

Transitioning from AP Computer Science Principles (CSP) to AP CS-A Java: Learning from CSP Successes

Beryl Hoffman, Elms College; Barbara Ericson, University of Michigan; and Jennifer Rosato, College of St. Scholastica

This research project focuses on broadening participation in the College Board's Advanced Placement (AP) Computer Science courses. It focuses on how to better prepare and support teachers and students who are new to CS as they transition from the AP Computer Science Principles course to the more advanced AP Computer Science A course. The researchers will build on previous work to create an interactive e-book for the AP CS A exam. This project includes professional development for 36 teachers and will reach approximately 720 students in one year.

Improving the Outcomes of Hispanics in AP Computer Science

M. Bachrach, G. Verdi, and P. Morreale, School of Computer Science & Technology, College of Education, Kean University

This research is aimed at improving the engagement and outcomes for Hispanic students in the AP Computer Science Principles and AP CS A courses. The researchers will investigate whether teacher awareness of language acquisition concepts and strategies improves teaching in the classroom and student performance in these classes. This research will include professional development experiences and follow-up support for 36 teachers.

Accessibility in Blockly: Touch Interaction Research

Lauren Milne, Macalester College

Block-based programming environments (such as Scratch or MIT App Inventor) are often used to introduce novices to programming but because they rely heavily on visual elements and drag and drop, they are generally not accessible for children with visual or motor impairments. This project focuses on improving the accessibility of the touch-based interaction with the Blockly library by adding accessibility data to the visual renderings of the blocks themselves and creating a separate interface designed for navigation by touch. The goal of this research is to generate an application program interface to make it easy for developers to integrate touch accessibility into their own applications.

Integrating CS Education into Teacher Education and K-12 Mathematics

Jennifer Parham-Mocell, Oregon State University

The goal of this research is to integrate CS education into the mathematics teacher education curriculum. The researchers will work with prospective teachers at two different stages and in two interrelated ways. First, they will develop modules for undergraduate pre-service teachers (PSTs) who are enrolled in a capstone mathematics course for secondary school teaching majors. These modules will develop prospective teachers' knowledge of central CS concepts, and help them understand opportunities for introducing these concepts in their math teaching. Second, they will develop modules to work with a group of master's level teacher candidates who are enrolled in a mathematics methods course. These modules will build the teacher's CS knowledge and instructional skills and help them design and teach CS lessons in their secondary classrooms. This research will immediately impact 50 teachers and 90 students.

National Computer Science Education Preservice Case Studies

Anne Leftwich, Indiana University

This research will provide a national picture of how are schools of education are preparing future teachers to teach CS in K-12 schools. The study will interview K-12 CS education experts to develop a pathways framework, select and create multiple case studies of CS teacher education programs, and survey all 1,396 teacher education institutions offering traditional and/or alternative initial licensure programs. This research will provide an overview of the CS education preparation landscape, examples of practices and policies being

implemented in CS teaching preparation, and a public repository of the common pathways schools of education use to prepare pre-service teachers to teach CS at the elementary and secondary levels.

Achieving Equity in K12 Computer Science Implementations: Strategies, Obstacles and Opportunities at the District Level

Rafi Santo and Dr. Leigh Ann DeLyser, CS4ALL

With the goal of making CS education truly accessible for all students, this research will examine how leading school districts are addressing equity issues in their CS education efforts. Researchers will conduct a study of eight school districts that have been developing comprehensive CS education initiatives to understand how different ideas about equity in CS education—from reaching all students, to creating inclusive classrooms, to teaching about equity issues in tech—make their way into district initiatives. The researchers hope to identify challenges, promising approaches, and emerging strategies from which other districts, policy makers, and the larger CSEd community can learn.