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CyberPDX: An Interdisciplinary Professional Development Program for Middle and High School Teachers

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ABSTRACT

CyberPDX is an annual professional development program hosted at Portland State University. Our long-term goal is to broaden participation in cybersecurity. Since 2016, over 70 middle and high school teachers from the Pacific Northwest have participated in the STREAM program, which offers interdisciplinary instruction in programming, cryptography, personal security, policy, literature, and arts. In this poster, we share our interdisciplinary curriculum, present data on short-term impacts, and describe our in-progress work to evaluate the program's longer term impacts.

1 OVERVIEW

In the face of critical workforce shortages, women and people of color face barriers to participation in cybersecurity that are similar to those found in other domains of computer science [2, 3, 6]. Informal learning is known to be important for catalyzing interest, building confidence, increasing identification, and motivating further study [2, 4]; however, not everyone has equal access to informal learning opportunities [1]. CyberPDX aims to provide another indirect means of introducing students to computing and cybersecurity: the integration of cybersecurity content in diverse subjects at the middle and high school levels.

CyberPDX is an interdisciplinary STREAM (Science, Technology, Reading/wRiting, Engineering, Art and Math) professional development program for middle and high school teachers. Our unique curriculum equips participating teachers to identify connections between cybersecurity and the variety of subjects that they teach (e.g., Biology, Government, Language Arts, Social Studies). At a one-week camp, teachers engage in activities such as literature circles, scavenger hunts, policy debates, and art projects that foreground the interdisciplinary nature of cybersecurity, and the diversity of related careers. Participants leave camp with the competence and confidence to become cybersecurity teachers and ambassadors who might spark the interest of a student in their biology or social studies classroom – a student who might not have opted in to a specialized computing elective. Three supplementary workshops foster

the development of a Professional Learning Community (PLC) [5] offering support throughout the following year.

Our focus on interdisciplinary professional development offers a unique angle for a research area that has primarily focused on either students' experiences (it is this research which suggests the importance of interdisciplinary curricula (e.g., [2])) or training teachers who will teach specialized computer science courses (it is this research that suggests the importance of PLCs (e.g., [5])).

The camp's funding agency, GenCyber, conducts a site evaluation and closing survey showing significant short-term positive impacts. Teachers report very high levels of satisfaction; in 2019, 17 of 19 participating teachers planned to integrate cybersecurity concepts in their existing courses across a variety of subject areas. However, we know less about the longer term impacts of CyberPDX on broadening participation in cybersecurity. In 2020, we will conduct follow-up research to develop more detailed and nuanced insights into the impacts of CyberPDX on teachers' practices – and its ultimate effects on their students.

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