SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)
Lift Off - Primary and Secondary Space Education (1)

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ROBOTIC MISSION TO MARS: HANDS-ON, MINDS-ON, WEB-BASED LEARNING

Abstract

Problem-based learning has been demonstrated as an effective methodology for developing analytical skills and critical thinking. The use of scenario-based learning incorporates problem-based learning whilst encouraging students to collaborate with their colleagues and dynamically adapt to their environment. This increased interaction stimulates a deeper understanding and the generation of new knowledge.

The Victorian Space Science Education Centre (VSSEC) uses scenario-based learning in its Mission to Mars, Mission to the Orbiting Space Laboratory and Primary Expedition to the M.A.R.S. Base programs. These programs utilise methodologies such as hands-on applications, immersive-learning, integrated technologies, critical thinking and mentoring to engage students in Science, Technology, Engineering and Mathematics (STEM) and highlight potential career paths in science and engineering.

The immersive nature of the programs demands specialist environments such as a simulated Mars environment, Mission Control and Space Laboratory, thus restricting these programs to a physical location and limiting student access to the programs. To move beyond these limitations, VSSEC worked with its university partners to develop a web-based mission that delivered the benefits of scenario-based learning within a school environment.

The Robotic Mission to Mars allows students to remotely control a real rover, developed by the Australian Centre for Field Robotics (ACFR), on the VSSEC Mars surface. After completing a pre-mission training program and site selection activity, students take on the roles of scientists and engineers in Mission Control to complete a mission and collect data for further analysis. Mission Control is established using software developed by the ACRI Games Technology Lab at La Trobe University using the principles of serious gaming. The software allows students to control the rover, monitor its systems and collect scientific data for analysis. This program encourages students to work scientifically and explore the interaction between scientists and engineers.

This paper will present the development of the program, including the involvement of university students in the development of the rover, the software, and the collation of the scientific data. It will also present the results of the trial phase of this program including the impact on student engagement and learning outcomes.