Paper ID: 38087
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SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)
Lift Off - Secondary Space Education (2) (2B)

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MEASURING THE EFFECTIVENESS OF AUTHENTIC ASTRONOMY PROJECTS FOR SECONDARY STUDENTS THROUGH ANALYSIS OF THEIR INTEREST, MOTIVATION, CONFIDENCE AND CONTENT ACQUISITION.

Abstract

To enhance real-world aspects of science, 36 gifted and talented students in Years 7-11 at St Joseph's School in Northam Western Australia, have conducted a diverse array of space science and astronomy exercises. Using an astronomy course as the foundation, activities were designed to motivate and increase enthusiasm in students to pursue additional science courses and future science careers.

To generate subject enthusiasm, it is crucial that the students are immersed in authentic projects with challenging, yet achievable, tasks. Not only do students participate in activities at a science outreach facility, such as the Gravity Discovery Centre based in Gingin, Western Australia, but they also conduct practical fieldwork through guided astrobiology activities at various locations and day and evening astronomical exercises, including astrophotography.

Developing the skills and techniques to use international, remote telescopes for celestial imaging has been added to the students' practical work, for which we recently utilised the United States Air Force Academy Falcon Telescope Network during the STEM First Light Projects at several locations.

As a means to develop inquiry skills, students proposed topics of study, conducted observations and analysed their own data leading to an increased skill set with software manipulation, astronomical object identification and imaging techniques. Additionally, the students' developed the technical capability to identify suitable parameters and timing to take high resolution images of nebulae, galaxies, planets and satellites.

Through this process the students involved had the opportunity to increase their scientific communication through submitting research proposals, working in teams on a defined task and liaising with a number of research professionals (including virtually with international researchers). The students described their data, findings and reports through presentations to their peers and sharing their newly acquired skills to younger students by running astronomy viewing evenings.

The students have been surveyed about their knowledge, motivation and enthusiasm with astronomy and general STEM topics, courses and careers throughout their activities. Insights into the students' thoughts provided by these surveys highlighted illuminating results that indicate shifts in interest, motivation and retention of key astronomical concepts through program participation.

The development of secondary level space science education programs, with authentic experiences covering a diverse range of topics such as astronomy, planetary science, astrobiology and astrophotography has fostered an excitement for STEM subjects, courses and generated an interest with careers in STEM related areas. This paper will present details of each immersive activity and the resultant student feedback.