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BUILDING BRIGHT FUTURES: STEAM AND RURAL EDUCATION FOR SPACE SCIENCE TEACHING

Abstract

STEAM (Science, Technology, Engineering, Arts and Mathematics) education is essential for the development of key skills. In rural communities in Mexico, limited technological infrastructure and disinterest in STEAM restrict access to meaningful education. According to the National Survey on Access and Permanence in Education (ENAPE) 2021 from National Institute of Statistic and Geography (INEGI), only 26.2% of students aged 3 to 29 in public education use laptops, compared to 69.8% who use cell phones. The STEAM approach provides young people between 14 and 18 years old with opportunities to develop essential 21st century skills, fundamental in Higher Secondary education. This model promotes creativity, critical thinking, problem solving and innovation, allowing students to acquire technical knowledge and develop transversal skills such as collaboration, communication and adaptability. In response to this need, we propose the "Sherp Project", an educational robotics kit that allows young people to emulate space and planetary exploration missions in an interactive and realistic way, using a Martian Rover controlled by a mobile application. This approach not only improves logical and computational thinking, but also fosters social-emotional skills, teamwork, and decision making. Sherp Project will immerse students in challenging scenarios, enhancing interdisciplinary learning and skills such as leadership and teamwork. We will use Project-Based Learning (PBL) and the STEAM approach as main pedagogical tools. Our research will adopt a mixed approach: Action Research to adjust pedagogical implementation, Case Study for in-depth analysis, Qualitative Research to explore student perceptions, and Quantitative Research to measure learning outcomes. To evaluate the impact of the project, we will conduct before and after assessments focused on STEAM knowledge and interest in space exploration, using questionnaires to assess changes in attitudes, and observations to document the development of soft skills. This evaluation strategy will allow us to validate the effectiveness of the "Sherp Project" and its contribution to education at the high school level.