



Engaging Secondary Female Students in Ubiquitous Intelligence and Computing

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Project Overview: Enhance secondary female students' academic self-concept in computing and engineering fields through a constructivist learning environment ([STEM for All Video](#))



Lessons Learned & Insights Gained *[Describe insights, achievements, findings, lessons of your project.]*

In 2022, we engaged 37 secondary female students through the five-week GUIC summer camp in learning Arduino and robotics and developing engineering projects in ubiquitous intelligent systems. About 85% of the camp participants reported that the summer camp activities improved their STEM knowledge & skills as well as academic self-concept in learning computing and engineering. The constructivist learning environment featuring in hands-on experience, tiered team structure co-mentored by teacher mentors and college student mentors, and virtual learning communities is effective in engaging girls in learning computing and engineering.

Equity *[Describe specific strategies, and pedagogical approaches used over the past 12 months to address equity within the context of the ITEST Pillars and NSF priorities.]*

About 68% of 37 participants come from Title 1 schools with the demographics of 21% African American, 30% Hispanic, 16% Asian, and 30% White. We reached out to Title 1 schools and contacted teachers in target schools to recommend underrepresented students. In addition to poem/essay writing activities, we added the crochet activity to integrate arts with STEM. The project demo of each team had two parts: 5-minute presentation and 5-minute live demo each at random order.

New Challenges & Next Steps *[What have you needed to reconsider? What have you been able to creatively overcome and how? What will you be tackling in the year ahead?]*

In 2022, we removed the training in Python so that students had more time to learn the subjects in Arduino and Robotics Design. We will continue to recruit and train committed teacher mentors partnered with college student mentors. We will study the impacts of mentors and non-STEM activities on students' learning outcomes.