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Standing on the Shoulders of Giant Artificial Intelligence Bots: Artificial Intelligence Can and Therefore Must Now Elevate Equity in Health Professional Education

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Newton unashamedly and accurately wrote, "If I have seen further, it is by standing on the shoulders of giants.[1]" Similarly, giant artificial intelligence (AI) bots can now elevate and telescope everyone's vision through the web accumulation of those giants' knowledge and computer scientists' provision of access to that knowledge. This turns the creation of powerful and accessible AI into an ethical mandate, especially for health professions education (HPE). As we approach the technological singularity, it is crucial to address the diverse range of AI risks, from academic dishonesty to the potential for catastrophic international conflicts. However, we should not allow these challenges to divert our attention from the incredible opportunity to foster education equity through innovation.[2,3]

Such success in AI-elevated equity is indeed achievable and is a clear new frontier in preventive medicine. AI programs have the potential to offer affordable and scalable solutions in various domains, such as assisting struggling readers in achieving literacy, accurately interpreting diagnostic studies, or making therapeutic information available in under-resourced settings. By overcoming the barriers of cost and limited availability of traditional treatments and increasing the capacity of healthcare professionals, these programs enable greater access to quality services in education and health care. HPE leaders worldwide facilitated a nearly overnight and universal shift to digital/online education during the pandemic. Many educators have become more conversant with using online and digital technologies. The sector is primed for adopting responsible AI tools that promote equity, particularly in low-resource settings with few or no alternatives. HPE withstood the rush to the market of online tools during the pandemic; so, having weathered that storm, it is time for a measured, efficient, and just shift to the integrated use of AI technologies.[4]

Specialists in preventive medicine and others interested in the United Nations Sustainable Development Goals must recognize that access to equitable, high-quality online education is obstructed by the difficulty of scaling evaluations of student writing and personalizing learning content for individual students.[5] Both of these barriers can now be significantly reduced by AI. Many learning institutions now use standardized tests with an analytical writing portion graded by AI[6] alongside human graders. The cost of this evaluative technology will likely decrease rapidly as its effectiveness increases, accompanied by risk-mitigating and cost-reduced enhanced monitoring technologies to reduce cheating and plagiarism. Learning opportunities can also be maximized through endlessly customizable and scalable content-specific bots that move students through the material while constantly checking knowledge acquisition and presenting students with additional highly customized learning opportunities as needed. Education-specific tutor bots have the potential to enhance equity

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in learning environments characterized by excessively high student-to-faculty ratios and for those with disabilities or special needs.

There are many additional ways in which AI can increase equity in prevention and HPE, including the following:

- Educators can use low-cost or open-access AI tools in low-resource settings to reduce the burden of learning activity creation. Many of these tools are readily available through the Internet.
- AI applications can be tailored to the needs of diverse student populations. Organizations can gain deeper insights into the unique needs of their students and provide access to the most appropriate learning resources.
- AI on a smartphone or laptop offers compelling opportunities for educational leapfrogging in low-resource settings, allowing students to access personalized, data-driven instruction often without traveling while avoiding serious security risks and removing economic walls for many.
- AI can create virtual simulations of clinical and other scenarios that provide students with low-risk (to learners, patients, and institutions), low-cost, infinitely repeatable, and variable real-world experiences.
- It can also provide diagnostic and treatment guidance to students, helping them to make better decisions and improve patient outcomes.[7]
- AI can monitor and assess student progress throughout a program, providing early intervention and support, particularly important in settings with high student-to-faculty ratios.
- AI can analyze locally collected public health and patient data, providing valuable insights into poor health outcomes, enabling accurate and efficient assessment of knowledge and curricular gaps for the development of targeted education interventions that address unique student needs in their specific, local context.
- AI can reach neglected institutionalized persons in jails, nursing homes, and mental health facilities.
- AI can decrease burnout for HPE faculty by reducing the work load associated with administrative and other delegable tasks.[4]

Competencies for preventionists[8] and professional health educators can act as a road map for identifying appropriate learning resources[9] and can be gathered into a data set for integration into an AI tutoring application for students. Responsible AI requires transparent and accessible data sets[10] and transparent processes for training AI models. To increase equity in HPE, high-quality data sets and appropriate interdisciplinary teams must be accountable to the public and available to review the work of AI programmers.[11]

There are important considerations that should be taken into account when utilizing AI applications in learning environments. When using AI applications in the learning environment, educators must learn, model, and teach new roles. They must critically evaluate an AI application for its appropriateness for clinical use and interpret the AI application's abilities to understand and mitigate sources of bias or error. The educator must also develop skills in communicating the outputs of the AI application as well as explain the process whereby the application arrived at its outputs. Health professions educators and students bear the responsibility of safeguarding patient data and maintaining trust between healthcare providers and patients. In addition, they play a vital role in advocating for patients' rights and in promoting the use of responsible and ethical AI systems that uphold them.[4,12]

The advent of AI in educational settings should bring eagerness and relief, not just fear. It is time for a paradigm shift in how HPE and preventive medical knowledge are conceptualized and delivered.[4,8] Advanced technologies that can dramatically reduce barriers to high-quality, scaled prevention/HPE must be safe, transparently developed, and fairly priced or open sourced—and the tools for customizing them must be understandable and accessible for all health professions educators.[8,13,14] In striving for educational equity through innovation, let us remember Newton's axiom and join him on the giants' shoulders, leveraging the power of AI to propel us further into a future of transformative and accessible HPE.

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