New Lab School Puts Digital Fabrication Technologies in the Hands of Middle Schoolers

- By David Nagel
- 11/04/13

Charlottesville City Schools has opened the first in what is expected to be a string of lab schools that will put advanced manufacturing technologies in the hands of middle and high school students and serve as a training ground for science teachers.

The school, the Buford Engineering Design Academy, is part of a National Science Foundation project being conducted by researchers in the Curry School of Education and the School of Engineering and Applied Science at the University of Virginia. The project is led by Glen Bull, UVa professor and co-director of the Center for Technology and Teacher Education. The academy is housed at Buford Middle School.

The aim of the Buford Engineering Design Academy is twofold. First, it aims to advance Next Generation Science Standards by integrating engineering into the science curriculum, specifically through the application of digital manufacturing technologies like 3D printing and computer-controlled die cutters. Second, it aims to help prepare educators to use the technologies in their teaching and help to boost the emphasis of engineering in STEM education.

"The next-generation science standards call for making science and engineering equal, but there are no science teachers today trained to teach science and engineering and, even more importantly, there are no professors of science education prepared to train teachers to teach science and engineering," Bull said in a statement published by the NSF. "We wanted to change this."

Middle school educators participating in the project teach for half a day at the academy and spend the other half at the University of Virginia learning about manufacturing techniques. In addition, the academy will be linked via video to the university, "enabling UVa professors and students to offer lessons and develop innovations for the participating laboratory schools," according to NSF.

Bull added: "Integrating engineering design into science teaching is an important but challenging goal. The engineering design academies provide a test bed for developing effective practices."

Additionally, the Buford teachers receive support from another group of teachers working through the NSF. The two groups meet weekly and share pedagogical approaches, which are piloted in the Buford academy. The NSF explained: "To help set the stage for K-12 schools successfully adopting science and engineering teaching and technologies, Bull is working with a group of teachers assigned to NSF through the Albert Einstein Distinguished Educator Fellowship Program. Led by elementary science, engineering, mathematics and robotics teacher Kaye Ebelt, the teachers have established a lab within NSF's Engineering directorate that
parallels classroom manufacturing technologies found in the Lab School. The Einstein Fellows meet with the Lab School teachers each week to pioneer new pedagogical approaches to incorporating engineering design into science teaching. After these approaches to science teaching are piloted in the Lab School, they will be disseminated nationally.

The academy — and the others that will follow — is part of the FabLab Classroom, a project of the NSF-supported Innovative Technology Experiences for Students and Teachers program. It was funded by the Commonwealth of Virginia, the NSF, the City of Charlottesville, and Charlottesville City Schools itself, which provided $1.4 million in matching funds toward the academy, according to the NSF. Three additional academies are currently expected: one at Charlottesville High School and two in a neighboring school district, Albemarle County Public Schools, at Jack Jouett Middle School and Albemarle High School.

"We like to see this kind of impact from a research project where NSF has made an investment," said NSF Assistant Director Joan Ferrini-Mundy, who leads the agency's Education and Human Resources directorate. "As there is more and more emphasis on teaching engineering concepts in K-12 classrooms, it's crucial that we understand the most effective strategies for student learning. The resources brought together through this partnership are building on the initial project and increasing its scope and reach. That's very exciting."

Additional details can be found on Buford Middle School's site.

About the Author

David Nagel is the executive producer for 1105 Media's online K-12 and higher education publications and electronic newsletters. He can be reached at dnagel@1105media.com. He can now be followed on Twitter at http://twitter.com/THEJournalDave (K-12) or http://twitter.com/CampusTechDave (higher education). You can also connect with him on LinkedIn at http://www.linkedin.com/profile/view?id=10390192.