

Middle School Science Using Robotics For ESL Students

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There is a need for more effective science teaching strategies for science teachers with large numbers of English-as-a-second-language (ESL) students in grades seven and eight. The nature of science lends itself well to concrete activities that offer students the opportunity to, not only learn English vocabulary, but to gain a better grasp of concepts when they are associated with inquiry and hands on learning. We will present the results of a project¹ that used robotics to teach MS physics to ESL students. The project was in collaboration with engineering, physics, education and the local school district to train middle school (MS) science teachers with high minority populations. The paper will describe how robotics was used (i) to address the physics part of the grade eight state physical science content standards (Nevada Department of Education, 1998), and (ii) to indirectly address the national science education goals of promoting science literacy and inquiry thinking in all students (NRC, 1996). We also address the connection of robotics to physical science content and pedagogy, as well as engineering principles. We explain how this was used to motivate students by connecting science to society. Even though the results of this project are directed at predominantly ESL students of Hispanic origin, the paper will address the issue of improving student achievement in multicultural societies. It will focus on the need for both different teaching strategies and different curricula for underserved ESL students in grade eight science to improve their science achievement. It will also discuss why underachieving students need curricula that apply and connect science to societal needs more than students from generally more affluent families.

The content is significant in several ways. First, pedagogical content knowledge and curriculum to make science more interesting to underserved students will be discussed. Second, the possibility that better science teaching strategies may motivate more underserved students to pursue more challenging science courses will be discussed. Last, the potential for increasing job opportunities and increasing the human pool for Science, Technology, Engineering and Mathematics (STEM) in a technology driven society will be discussed.

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