Disputes & Debates: Editors' Choice

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Editors' Note: Neurology Education in 2035: The Neurology Future Forecasting Series

Considering the increasing subspecialization of medical providers, including that of neurologists, Drs. Moeller and Salas provide a refreshing perspective on the educators and scholars as medical subspecialists. There is a unique skill possessed by these individuals, which requires tutelage and time, not to mention recognition by departmental leadership if these roles are to be appreciated and sustainable. In their narrative review on the future of clinician scholars and educators, the authors delineate these evolving roles and, more specifically, how current and future stakeholders can support individuals with this unique skill set. Dr. Das highlights the uncertain but likely significant impact of artificial intelligence in future neuromedical education. The fact that ChatGPT (as an example) emerged between the acceptance and publication of the article by Moeller and Salas—and that ChatGPT has captured the attention of clinical medicine, research, and other disciplines—is a testament of how difficult it may be to predict the future of medical education. The authors acknowledge that artificial intelligence platforms such as ChatGPT will play a role in medical education; however, the influence of these and other technologies will require filtering and application by educators, scholars, and other investigators to understand their impact. Nonetheless, these technologies are likely to drive the movement toward personalized educational experiences while providing new avenues to advance our neurologic knowledge.

Reader Response: Neurology Education in 2035: The Neurology Future Forecasting Series

Saurav Das (Lexington, KY)

Moeller and Salas have written a thoughtful forecast for the future of neurologic education in 2035.[1] However, the forecast is incomplete without mentioning the role that artificial intelligence will play in neurologic education. Artificial intelligence and machine learning will reduce the cognitive load from clinical environments and facilitate bedside teaching.[2] For example, the artificial intelligence-based large language model called ChatGPT can aid clinical decision-making by providing differential diagnoses for common symptoms, draft research manuscripts, and pass the United States Medical Licensing Examination.[3,4] These tools have their inherent limitations such as potential misinformation and lack of accountability, yet such technology will continue to evolve and potentially be effective in neurologic education in the next decade.

1. Moeller J, Salas RME. Neurology education in 2035: the neurology future forecasting series. *Neurology*. 2022;100(12):579-586. doi: 10.1212/WNL.0000000000201669
2. Ehrmann DE, Gallant SN, Nagaraj S, et al. Evaluating and reducing cognitive load should be a priority for machine learning in healthcare. *Nat Med.* 2022;28(7):1331-1333.
3. Stokel-Walker C, Van Noorden R. What ChatGPT and generative AI mean for science. *Nature*. 2023;614(7947):214-216.

Author disclosures are available upon request (journal@neurology.org).

4.   Kung TH, Cheatham M, Medenilla A, et al. Performance of ChatGPT on USMLE: potential for AI-assisted medical education using large language models. *PLOS Digit Health*. 2023;2:e0000198.

Author Response: Neurology Education in 2035: The Neurology Future Forecasting Series

Jeremy J. Moeller (New Haven, CT) and Rachel M.E. Salas (Baltimore)

We appreciate the comment by Dr. Das and welcome the opportunity to provide some thoughts about Artificial Intelligence (AI) in neurology education. We drafted this manuscript in the first half of 2022, and it was accepted in its final form in October 2022, a month before the launch of ChatGPT moved AI to the forefront of our collective consciousness. Although the principles of machine learning date back to the 1950s, the integration of AI into medical research and clinical care has been challenging and typically slower than predicted. We direct readers to the excellent Future Forecasting Series article by Jones and Kerber[1] for a detailed and nuanced discussion of this issue. There have been many examples of potential applications of AI in all aspects of medical education, but there are still major limitations in the methodological frameworks to evaluate the effect of this work.[2] AI will likely play a greater role in everything in 2035—including neurology education—and like every other technological innovation, it will have essential applications and serious shortcomings. Our goal as educators will be to ensure that the desire for efficiency and automation does not supplant the centrality of human relationships in our educational mission.

1.   Jones DT, Kerber KA. Artificial intelligence and the practice of neurology in 2035: the neurology future forecasting series. *Neurology*. 2022;98(6):238-245. doi:10.1212/WNL.0000000000013200
2.   Tolsgaard MG, Pusic MV, Sebok-Syer SS, et al. The fundamentals of artificial intelligence in medical education research: AMEE Guide No. 156. *Med Teach*. 2023:1-9. doi:10.1080/0142159X.2023.2180340

CORRECTION & REPLACEMENT

Teaching NeuroImages: Optic Nerve Sheath Meningioma Presenting as Gaze-Evoked Amaurosis

In the Resident and Fellow Section article entitled "Teaching NeuroImages: Optic Nerve Sheath Meningioma Presenting as Gaze-Evoked Amaurosis" by Johnson et al.,[1] the first author's name should be listed as "Stephen A. Johnson." The article has been replaced by a corrected version. The publisher regrets the error.

Reference
1.   Johnson SAA, Chen JJ, Tobin WO. Teaching NeuroImages: Optic nerve sheath meningioma presenting as gaze-evoked amaurosis. *Neurology*. 2018;90(23):e2095-e2096.