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IAF SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)
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TEACHING TEACHERS TO TEACH STEM

Abstract

Over the last several years, schools have been under pressure to provide more STEM learning opportunities for students. However, teaching STEM topics is a challenge for many middle and high school teachers. According to Computer Science Education Week, over 9 out of 10 of parents want their students to learn coding, but most teachers aren't equipped with the knowledge to teach critical STEM skills that students need to learn in today's environment. To address this challenge two standards-based programs were initiated by the Association of Space Explorers - USA, designed and developed by Because Learning, Inc, and funded by the Association of Space Explorers-USA and Northrop Grumman Corporation.

The first program, called AstroSat, provides a school class the unique opportunity to run an experiment on an actual satellite already in orbit and collect data from its many sensors. This program's unique attribute for schools is it does not require the time and expense of building a unique satellite. Three cohorts of classes have passed through this program over the course of a three-year period. The impact metrics show that many classes were successful, but several didn't complete the experiment process. After analysis of the metrics and conversations with the teachers, it was determined that many teachers were excited with the opportunity to participate in AstroSat with their class, but reticent in their ability to carry out the AstroSat program.

Consequently, a beginner program was developed, called AstroSchool. It consists of a six-week certified professional development course that exposes teachers to sensors, micro-controllers, and coding, with particular focus on how to teach standards-based STEM lessons in the classroom. The number of applicants for AstroSchool has been substantially greater than those for AstroSat, beyond what could be accommodated by sponsorship. The impact metrics show that far fewer teachers dropped out and many more students were positively impacted by the improved skills of their teachers in bringing these lessons to the classroom. It also prepares teachers to 'graduate' to the AstroSat program.

This paper will outline the history and implementation of the two programs, the resulting metrics and impact to the teachers and students, and the plans for future improvements in the curricula and sponsorship of both AstroSat and AstroSchool.