-37.1
15. Koklanaris N, MacKenzie AP, Fino ME, Arslan AA, Seubert DE: Debate preparation/participation: an active, effective learning tool. Teach Learn Med. 2008, 20:235-8. 10.1080/10401330802199534
16. Zeng HL, Chen DX, Li Q, Wang XY: Effects of seminar teaching method versus lecture-based learning in medical education: A meta-analysis of randomized controlled trials. Med Teach. 2020, 42:1343-9. 10.1080/0142159X.2020.1805100
17. Luc JG, Nguyen TC, Fowler CS, et al.: Novel debate-style cardiothoracic surgery journal club: results of a pilot curriculum. Ann Thorac Surg. 2017, 104:1410-6. 10.1016/j.athoracsur.2017.05.072
18. Luc JG, Fowler CS, Eisenberg SB, et al.: Multiinstitutional evaluation of a debate-style journal club for cardiothoracic surgery trainees. Ann Thorac Surg. 2022, 114:327-33. 10.1016/j.athoracsur.2021.07.104
19. Jhaveri KD, Chawla A, Shah HH: Case-based debates: an innovative teaching tool in nephrology education . Ren Fail. 2012, 34:1043-5. 10.3109/0886022X.2012.697443
20. Simsek E, Karakus Yilmaz T: A systematic review of the effects of gamification in online learning environments on learning outcomes. Open Praxis. 2025, 17:166-83. 10.55982/openpraxis.17.1.692
21. Hurtubise L, Hall E, Sheridan L, Han H: The flipped classroom in medical education: engaging students to build competency. J Med Educ Curric Dev. 2015, 2:23895. 10.4137/JMECD.S23895
22. Rahman S, Issaka S, Suvarna A, et al.: AI debate aids assessment of controversial claims . Advances in Neural Information Processing Systems 38. Neural Information Processing Systems Foundation, Inc. (NeurIPS), 2025. 10.52202/085713-5666
23. Kuhail MA, Dahu BM, Kittur J, et al.: The great debaters meet the great facilitators: how debate students evaluate human moderators and their AI counterparts. Journal of Computer Assisted Learning. 2026, 42:70319. 10.1002/jcal.70319
24. Manzocco M, Ade-Thurow B, Byker EJ: Developing critical thinking through AI-powered debate: technical design and intercultural implementation of an educational debate bot. International Research and Review. 2025, 14:47-63.
25. Lee U, Jeong Y, Koh J, et al.: Can ChatGPT be a debate partner? Developing ChatGPT-based application “DEBO” for debate education, findings and limitations. Educational Technology & Society. 2024, 27:321-46.
26. Muehlensiepen F, Mucke J, Krusche M, et al.: The virtual fishbowl: bringing back dynamic debates to medical conferences. Ann Rheum Dis. 2021, 80:675-6. 10.1136/annrheumdis-2020-219552
27. Hull AL, Cullen RJ, Hekelman FP: A retrospective analysis of grand rounds in continuing medical education . J Contin Educ Health Prof. 1989, 9:257-66. 10.1002/chp.4750090410
28. Edmondson AC: The Fearless Organization: Creating Psychological Safety in the Workplace for Learning, Innovation, and Growth. John Wiley & Sons, Hoboken, NJ; 2018.
29. Cole JD, Ruble MJ, Povlak A, Nettle P, Sims K, Choyce B: Self-directed, higher-level learning through journal club debates. Health Professions Education. 2020, 6:article 7.