IMPACT

Robotics education in rural schools promoted by 4-H school enrichment

AT A GLANCE
Using 4-H computer science curriculum in school enrichment programs, over 1,000 students have been exposed to robotics and programming in Washington and Payette county.

The Situation
Idaho 4-H has been at the forefront of providing robotics, programming and computer science education in Idaho. Computer science has become a new basic skill, essential in order to excel in an increasingly computational and data-intensive world.

However, access to computer science at the K-12 levels remains limited. Computer science is taught in less than 25 percent of U.S. high schools. Rural and high-need schools are even less likely to offer it.

Computing occupations make up to 2/3 of all projected new jobs in Science Technology Engineering and Mathematics (STEM) fields according to the bureau of Labor Statistics. Computer science is the second highest paid college degree, just after engineering graduates.

Developing computer science teachers who can support students in learning computer programming is a challenge for schools, especially rural schools. Teachers without a background in computer science are intimidated by the curriculum and technology options.

4-H has curriculum to teach students of all ages the basics of robotics, programming and computer science using hands-on activities. One 4-H delivery model is school enrichment which provides the opportunity to teach 4-H curriculum in the traditional classroom.

Students at Fruitland Elementary show off their robotic plane built with LEGO We-Do robotics kits during a 4-H school enrichment activity.

Our Response
University of Idaho Extension, Washington County 4-H program has offered school enrichment robotics programs to Fruitland Elementary, Fruitland Middle School, Weiser High School and Weiser 21st Century Grant Afterschool program.

The first school enrichment program was offered at Fruitland Elementary talented and gifted program. Seven lessons using 4-H curriculum with We-Do LEGO robotics kits were taught. This sparked parent interest in computer science education which led to a one hour project being taught to every student in the 3rd-6th grade in Fruitland, exposing 600 students to computer science education. As a result of the in-school enrichment, the Fruitland parent teacher program purchased ten LEGO WeDo robotics kits for use by all elementary teachers. A one credit professional development course was offered to the teach-

ers to prepare them to use the kits in their classrooms. Fruitland Middle School purchased LEGO Mindstorms kits to offer an elective course in robotics.

This is not the only case of school enrichment leading to increased access to computer science curriculum. Weiser afterschool program also purchased LEGO WeDo kits for their use after being introduced to the program through 4-H school enrichment.

UI Extension, Washington County 4-H program provided support at the high school level in cooperation with a new computer science curriculum which has a robotics unit. The UI Extension office loaned LEGO Mindstorms robotics kits for a semester to Weiser High School and provided teacher training. Fruitland High School is utilizing the same curriculum and sought the advice of UI Extension on purchasing and use of the robotics kits.

Comments from administrators and teachers:

"The excitement that students show when they are engaging with robotics is rarely shown with other forms of teaching. It is a combination of critical mathematics sequencing and imagination." — Jared Olsen, Fruitland Elementary Principal

"Building and programming robots develops problem solving skills and practical reasoning. This is especially important with the new Common Core Standards. Students love the hands-on learning and the challenge." — Renee Sweet, Weiser After School Program Coordinator

"As a small rural school in Idaho, WHS is a leader in providing computer science education to its students, and none of this would have been possible without the help of Montessa Young through robotics." — Joey Endicott, Weiser High School Computer Science Teacher

"I want to thank you for the wonderful work you did with our elementary and middle school students. It was so great to see students so engaged and to see how much they loved such an educational experience." — Teresa Fabricius, Fruitland Schools Superintendent

"Ms. Young was extremely knowledgeable and her passion for the subject was contagious. Parents of students involved were so impressed that they convinced the PTO to use funds to purchase 10 We-Do kits for the elementary school." — Kathy Johnson, Fruitland Elementary Talented and Gifted Teacher

Program Outcomes
Through the 4-H computer science school enrichment programs, over 1,000 students have been exposed to robotics and programming in Washington and Payette counties. 4-H has been able to significantly increase access to computer

science beyond the one time school enrichment activity. With robotics kits available for regular use in the classroom and school courses being offered, students are now receiving comprehensive computer science education that will prepare them for careers in computer science. This is a career field in high demand with higher than average wages leading to increased prosperity for rural Idaho students.

These school enrichment programs have also increased the visibility of 4-H STEM programs. UI Extension, Washington County is now being asked to provide trainings and advice to multiple programs, even across state lines.

In the Future
National 4-H Common Measures evaluations will be conducted in the future to provide statistics on the effectiveness of the school enrichment program.

FOR MORE INFORMATION

Montessa K. Young, Extension Educator
Univ. of Idaho Extension, Washington County
485 E. Third
Weiser, ID 83672
Phone: 208.414.0415
E-mail: montessay@uidaho.edu

Timothy G. Ewers, 4-H Youth Dev. Specialist
University of Idaho Extension
875 Perimeter Drive, MS 3015
Moscow, ID 83844-3015
Phone: 208.885.4080
E-mail: tewers@uidaho.edu

Suzann H. Dolecheck, Extension Educator
University of Idaho Extension, Twin Falls County
630 Addison Ave. W., Ste. 1600
Twin Falls, ID 83301
Phone: 208.734.9590
E-mail: sdolecheck@uidaho.edu