

SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)
Lift-Off - Secondary Space Education (2)

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INCORPORATING COMPUTER-AIDED DESIGN INTO A HIGH SCHOOL ASTROPHYSICS
COURSE

Abstract

This paper presents an example of The King David School's ongoing effort to elevate the profile of the STEM subjects by embedding engaging and relevant activities, within the school curriculum. As part of a senior high school detailed study in Astrophysics, students were introduced to Multiwavelength Astronomy. Experiential learning was chosen as being an appropriate method for delivering this topic, as this learning methodology would provide the students with skills that would be valued by prospective employers, as well as better prepare the students for future studies at the tertiary level. Following an initial 60 minute lesson, which briefly covered the electromagnetic spectrum, tools of astronomy and some of the well known land-based and space-based detectors, students commenced their extended project. Focusing on one part of the electromagnetic spectrum, students were required to design a space-based observatory using Computer-Aided Design (CAD) software donated to the school as part of an educational grant. Students were given some basic instruction on using the CAD software, as well as access to a suite of online tutorials that would allow them to further develop their CAD skills set. The incorporation of this engineering element offered benefits such as: developing the students' technological literacy; increasing their awareness of work done by engineers; and establishing a conceptual connection between their work and the real-world. Students also developed a deeper understanding of the key features of a satellite, how the different detectors are sensitive to different wavelengths of light, and the contribution of Multiwavelength Astronomy to improving our understanding of the universe. The completed CAD designs were then 3D printed and exhibited in conjunction with a poster presentation. While a number of difficulties were experienced by some of the students, specifically relating to developing the requisite CAD skills to complete the task, the students were excited by being able to produce a tangible 3D model of their satellite. The ability to gain access to, and use sophisticated software technology, no different to that which is used by industry, was pivotal to student engagement during this detailed Astrophysics study. The structure of this particular course, the learning outcomes achieved, and the positive impact on the students are examined and discussed in detail.