F22.010: Working with Elementary School Teachers to Create Culturally Relevant Computer Science Curriculum

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Overview

Native Americans are significantly underrepresented in computer science careers. However, studies show that early exposure to computer science allows underrepresented students to develop foundational computer science skills and consider future learning in computer science. This project is focused on developing culturally relevant pedagogy and problem-based learning for Native American students in computer science. The project would create an innovative activity focused on equity in Internet access and how the Internet works so students can learn about computer science in a meaningful context. The project will use a citizen science approach to engaging students in tasks that are important to their local communities. The project will develop and pilot a curriculum to help fifth-grade students contribute to Internet maps by engaging with computer science and computational thinking concepts such as computer networking, data representation, data collection and analysis, and algorithmic thinking. There are two research questions. (1) How do K-5 schools and teachers identify culturally responsive, computationally rich problems that lend themselves to rigorous problem-based learning in computer science and computational thinking? (2) What curricular and teacher development support is needed to enable K-5 teachers to engage all students (particularly Native American students) in problem-based learning that rigorously integrates computer science and computational thinking?

What the student will DO and LEARN

Students will: GET CERTIFIED to work with human subjects data TRANSCRIBE video recordings of researchers working with teachers to identify computational problems embedded in real-world problems LEARN how to ANALYZE transcripts to identify common themes using a Grounded Theory methodology LEARN how to MAP curricular activities to learning objectives GRAPH survey and rubric results to generate figures that will be used in presentations and publications

Additional benefits

Students will get insight into the process of developing problem-based STEM curriculum. Because this project is focused on improving interest in computer science in Native American students, student interns will have the chance to learn about how curriculum is created, implemented, and evaluated by STEM experts, teachers, and students.

Additional qualifications

Interested in STEM education, Interested in elementary education

Time commitment

6 hrs/week for 30 weeks