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3-D printer enlivens students' ideas in Plum

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By Annie Siebert / Pittsburgh Post-Gazette

In the corner of Jason Steele's classroom at Oblock Junior High School in Plum, two 3-D printers whirred softly as they slowly created two objects out of blue plastic thread.

Mr. Steele is using the four printers in his eighth-grade technology education classes to allow students to develop a three-dimensional object on a computer and turn it into a physical product.

The 3-D printers could completely change the way objects are manufactured -- instead of finding a supplier, ordering an item, paying for shipping and waiting for delivery, manufacturers will be able to make their own objects in a matter of minutes or hours.

Mr. Steele wants his students to be ready.

And it's important for them to learn a "digital language," he said.

In Phil Beatty's seventh-grade technology education class, students learn how to use Google's SketchUp software. When they get to eighth grade, they use the software to design an object that is created using the 3-D printers.

Mr. Steele said he instructs students to build something that is related to work that they are doing in another class. Students studying biology, for example, could design models of cells and then use the printers to create them.

One group of students with an interest in role-playing games wanted to create a 20-sided die, Mr. Steele said. The challenge was in the design: The students had to identify the angles and figure out how to hold it together. The die is smaller than a lime and feels nearly weightless, but it's very strong -- the plastic doesn't give at all.

"You use only the material you need to make the object, but it's strong because of its internal structure," Mr. Steele said.

Mr. Beatty said the Plum Borough School District administration and school board has been very supportive of STEM -- science, technology, engineering and mathematics -- education. The first 3 -D printer was funded through an innovation in teaching technology grant from the district. After that, the administration funded two more printers, which were built by Mr. Steele. Some of the parts on the from-scratch printers were made using the original 3-D printer, Mr. Steele said.

He said building the 3-D printers from the ground up is like constructing "a headache-filled Ikea cabinet." With some help from his 9-year-old son, he's working on building the third 3-D printer, which will go into Mr. Beatty's classroom.

Last week, Mr. Beatty's seventh-graders were building gum ball machines out of wood. Once he gets a 3-D printer, Mr. Beatty said, he'll allow students to incorporate items made with the 3-D printer into the wooden gum ball machines.

"We can get the best of both worlds in here," he said. "Learning to use tools, and use them correctly, is still important," despite the educators' emphasis on learning computer skills.

"Everyone, at some point in their lives, will have to use tools," Mr. Beatty said.

Mr. Steele said the ultimate goal is to have 3-D printers throughout the school because they have so many applications. Students in an art class, for example, could use the printers to create an M.C. Escher-esque structure.

The next thing Mr. Steele wants to procure (or build) is a device called a "filament extruder," which would melt down 3-D objects that didn't turn out as well as students had envisioned -- a plastic bin in his classroom contained what looked like a small, plastic tennis racket that had been partially run through a paper shredder -- and feed the melted plastic into a new spool.

Marissa Durst and Geoffrey Polley, both 13 and in the eighth grade, said they'd like to study engineering after high school. Marissa said she's fascinated with how quickly technology has progressed in her lifetime. Geoffrey said this class will give him a knowledge base for high school technology education classes.

"If I ever want to go into engineering, I have a head start that most people wouldn't," Geoffrey said.

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