

PROJECT SUMMARY

Overview:

Camp DIALOGS will provide technology-rich learning opportunities for middle school students to design and develop spoken conversational apps using computer science. Spoken conversational apps include today's voice assistants and chatbots such as Siri, Alexa, Google Home, and many more. They are increasingly ubiquitous, and common interactions include asking them about the weather, or requesting them to play your favorite song. However, these interactions represent only a fraction of spoken conversational apps' capabilities. With today's visual tools for developing conversational apps, young novices can create a tremendous variety of projects such as conversational games, recipe helpers, or CPR coaches. Creating this kind of personally relevant project offers meaningful engagement that has the potential to transform the way middle school students view STEM and computing careers. Beyond its impact on these participants, this project will contribute research findings and best practices for engaging middle school students in learning experiences around spoken conversational technologies.

Intellectual Merit:

In Camp DIALOGS, youth-led teams of middle school students will design and develop spoken conversational apps over the course of two-week summer camps. The project team's faculty, graduate students, and trained undergraduate camp counselors will guide campers as they create spoken conversational apps and learn foundational principles of computer science and artificial intelligence. Using Dialogflow, a flexible and powerful spoken conversational app development environment, learners will create a fully functional application which can be accessed by users from any smartphone, dial-up phone, or Google Home speaker. All middle school students who participated in the summer camp will be encouraged to return as peer leaders in subsequent years of the camp, affording them the continuous opportunity to build sustained interest through meaningful engagement.

The project investigates the following overarching research question: In what ways can a summer development experience around spoken conversational apps foster middle school students' cognitive outcomes around computing and social-emotional outcomes of interest and identity formation related to STEM careers?

Broader Impacts:

The proposed project is poised to make broad impact by broadening participation, broad dissemination through a multi-faceted strategy, STEM workforce development, and benefits to society. The proposed project will afford novel learning opportunities for historically marginalized children from low socio-economic neighborhoods, with an emphasis on engaging African American students in innovative STEM learning experiences. We will recruit from middle schools with dense walkable neighborhoods nearby that are primarily African American. The team is well prepared to serve this population, with deep expertise in broadening participation research across PI Boyer, Co-PI Israel, Evaluator Tom McKlin, and advisory board members Kinnis Gosha and Fox Harrell. The project's deliverables include a curriculum that will have been iteratively refined over four years. This curriculum and accompanying materials will be made publicly available and disseminated on the project website, on computer science education web portals run by NSF and other professional organizations, and at conferences and workshops including the Association for Computing Machinery Special Interest Group on Computer Science Education (SIGCSE), the Computer Science Teachers' Association (CSTA) and the American Society for Engineering Education (ASEE) where scholars and practitioners gather. We are connecting the needs of middle school students to future workforce needs through developmentally appropriate learning experiences centered around this state-of-the-art technology. By providing these personally relevant, highly engaging experiences, we will promote students' knowledge of, and interest in, STEM careers.