

A Mixed-Method Study Exploring Student Motivation for Participating in Cybersecurity CTF Competitions

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Abstract

Training a skilled cybersecurity workforce is a complex problem, similar to the challenge of securing cyberspace itself. The National Academy of Engineering identified securing cyberspace as one of the 14 Grand Challenges due to the complexity of cyberspace. This same complexity impacts the ability to effectively recruit and educate cybersecurity students with the necessary knowledge, skills, and abilities to secure these critical and open systems. A growing number of organizations and academic institutions use cybersecurity competitions to increase students' interest and cybersecurity-related knowledge. Although literature exists regarding cybersecurity competitions, current research regarding the participant's perspective is lacking. Using Eccles' Situated Expectancy Value Theory (SEVT), this study explored how students were motivated by participating in cybersecurity Capture the Flag (CTF) competitions. Results found participants who identified as female had a significant variation in expectancy of success compared to those who identified as male. Results also showed that interest and attainment were the SEVT elements of motivation that were most salient for student CTF participants. Responses regarding the CTF utility were more dispersed and relative costs were the lowest construct as students did not believe participation required much preparation or stress. Prior studies claimed that cybersecurity CTF competitions have a high knowledge barrier that discourages wider participation; however, results from this study show that students did not find their lack of cybersecurity knowledge stressful. This study contributes to CTF developers and educators' efforts to build CTFs that successfully engage students in cybersecurity education.

Keywords: cybersecurity education, cybersecurity competition, Situated Expectancy Value Theory, student academic motivation, Cyber CTF.

An updated version of this abstract may be found at: <https://cppj.info/>