Opening Doors for Cybersecurity & AI: An Interdisciplinary Approach to Engaging Middle School Students

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The *Opening Doors* project engages professionals in the fields of cybersecurity and AI in conversations with educational researchers, cybersecurity researchers, and K-12 teachers as a means for identifying the disciplinary knowledge at the intersection of cybersecurity and AI. We have developed an interdisciplinary think tank tasked with identifying aspects of cybersecurity that intersect with AI, the gaps and coherences between industry and academic expectations in those realms and thinking about ways to engage middle school students and their teachers in learning about those intersections. Our conjecture is that this investment in middle school students (and their teachers) will lead to students who are more knowledgeable about and engaged in the cybersecurity and AI worlds whether as citizens, users, programmers, or in other roles. Our goals are two-fold: (a) to identify what students know, what teachers know, and what the industry knows about the ways in which AI and Cybersecurity shape our everyday lives, as well as about the professional skills and practices essential for careers in these fields and (b) to leverage the expertise of each of our think tank stakeholder groups to create innovative avenues for addressing those gaps.

Challenges

- What do middle school students know about cybersecurity & AI?
- What should they know about it?
- How do we support teachers to engage them with these ideas
- How do we bring a transdisciplinary team together around this challenge?

Scientific Impact

- Looking at the values of each stakeholder group to find points of convergence
- Identifying an initial definition for what middle school students should know in this domain
- Creating an instrument to support subsequent research about students' knowledge
- Finding out what middle school students know about cybersecurity & AI

Solution

A think tank with stakeholders from each group was convened in fall 2021 to discuss what students should know and identifying ways to help them learn. From these think tanks, we will develop a survey to better understand what middle school students do know, a proof-of-concept instructional module that allows the teacher to learn with the students, and an analysis of the expertise the think tank participants brought to the sessions. We are very interested in supporting students (and their teachers) to understand and leverage cybersecurity practices in the age of AI.

The outcome of this collaborative has the potential to foster our understanding about critical issues, knowledge, and skills for developing socially responsible, equitable and "robust workforce with integrated AI and cybersecurity competencies, and develop an informed public that understands the privacy, confidentiality, ethics, safety, and security implications of AI" (NSF, 2020) as well as to map the discipline in a way that lends itself to instruction.

The outcome of the think tank partnership has the potential to develop one of the first novel education models and outreach efforts designed to be used by any teacher, not just a teacher with a computer science background. The survey to be developed will help inform teachers and future projects about what their students already know about this domain and how it impacts their lives.

The research proposed here can lead to important changes in our understanding of the foundations of AI and cybersecurity, issues related to social responsibility and digital equity as well as provide a new and innovative model to motivate and educate students from culturally, linguistically, and racially diverse backgrounds about AI and cybersecurity