

AI and the Impacts on Education, Clinic, and Science

I recently attended a 2-day AI workshop for health care where I heard about the predictions, advantages, and challenges that accompany the range of technologies spilling into our daily lives. Those of us in higher education have been addressing this full-on since the deployment of large language models (LLMs) like ChatGPT in November 2022. There are indeed many potentials and, yes, challenges. The ability for a student to compose a first draft of a paper or build their own study guide on a difficult topic holds great potential. The act of individualized contextualization of information has been known in the field of andragogy to be the best way for adult learners to understand difficult concepts in a way that matters to them. While this may seem strange to the traditional teacher/expert–student/novice relationship, the reality is that dental students have been doing this for generations (behind the scenes to the faculty).

AI is rapidly changing our world from generative text responses to images (eg, GPT-4). We now have the ability to accurately predict protein folding for new drug development (eg, Alpha Fold-3) and related applications, which is transforming multiple fields of discovery research. The scientific community has also raised legitimate cautionary perspectives on these products, especially around applications that complete technical research and development.¹ We have a goal of transparency in AI processes and source data sets, which makes the evaluation of potentially dangerous capabilities (often unknown to the developers) pressing, such as societal risks, AI hallucinations, and the risk of loss of human control over these large, distributed neural networks. While policy and regulation typically lag innovation, movement is occurring!

Again, from an educator’s perspective, the ability for a student to bring a textbook and scientific article(s) to life by creating their own interactive podcast is a wonderful application of AI as a learning tool because they can interact with information in a way that is appealing to them. Further, AI has a great potential in our medical and dental settings by taking large clinical data sets and creating a set of associated data predictions to help the clinician in point-of-care decision-making. When running a large dental hospital, there are wonderful potentials of using these application(s), such as the ability to virtually teach patient-communication skills and culturally responsive approaches to patient interactions through avatars, all in real time with immediate translation from one language to another. “Voice cloning” has the potential to allow a lecturer to speak in their preferred language while students listen in their preferred language. (I have done this; it’s weird and incredible at the same time.) In day-to-day dental

practice, the applications around front office training, AI-enabled de-escalation training, customer service training, and call center support to back-office support are all changing with the application of AI tools.

What about the creation of new knowledge? Many of the current AI tools have gone through a “training” period based on certain data sets (with inherent bias), implying that they may have limitations. Note that ChatGPT stands for “pretrained transformer” and yet this is changing. As AI now moves into full autonomous neural networks, does this imply that the ability to creatively make new connections between data sets and to evaluate the plausibility of these associations is now accepted as the new norm? (Notice that this is one definition of a sentient being.) Many of you have heard of AI’s hallucinations, where facts and references are created when the system believes in its own conclusions. When it comes to academic and scientific publication, what is the role of AI? Should AI be cited as a “co-author”?² Should an author disclose what sections of a paper were drafted by LLMs? If they do, how is the accuracy, rigor, and integrity of scholarship ensured?³ Furthermore, the notion of what is an “original” work comes into question. If an author uses an LLM to prescribe the outline of a paper, is this paper “original work”? Subsequently, if another author uses this work without citation, is it plagiarism when it is unclear what was “original” in the first place? Do you see the rabbit hole here?

My perspective is that LLMs are useful to generate ideas, discussion, and debate. Much like the newspapers of yesteryear, just because it’s in print doesn’t mean it’s accurate. This allows for conversation, debate, and reflection, leading to a granular layering of detail and contextual development by the writer. It also allows for a great potential to move forward. As an editor, I just ask that authors be truthful about how they used LLMs in the disclosures. In health care, I’m all for systems that improve decision-making and patient safety. I just feel compelled to “trust but verify.” (And, no, this was not prepared by an LLM.)



Clark Stanford, Editor-in-Chief

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