Proposal for the Acquisition and Implementation of

Nao Robot

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Rationale

      The purpose of this technology proposal is to aid in the decision making process for the acquisition and implementation of a Nao Robot into the A. Harry Moore School. This Robot will not only serve as a means for differentiated instruction and lesson enhancement in all classrooms but will be utilized in a research project studying the effects of humanoid robots on language acquisition in preschool disabled students with significant language delays. Its unique capabilities which include speech, speech recognition, facial and picture recognition and intricate movements will be utilized to enhance New Jersey Core Curriculum Content Standard aligned lessons throughout the building. Additionally, the Nao robot will be used to introduce the concept of basic coding to a select group of older students.

Background Research

      With the rapidly advancing development of robot technologies, their use within the teaching and learning environment has become a trend. The development of collaboration, communication and problem solving skills seen in students today has been attributed to the use of robots in education. However, "there are few studies which discuss robots in language instruction" (Chen and Chang, 2010). Several studies have been conducted over the years outlining the positive effects of humanoid robots on children with Autism Spectrum Disorder (ASD). In a study done by Huanghao Feng (2014), social robots were used either individually or in conjunction with caregivers to improve social skills of individuals who have social behavioral deficits. Aresti-Bartolome and Garcia-Zapirain (2014) concluded that the use of robots can assist children with special needs in the area of social skills due to their fixed and predictable behavior. Additionally, advanced computer science students at Wayne Hills High School in New Jersey were able to program Nao to "help autistic kids interpret daily information regarding facial and

hand expressions, taking away fears and allowing them to feel more at ease" (Winters, 2014). These findings are the basis of our proposed research study on language acquisition in preschool disabled students.

Policy Consideration

The National Educational Technology Plan (2010) describes a model of learning that "calls for engaging and empowering learning experiences for all learners." Teachers need to consciously make an effort to align materials and methods with what people need to know, and how they learn. We are implored to bring state-of-the art technology into learning to "enable, motivate, and inspire all students, regardless of background, languages, or disabilities, to achieve." (NETP 2010) The acquisition of a Nao robot would successfully fulfill these requirements set forth by the U.S. Department of Education.

Current State of the Field

Science, technology, engineering, and mathematics (STEM) education has a significant role in schools today. Schools in the United State, and throughout the world, are finding creative and innovative ways to infuse technology and engineering into their curriculum.

Developed by French robotics company Aldebaran Robotics, Project Nao was first launched in 2004. In 2008, the Nao Academics Edition was developed for research and educational purposes by universities and laboratories. "As of 2015, over 5,000 Nao units are in use in 50+ countries." (Cahill, 2015) Given the success of the Nao robot in schools worldwide, the introduction of Nao into A. Harry Moore would enhance the culture of learning.

Description

One Nao Robot will be purchased from Teq Inc. with funds obtained through our annual technology budget. The robot will be housed in the technology lab and will be the responsibility of the school technology coordinator. The technology coordinator will attend all trainings provided by Teq, Inc. and will subsequently turn-key all relevant material to administrators, faculty and staff. After meeting with each teacher interested in implementing Nao into a specified lesson and programming the robot for each task, a schedule will be implemented. Assessments will be conducted by the technology coordinator and all participating classroom teachers and therapists.

Assessment Plan

"There seems to be universal agreement that a major aspect of technological implementation in the schools should be whether such applications actually do improve teaching and learning and increase student achievement" (Noeth & Volkov, 2004). Assessment of the use and effectiveness of Nao in the classroom will encompass several methods. Classroom teachers will be required to fill out a survey describing student interactions including eye contact, verbal interactions, and if learning outcomes are being achieved. Pre and post tests will be administered for learning outcomes that are concrete and measurable. The data collected by Nao during interaction sessions will also be used to implement an innovative preschool language acquisition program.

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