SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)
"Hands-On" Space Education (1)

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SIMULATING THE ESA CONCURRENT DESIGN FACILITY USING GAMES TECHNOLOGY

Abstract

Computer games offer more than an opportunity for escapism; they also have potential as teaching and learning tools. These "serious games" have an explicit and carefully thought-out educational purpose and are not intended to be played primarily for amusement.

The Victorian Space Science Education Centre (VSSEC) is working with the Centre for Games Technology at La Trobe University to utilise the "serious game". A range of programs have been developed, including the Mission Control software for the Mission to Mars and the Mission to the Orbiting Space Laboratory. The use of this software in conjunction with hands-on activities, problem solving and teamwork has been demonstrated as effective for the teaching of scientific concepts.

The latest programs at VSSEC to utilize this approach simulate the Concurrent Design Facility (CDF) at ESA-ESTEC. The physical environment and software simulates the CDF, with students placed in teams representing the different aspects of the design process. Students assume the roles of scientists, engineers, payload integration specialist, manufacturing and testing officers and accountants/insurers. The immersive nature of the program provides a real-life context and purpose to what students might otherwise consider disjointed information.

In the junior program students are presented with eight Australian payloads that have flown in space. Working in groups, the students must negotiate which four payloads will be selected for launch. The use of data from real payloads broadens the students understanding of the type of activities and research conducted in the space environment, and the real world limitations of budget, power, launch vehicle volume and the desire to maximize scientific return.

The middle school program uses the same premise whilst introducing more advanced scientific concepts. Students are asked to select scientific instruments and sensors for a Mars rover. The same limitations of budget, power, weight and volume apply, but the emphasis is placed on the use of sensors for data collection. After selecting their instruments students analyse the data collected to expand their understanding of the geology of Mars.

Skills such as teamwork, communicating ideas, conflict resolution, problem solving, and data analysis and interpretation, all requite higher order skills that are difficult to develop within a traditional school environment. The use of the "serious game" can provide a stimulating and relevant context for engaging students in science education, and produce scientists and engineers with the skills needed to meet the demands of the new team-based work environment.