

IAF SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)
Lift Off: Primary and Secondary Education (1)

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STUDENT INFORMED CHOICES ABOUT STEAM: A CASE STUDY FROM VSSEC

Abstract

Equal opportunity in education is critical. Students in primary and secondary school and their teachers must be supported to recognise their place in Science, Technology, Engineering, the Arts, and Mathematics (STEAM) disciplines. As teachers we have a responsibility to include sustainable opportunities that challenge a student's fixed-mindset – 'I'm not a mathematician' or 'I'm not good at science' – toward a growth-mindset; this shift toward growth-mindset can improve the motivation, achievement, and well-being of students and their teachers.

The Victorian Space Science Education Centre (VSSEC) had secured funding from the Victorian Challenge and Enrichment Series (VCES) as part of the Student Excellence Program (SEP) to develop teaching and learning materials for students between 5 to 18 years of age. VCES has outlined that 100,000 Victorian (Australia) high-ability government school students are provided enrichment opportunities across the curriculum. With students identified by the Victorian government host school, VSSEC has used project-based learning (PBL) to deliver two initiatives. The first, 'Radio Astronomy – The Invisible Universe,' allows high-ability students in Years 7 to 12 to use a research-grade radio telescope to search for and map celestial objects. The second, 'STEM Clubs' initiative will provide teaching materials (such as Optical Telescopes, CanSATs and Water Rocket equipment) and professional development for teachers in rural and regional areas of Victoria to start, or further develop, STEAM initiatives within their school. The PBL framework is used to support the delivery of these programs in schools. PBL provides a way for students to learn or continue to develop problem-solving skills. We focus on the development of two skills, student voice and agency, so that students can make informed decisions or reconsider how they might pursue STEAM in further education.

This paper outlines a qualitative and thematic case study across two rounds of VCES funding (2020 to 2022 with 10,745 participants, and 2023 to 2025 with current 4516 and projected 8,800 participants) in three categories: The first is to measure the reach and engagement of these programs for students in rural and metropolitan schools assessing their attitude at a single point in time; the second outlines the development, delivery, adaptations made by teachers to integrate within a host school's curriculum, and ongoing sustainability of delivery and perceived impact of growth-mindset; and the third proposes further research on changing mindset using a theory of change.