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ILEAD'S DREAMUP TO SPACE AND CUMBERLAND COUNTY SCHOOLS' STARWARD STEM: HOW TWO SCHOOL SYSTEMS ENGAGED K12 STUDENTS IN ISS PAYLOAD COMPETITIONS

Abstract

Since 2014, iLEAD California Charter Schools' "iLEAD DreamUp to Space" has incorporated spaceflight experiments in over 7 sites. As a public charter school network, iLEAD has autonomies to create curricula cutting across subject areas and engaging students in ways that are often less accessible to traditional USA public schools. iLEAD parents often seek this educational experience, which can be differentiated for all students, because their children were not successful in traditional institutions. Over 7 years, iLEAD's Dreamup to Space Design Challenge has engaged over 5,000 students and community members.

Cumberland County Schools (CCS), a traditional public school district in North Carolina, has implemented spaceflight experiments with STARward STEM, supported by RTI International and the US Department of Defense Office for STEM Education. STARward STEM increases access to high-quality STEM learning for students traditionally underrepresented in STEM (including in the space industry) such as students of color and students from high poverty communities. RTI has extensively coached educators to navigate real and perceived barriers to incorporating spaceflight experiments in their schools.

To implement STARward STEM, RTI engaged DreamUp, a company that provides educational space research opportunities. CCS and RTI drew on DreamUp's experience supporting over 500 student projects in low Earth orbit. DreamUp connected RTI with iLEAD's Director of STEAM Initiatives, Kathleen Fredette, who provided guidance based on iLEAD DreamUp to Space. Based on Ms. Fredette's insights, the STARward STEM team designed a design challenge that engaged over 1000 students from 11 schools in 2 annual design challenge competitions.

Both organizations also have iterated and refined their programs based on lessons learned year over year. iLEAD also engages its community through an annual "Space and Innovation Expo," showcasing and celebrating student work and participation in the process. Aerospace and subject matter experts from government, academia, and industry are involved in the program, which also includes an extensive post-flight analysis phase once the experiments from ISS are returned. At CCS, multiple rounds of judging for student experiment submissions were critical so that students could receive feedback and improve their experiment proposals during the process. CCS students also showcase their work as young scientists alongside industry STEM experts at the annual STARward STEM Expo where competition winners are announced.

These two school systems serve as instructive examples of how educators, school leaders, and administrators can successfully incorporate spaceflight experiments into their schools while ensuring adherence to their values, missions, and respective standards.