EDITORIAL
Of Chatbots and Colonizers

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I am sure your campus, like mine, is having discussions on this new Chatbot technology. If you haven't read it yet, I found Stephen Wolfram's explanation of ChatGPT very helpful in trying to understand how chatbots work (see Wolfram, 2023 in the references). Chatbots are another tool that we will have to learn how to integrate into our teaching and research. We as a neuroscience community can give direction on these technologies and the popular culture's desire to describe these as intelligent or sentient. While neuroscientists understand the brain as a probability machine, we don't know if computational "neural nets" or the way chatbots are trained have similarity to the construction of circuits in the brain or to the way the brain learns. As a community we can help people understand how these tools are like, or not like, the brains that use them.

Our community also has a leading role to play in the integration of chatbots and other tools into our teaching. I would welcome and encourage any collaborations, editorials, or articles on your ideas or use of these tools in your classroom. Based on what I understand so far, these tools will allow us to search the internet and to have that information delivered in textual form. It will provide access to content in a form that is active and dynamic. This process removes an important level of evaluation, which allows an opportunity for learning. We can ask our students to provide that evaluative step, comparing chatbot searches with paper texts, literature searches, reviews, or other scientific consensus. I am particularly excited about what it might do for creating code. This may be the tool that gives our neuroscience students who are a bit code-phobic a boost into this necessary skill set.

Chatbots, however, raise several issues of equality and the form and structure of scientific information. The first iteration of chatbots were free, but the ChatGPT4 that was just released comes with a $20 a month subscription. I believe that companies are looking towards these tools as profit makers. So, will all students have access? Will this be included in college/university Google suites? Will all colleges/universities have these tools available to students? As teaching and learning has become increasingly digital, we must ensure that our students have equal access to the tools they need to use in classrooms and to develop their intellectual skill sets. In my experience as a college professor, that access has never been equal for my students. What about at your college/university?

The nature of these chatbot tools reflects the structure of the information they are compiling. This raises the very sticky questions of how we create knowledge in the sciences, how we have curated that knowledge on the internet, and how we convey that knowledge to students.

This extends beyond the simple question of vetting the information obtained through these tools. I believe that chatbots will amplify the most common narratives in our fields, some of which might be false but embraced by the public or vocal scientists at some point in time. These tools would exclude content areas that are evolving, that present alternative perspectives, or that are outside the mainstream narratives. Chatbots have the potential to become the new "sage on the stage", reflecting this dominant culture and a content-based approach to learning material. It will be up to us to oppose false narratives, suggest alternatives, and to encourage other perspectives on that knowledge.

Our job, then, requires us to think thoroughly about the impact of this dominant culture and to develop strategies to question these norms and to teach alternative ways of thinking. A colleague recently asked me what "decolonizing neuroscience," is, and it is a very good question. This area has been identified as one of the topics for the **FUN summer workshop entitled "Reimaging Neuroscience" being held July 27-30, 2023 at Western Washington University. Here is a link to information about the workshop (https://www.funfaculty.org/faculty_workshops)**. The term "decolonizing" has come into usage in the education pedagogy field more recently and as part of DEI efforts. STEM disciplines have a long history that has been influenced by culture as much as knowledge. For example, in a class I teach in Greece, I talk about how the ancient Greeks clearly advanced western scientific knowledge, but those advances were in the context of a culture that was patriarchal, denying women and others the opportunity to engage in science (see Thomas, 2023 for a recent discussion). The structure of scientific ideas, research, and teaching have been influenced by these early Greek ideas and developed through a dominant western Eurocentric culture up through the last century. While women and people of color have made contributions to science, they have done so through this structure and culture while being subjected to exclusion and appropriation. The idea of examining or changing this culture has only become widespread within the last decade as we create opportunities for diversity and inclusion.

There lots of signs that we need to diversify STEM and examine knowledge creation. Progress in creating a diversified leadership in science is slow; a recent report suggests the gender and racial gaps in funding for single grants have only modestly improved, and the gap for PIs who received multiple grants is widening (Nguyen, et al. 2023). The stakes in many disciplines are high. Two recent examples in medicine point to the problems that arise when a dominant culture determines what is valid research.

Recent work suggests that pulse oximetry is inaccurate in people of color and may have contributed to poor Covid outcomes in those populations (Fawzy, et al. 2022). Another recent article points to disparities in determining kidney function and transplant eligibility in some racial populations based on a single paper that suggested a racial factor be added to kidney function calculations (Mohottige, et al. 2023).

I believe we need to examine whether the culture of neuroscience permits or accepts diversity. The culture and structure of knowledge needs to have input from a diverse set of perspectives as only with these perspectives will we be able to solve the problems of our world. Shahjahan et al. (2021) identifies ways that scholars are moving to address these issues. This work suggests that our community should recognize the way a single dominant culture impacts our discipline, and then work to allow room for alternative perspectives and imaging things differently. We need to create inclusive pedagogy with ideas like relational teaching and learning, coproduction of knowledge, alternative forms of knowledge, and connecting learning to the real world. Since chatbots will represent the existing culture, they may make our job tougher as teachers. With awareness, the texts they generate can be used to question the structure of knowledge as it currently exists. I know many of you are engaged in these activities and I am asking for you to further share your experiences with the community.

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