Overview

A research-practice partnership (RPP) comprised of Broward County Public Schools (BCPS), UChicago STEM Education (UChicago STEM) at the University of Chicago, and the University of Florida (UF) is submitting a medium RPP proposal to the PreK-8 strand of the CSforAll program. This project directly builds on the RPP's NSF STEM+C exploratory study ("Time4CS" NSF #1542842) that generated six (two for each, 3rd – 5th grade) early prototype Integrated Problem-Based Learning (IPBL) modules and findings about their impact on student outcomes. The RPP's long-term goal is to increase all elementary students' opportunities to engage in computer science (CS) and realize more equitable academic and attitudinal outcomes. The objectives of this project, which we will call "Time4CSforAll," are to create one finalized module that explicitly addresses broadening participation and to generate new knowledge about the impact of the IPBL Module on student outcomes. In addition to these contributions to the field, these objectives will also lead to a foundation for a large scale-up effort in the future.

Concurrent with the module revision and dissemination process, the RPP will pursue the answers to a set of research questions via a quasi-experimental implementation study. Research questions focus on the impact of the Time4CSforAll module on student outcomes as well as the functioning of our RPP. Examples are: Is Time4CSForAll Module implementation associated with students' academic achievement, CS proficiency, and CS attitudes? Are there group differences in students' academic achievement, CS proficiency, and CS attitudes by students' socio-demographic characteristics?; and How does the RPP function and how does that functioning change over the duration of the project? Data collection will include: 1) status of Module implementation (using teacher questionnaires and interviews as well as data from Code.org); 2) student and teacher attitudes (using teacher and student questionnaires); 3) academic achievement in ELA and math (using data from the Florida Standards Assessment); 4) CS proficiency (using data from Code.org Fundamentals Course E); and 5) student socio-demographic data (from district records). Research question 6 will be answered through our evaluation.

Broader Impacts

This project will benefit society and contribute to desired societal outcomes in several ways. First, in response to the need for increasing CS learning opportunities at the elementary level, this project will create a solution for finding time for CS in the elementary school day and make that solution available at no cost to every teacher in the nation via the Code.org platform. Further, in recognition of the importance of broadening participation in CS for groups that have been traditionally underrepresented, this project will explicitly address the needs of learners with disabilities and of particular racial/ethnic groups by infusing UDL and CRP into the Time4CSforAll Module and by making the educative teacher resources available on the project website, apart from the Module. In this project, we will focus in particular on African-American and Hispanic youth as they are among the largest underrepresented groups in CS and are the two largest non-White racial/ethnic groups in BCPS. Additionally, the project will directly impact thousands of students in BCPS. Finally, the RPP will continue to increase their engagement with other RPPs to broaden the RPP learning community.

Intellectual Merit

This project will advance knowledge in several areas. First, as an implementation study, the RPP will produce findings not only about *whether* the Time4CSforAll Module had an impact on student academic achievement, CS proficiency, and CS attitudes, but also about which *components* of the Module were most impactful for whom and under what conditions. Second, while these contributions are important in and of themselves, these findings will be presented in the larger context of equity. The RPP's exploratory study confirmed that the long-standing gaps in standardized outcome measures and CS attitudes between students in different socio-demographic groups persist (Century, et al., in press), and specific teacher practices widened or narrowed these gaps (Ferris, et al, in preparation). Thus, this project will generate specific knowledge about Module components that promoted equitable academic and attitudinal outcomes across all groups of young learners. Finally, this project will contribute to knowledge about RPP improvement and RPP engagement with the educational system.