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Help Wanted. A Lot of It.

Who's going to fill all the high-skilled jobs that a manufacturing resurgence requires? That's the question companies and governments are trying to answer.

By **JAMES R. HAGERTY**

MOON, Pa.—Tracey Spinelli recently led 18 of her students into a place college-bound kids typically shun: the school's tool and machinery shop.

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Ms. Spinelli, who works with "gifted" middle-schoolers in this Pittsburgh suburb, handed out kits containing pieces of pine wood, plastic tubes and syringes. Over the next 90 minutes, students glued together contraptions using hydraulic power—water squirted from the syringes—to lift or manipulate small objects.

"Each year there are more kids participating" in manufacturing-related projects, Ms. Spinelli says, "because they're seeing what the other kids are producing and saying, 'Ooh, let's do that.' "

Ms. Spinelli isn't the only one trying to get top students to get their hands dirty. Manufacturers, government officials and nonprofits across the country are looking for ways to get the country's brightest kids fired up about industry. They're setting up engineering contests, backing classroom projects where kids design everything from audio speakers to artificial limbs, and taking students on tours of factories.

Filling the Gaps

Despite high unemployment, manufacturers find themselves short of skilled candidates for many jobs, such as operating or programming computer-controlled cutting tools or repairing sophisticated machinery. Manufacturers also fret that the U.S. isn't producing enough engineers to design products and factory processes—and drive innovation.

Of course, there are vocational classes in many schools that teach skills needed in manufacturing and other fields. But those programs usually don't try to attract the top students. This new push is designed to spark interest among students who might not give



James Hagerly/The Wall Street Journal

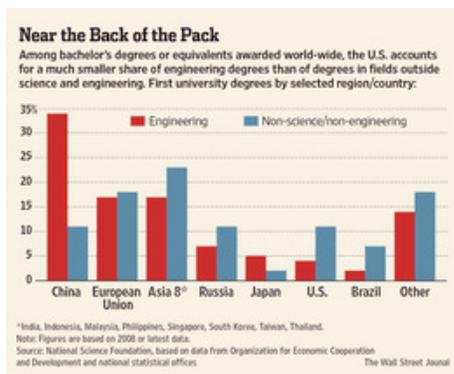
Learning about hydraulics at a middle school in Moon, Pa.

manufacturing a second thought otherwise.

"What's at stake is our mantle of economic leadership around the world," says Jay Timmons, chief executive officer of the National Association of Manufacturers.

In 2008, the latest year for which comparable data are available, about 4% of bachelor's degrees awarded in the U.S. were in engineering, compared with 17% in Asia overall and 34% in China, according to the U.S. National Science Foundation.

These worries are compounded by the looming retirement of millions of baby boomers with hard-to-replace skills. The median age of people employed in U.S. manufacturing is 45, and 23% are 55 or over, according to the Labor Department.



Groups with a stake in manufacturing and in science, technology, engineering and math education are rolling out a range of efforts to snare those kids.

The National Tooling and Machining Association tries to excite high-school students' interest in making things by sponsoring the National Robotics League, in which kids make robots that fight one another in competitions.

The University of Virginia, using a \$1 million grant from the National Science Foundation and other funding, is piloting a program that enlivens science lessons by coupling them with engineering-design projects. Primary- and secondary-school students in Charlottesville, Va., and Albemarle County, Va., are designing and making their own audio speakers after learning about sound waves.

Project Lead the Way, a nonprofit based in Indianapolis, supplies educational programs for thousands of middle and high schools across the U.S., encouraging students to consider careers requiring math and science skills and teaching them problem-solving skills. High-school students in the Kansas City area recently designed such things as a head-cooling football helmet and a foot pedal to flush toilets.

With funds from a foundation sponsored by the Society of Manufacturing Engineers, students at a high school in Calera, Ala., have learned to make artificial limbs for donation to poor people in Honduras.

Some companies think they can win kids over by giving them an inside look at their operations. The National Association of Manufacturers last year started promoting an annual Manufacturing Day on which factory owners are urged to open their doors to students and others. Likewise, [Kennametal](#) Inc., a maker of metalworking tools, alloys and other materials, based in Latrobe, Pa., is trying to counter perceptions of factory work by holding tours.

"People still think that factories are dark, dirty and dangerous, and that the jobs are dull," says

Carlos Cardoso, CEO of Kennametal, which also sponsors a program to get high schoolers interested in engineering. "That was the factories of 50 years ago. We really need to change the perception."

Winning Over Kids

Nathan Schomer, who lives near Latrobe and took part in Kennametal's high-school program, took a tour of a plant in Solon, Ohio. He noticed that the factory was clean and that the machines were controlled by computers, not people pulling levers. "That's just not how you imagine manufacturing to be," Mr. Schomer says.

A 2013 high-school graduate, Mr. Schomer has enrolled in an engineering program at Drexel University in Philadelphia. He says he would consider working for a manufacturer like Kennametal, though he may want to start his own business.

Some kids don't need much encouragement. Xander Luciano, who recently completed his sophomore year at Esperanza High School in Anaheim, Calif., says he has always enjoyed taking machinery apart. He chose Esperanza partly because it has a sophisticated machine shop. A few months ago he spotted the nearby plant of Pacific Contours, a maker of aerospace parts, and walked in to ask about internships. "I almost got myself kicked out because they thought I was some random kid off the street," he says, but he ended up getting the summer job.

Eventually, he aims to get an engineering degree. Boomer retirements will leave "a huge gap in the workforce, which I'm hoping to fill," he says.

Mr. Hagerty is a staff reporter in The Wall Street Journal's Pittsburgh bureau. He can be reached at bob.hagerty@wsj.com.

Corrections & Amplifications

The National Tooling and Machining Association tries to excite high-school students' interest in making things by sponsoring the National Robotics League. An earlier version of this article incorrectly identified the program as the BattleBots IQ program.

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