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Artificial Intelligence and Environmental Health Teaching: Impacts for the Wider Profession

ENVIRONMENTAL HEALTH ACROSS THE GLOBE

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Editor's Note: We are familiar with the phrase, "Environmental health is extremely local." While environmental health affects most of us on the local level, we also understand that environmental health is universal and does not know borders. The location, geography, people, and conditions can differ but the science and principles of environmental health do not. In this new column, the National Environmental Health Association (NEHA) will present environmental health issues and topics from a global perspective. Understanding environmental health on a global scale can help us recognize how that influences our local spheres and provides learning opportunities to broaden our perspectives.

The conclusions of this column are those of the author(s) and do not necessarily represent the views or official position of NEHA.

The Environmental Health Community of Practice is a group of professionals from around the world with expertise in the teaching and practice of environmental health. The community was established in the early days of the COVID-19 pandemic and its goal was to share ideas to respond to the challenges posed by the pandemic and to offer each other support. The community continues to meet and focuses on writing manuscripts for publication and sharing teaching ideas and practice insights.

ChatGPT, a new, easily accessible, and user-friendly artificial intelligence (AI) platform (https://chat.openai.com/chat), as well as other emerging AI platforms, allow for the creation of well-crafted essays complete with citations, and quickly and mostly correct answers to multiple-choice questions. These types of platforms pose significant concerns for academic programs, including environmental health, as much of our students' learning is guided by written assignments. Academic integrity is an educational and professional attribute and breaches of ethical conduct risk the reputations of organizations and by association, those who work in them.

To address this threat, the Environmental Health Community of Practice (CoP)—a group of academic professionals in environmental health from across the globe—has developed potential approaches to address AI within the academic and professional realms of environmental health. These approaches include positive engagement such as appealing to student morality, their desire to learn, and their developing sense of professionalism. Threats of punishments and incorporating AI-resistant assessment approaches are also considered.

We believe most environmental health students (and indeed most university students) are overwhelmingly honest, and the assignments they submit are a result of their own work and endeavor. The world of academia has become, however, increasingly concerned with the development and sophistication of AI systems that are able to produce work on demand. The new AI systems facilitate easy access to information and its ease of use is likely to result in widespread adoption. It is this ubiquity of use that has prompted our CoP to consider AI from a professional and academic perspective.

Ever since universities came into being, there have been students who have cheated or presented others' work as their own (known as plagiarism). Such activities have adapted to changes in technology. Text matching software was developed to identify students' work that was copied directly from the internet or other sources; however, we reached a stage this year where AI is readily able to write coherent and appropriate answers to assignments. AI detection software is only partly successful in its detection capacity. We have entered an arms race with plagiarism and detection software seeking to catch up with the latest developments and being unable to currently overtake them.

It might seem odd to bring a discussion around plagiarism to the field of environmen-

tal health practice, but there is the potential for significant impacts on the profession as a result of AI. The roles of environmental health practitioners are many and varied, with giving advice, technical support, and education all key aspects of these roles. Yet at its heart, environmental health remains an enforcement profession and environmental health practitioners must act with integrity and be seen as honest brokers and trustworthy by businesses, the public, and their colleagues. Anything that would seek to undermine this integrity and trust is worthy of the profession's attention.

Universities are at the forefront of creating the next generation of environmental health practitioners. Having students who engage in cheating will have repercussions for the profession. There is a danger that through plagiarizing, students will fail to understand the taught material, which will have implications for their ability to practice in the future. In addition, universities provide more than the accumulation of knowledge, they are the first step on the road to developing professionalism in students. Plagiarism could foster a set of behaviors and beliefs that are not in line with professional expectations, such as established codes of ethics.

Therefore, there is a challenge for both universities and the profession to deal with this issue. For universities, the answer lies in not simply investing in more effective detection software or returning to face-to-face exams. Below we outline a few approaches.

First is an appeal to the students themselves not to engage with AI systems, both in their own learning and their own developing professional identity. In terms of learning, it should be made clear to students that environmental health programs are cohesive in nature. While there are individual components of environmental health that students study, these components build together and support the creation of environmental health professionals. To weaken any of these blocks by engaging in plagiarism is to weaken the whole structure.

In terms of their professional development, as previously noted, universities are where students take their first steps on the pathway to becoming professionals. An appeal to a student's sense of fairness, honesty, and integrity should be made. This approach could be more formalized, with perhaps the profession adopting a "fitness to practice" element that students sign up to. Such an approach has been taken, for example, with nursing in the UK. This fitness to practice element would set out the standards and expectations that a student would need to ensure they met and maintained, with consequences if they do not. For our readers who hold a credential such as the Registered Environmental Health Specialist/Registered Sanitarian, you are familiar with the code of ethics that articulates that credential holders do nothing to undermine, detract from, or otherwise cause to develop any damaging associations with respect to their professional status.

Second, we might consider the manner in which students are assessed. The issue of plagiarism relates almost exclusively to coursework assignments. One approach might be to limit the amount of coursework and substitute written assessment with in-person or oral examinations. There is significant opposition, however, to increasing the exam load. Universities have favored moving away from the traditional exam. This process was accelerated by the COVID-19 pandemic, when social distancing meant such exams were not possible and the return of exams has been patchy or nonexistent.

The practical components of environmental health do mean that more practical and individual assignments can be used to assess student learning. Indeed, students seem to favor practical assignments as they can see a clear link between the assignment requirements and professional practice. Such assignments will, however, result in an increase in demand on staff time and resources to undertake them effectively and fairly. For example, having a student undertake a viva—where they talk through their assignment with their lecturer to show they have understood what they have written—is an option currently used in several universities but requires significant staffing resources. With this in mind, there might be a role for the wider profession and employers to help support and develop practice-based assignments. A wholly practical approach to assignments will not, however, solve all issues, as this type of assignment cannot examine the more theoretical elements of environmental health teaching.

The current AI systems work well with assignments that are low on Bloom's taxonomy where students have been asked to remember facts and content. AI systems currently do less well on the higher order functions such as analysis and critical evaluation. Undoubtedly, AI will become more sophisticated and will perform better in these higher-level functions.

A third approach is the manner in which cases of plagiarism or cheating are adjudicated. Across all universities, mechanisms exist to discipline students who have been found guilty of breaches of academic integrity. The penalties students can incur operate on a sliding scale that takes into account the severity and frequency of the offense, and ranges from students being required to resubmit the suspect work to the possiblility of expulsion. As AI systems become more sophisticated and therefore their use becomes harder to detect, we need to ensure the penalties associated with cheating remain relevant as a deterrent.

The authors recognize students tend to plagiarize when they are desperate, especially when they are short on time. Since these AI systems are efficient in producing assignments, they will be appealing to students if they have left the assignment to the last minute. This situation means that universities should carefully consider the structure, nature, and timing of assignments to remove some of this pressure and the subsequent temptation to cheat.

On a positive note, there are many ways that AI can be embraced to support and enhance our teaching and to prepare students to enter the world of work. AI will increasingly become a feature of workplace activities. In addition, the advantages of utilizing AI in universities are numerous, ranging from being an assistive technology in teaching to supporting individuals with disabilities. In fact, AI might be an appropriate teaching vehicle to raise the issues of ethics, morals, and professionalism. For example, the Council on Education for Public Health in the U.S. identifies leadership as one the eight foundational competencies for master of public health-level education. Professional ethics, including the appropriate use of AI, could be addressed in the curriculum. AI can help professionals with environmental health literacy—with communication to the public, business owners, elected officials, and others. The tools within AI could better convey what needs done and why and how to encourage change. Additionally, its use in grant writing might be significant. AI could be advantageous in many areas of environmental health, especially for those working in public health and health promotion, in creating

accessible, simple messages and well-written communication tools.

In conclusion, the environmental health practice is based on the ability of its practitioners to solve problems. In view of this basis, skills related to seeking out information and drawing appropriate conclusions from the information available are of paramount importance. Therefore, assignments at universities should be used to help develop these cross-cutting, problem-solving core skills. In this new world, we need to rethink the methods to achieve this endeavor, acknowledging both the advantages and perils of AI. Certainly, AI can be an effective tool to help practitioners systematize existing knowledge, thus saving time, but it cannot replace many of the skills required for the practice of environmental health. Nor can it instill a sense of professionalism within students, which is an essential characteristic of environmental health and how we are judged by the outside world.

It remains to be seen how AI affects university teaching. By taking the lead and determining which components of AI we embrace—and those components that counter in our teaching—we can ensure our environmental health students continue to acquire the skills and knowledge they required to be valuable and professional environmental health graduates.

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