1949458 Career Exploration Lab: 3D Printing and STEM Engagement for High School Students with Visual Impairments and their Educators

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Develop and research STEM Career Exploration Labs (CELs) for high school students with visual impairments, using astronomy and 3D printing to bolster their interests in and knowledge of STEM and STEM careers.

Project type: Developing and Testing Innovations (DTI)

Project start/end date: 2020 – 2023

Strategies:

Use 3D printing, 3D models, and inquiry-based instruction to teach astronomy to students with visual impairments, motivating such students to pursue careers in STEM.

Engage various types of educators via ‘Educator Partner Institutes,’ building teacher dexterity in using 3D printing tech and tactile- and sound-based astronomy instruction.

Insights & Achievements:

Development of 9 3D printable models and associated lesson plans in astronomy & 3D printing.

First Educator Partner Institute scheduled for October 2021.

Recruitment of 12 schools for the blind located around the US via partnership with the Council of Schools and Services for the Blind.

Reconsiderando:

What have you needed to reconsider? How to safely implement our hands-on project.

What have you been able to creatively overcome and how? An acceptable IRB protocol.

What are you still grappling with? The COVID pandemic and its varying impacts in different regions.
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**Figure 1 (left):** During the STEM CEL workshops, students use specially designed 3D printed tactile models to explore a variety of astronomy topics. Pre-/post-activity surveys, astronomy assessments, and video recordings are used to gauge the effectiveness of the 3D models and activities, and the impact of the CEL on students’ perceptions of and interests in astronomy and STEM.

**Figure 2 (top left):** Students participate in several hands-on 3D printing activities using on-site 3D printer facilities.

**Figure 3 (bottom left):** Students also participate in a 3D printer build workshop, assembling and learning to use a desktop 3D printer.