

Students require concrete familiar examples to understand cybersecurity concepts prior to extension to more abstract realizations.

**Concrete and Interactive Cybersecurity Education (CICE) for Middle School Students**Chrystalla Mouza, Teomara Rutherford, and Chien-Chung Shen (University of Delaware)  
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Project Overview: In collaboration with practitioners, learning scientists, and CS education researchers, we develop a series of Mixed Reality games to teach expert-identified, important cybersecurity concepts to middle schoolers.

**New Challenges & Next Steps**

Through the process, the question of the benefit of Mixed Reality and what a Mixed Reality game entails arose. Through collaboration with teachers we’ve begun to understand this question better and how to design mixed reality games for a diverse population of adolescents. In the year ahead, we will be piloting our first game with students and developing another with teachers.

**Equity**

We have incorporated teachers’ opinions throughout the process of our application develop; as our application is implemented, it will be piloted with a diverse student population. Further, we have designed our games to allow group play on a single tablet to increase accessibility across classrooms. Finally, our plan to include multiple representations of concepts at each game level makes this concept approachable to students with varying interests.

**Lessons Learned & Insights Gained**

Through meeting with teachers across Delaware, we’ve learned what they feel is valued and needed by their students. These teachers identified that students require concrete examples (e.g., attacking monsters) prior to abstract concepts (e.g., file types). Identifying mixed reality components for teaching cybersecurity was challenging; the research/practice partnership design team is still in the process of identifying the best ways to incorporate these elements.