

Information Technology Experiences Using Simulated Tele-Science Exploration of Mars (ITESTEM)

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Abstract

To promote the advancement of Native American and Hispanic students in Information Technology (IT) and Science, Technology, Engineering and Math (STEM) careers Southwestern Indian Polytechnic Institute (SIPI) proposes to develop a year-round robotics centered IT immersion program that will provide students a stimulating learning environment to explore their curiosity and creativity in IT and stem fields. To expand the impact of the program, and the number of students reached, SIPI will partner with three regional high schools with predominantly Native American student population. Utilizing SIPI's experience in program development these Tribal Colleges (TCU's) will develop and implement similar programs from their campus to reach out to underrepresented students in their local communities.

The robotic elements of this program will focus heavily on performing remote science operations, akin to the Mars Exploration Rovers, to provide an interesting and technically rich IT environment for students to learn. Students will get hands on experience in operating robots from remote locations to emphasize the importance of computers for computation and control, and communication networks to transmit and receive information. Additionally students will work directly with robots to program them and configure them with various science and technology payloads. The concepts of system integration will be learned through these experiences to create a big-picture understanding of how IT infrastructure impacts science and technology systems.

The intellectual merit of this program lies in its application of a globally recognized high technology accomplishment, the exploration of Mars with robots, and bringing those same concepts to high school students so they can experience first hand many of the technologies that make these missions possible. Without an engaging context to learn IT and STEM disciplines, students can easily be attracted to other prospects and may find little motivation for engaging in the hard work of studying STEM and IT at higher levels. Few if any professionals working in the STEM industry chose their field because it was difficult. They likely chose it because at some point the possibility of creating something bigger than themselves seemed possible.