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UVU Students Reinvigorate Science And Math Curriculum With Elementary Robotics Program

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Beginning in January, following the end-of-school bell, 5th and 6th graders in the Alpine School District didn't rush home to their video games and computers. Instead, they picked up an entirely new type of technology — one students, parents and educators can all be excited about — robots.

Nearly a dozen elementary education majors from Utah Valley University have teamed up with the Alpine School District and local business Learning Through Robotics to offer a 10-week robotics program designed to open young minds to the boundless opportunities available to them in the fields of science, technology, engineering and math.

The partnership is the brainchild of UVU School of Education faculty members Vessela Ilieva and Elaine Tuft, whose goals are two-fold:

"We hope to catch students early on and build their interest in STEM subjects and careers, which are becoming increasingly important in our world," Ilieva said. "At the same time, this project will help UVU education majors gain more practical experience teaching children, especially teaching math. This hands-on experience will increase our graduates' marketability and confidence."

Research shows that by middle school, most students have decided whether they are good or bad at math and whether they like it.

"This is an opportunity to show students that the STEM subjects are all related and to develop a good attitude toward them," Tuft said. "Robotics bring all four of these subjects together."

The program is being financed with funds from a UVU GEL grant, a contribution from the Alpine School District and a generous donation from Renya Kikuchi, chairman of Learning Systems Japan.

The robots, provided by Learning Through Robotics, include Lego's Mindstorm sets and other equipment, including programmable robotics construction kits and software that allow students to first build a robot and then configure its behavior using the software and sensors.

"By the time the course is over, students will have built an educational robot and programmed it to get their robots to complete certain tasks. This requires basic engineering and math application principles. The entire program is focused on problem solving and hands on application of STEM subjects. They will have learned how to manage a project from beginning to end and build teamwork," said Jay Jayaseelan, owner of Learning Through Robotics. "We already have students who hated math or science and refused to do homework picking up textbooks to figure out how to make their robot do these challenging tasks. We have kids who were quiet and shy jumping right in and having fun, and the parents can't believe it."

The program is available four days a week, Monday through Thursday. Each Friday, UVU's student teachers are trained on the lesson they will teach the following week. More than 500 elementary school students from 15 schools attend one of the numerous sessions once a week.

During the first week of classes, Saratoga Springs' Ben Everitt, an elementary education major at UVU, taught the first round of lessons to more than 70 students at two schools in Lehi and Highland, Utah.

"I walked in the door and it was like the day before Christmas for the kids," he said. "They were so excited to build robots. By the end of class, they had built the robot base and wired the motor. When class ended, they were bombarding me with questions, wondering what the next step would be."

"The highlight for me is seeing the range of kids — boys, girls, athletes and academics — and they're all making connections and getting excited about learning," Everitt said. "Seeing the light come on when they realize that STEM is everywhere around them and seeing them get excited about robotics in the home and in the world is really rewarding."

Participating students completed a survey prior to the program related to their attitudes about robotics, STEM subjects and their interest in pursuing a career in a related field. They also completed a content test to determine their mathematics and robotics programming proficiency. These surveys will again be administered following the program's completion to determine its effectiveness. The Alpine School District will also hold a showcase at the end of the program, to allow students to demonstrate what they have learned. Once proven successful, Ilieva and Tuft hope to be able to expand the program into other local schools, depending on the availability of grants and other funding.

"The way the world is changing, there is going to be more and more demand for people with skills in these areas, but Utah historically has not produced enough of those people," Ilieva said. "We want to change that, and we need to start early. Utah is rich in technology-based companies. We just need to begin building the people they need to continue progressing."



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