

Community Case Study

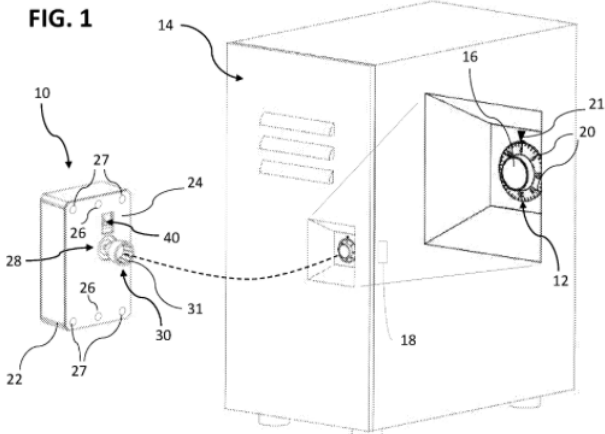
INVENTION AND STEM EDUCATION TRANSFORM RURAL SCHOOL IN MICHIGAN

Teachers and students at Michigan’s Williamston High School Math and Science Academy found themselves Grand Marshall of a hometown Jubilee parade after their Lemelson-MIT InvenTeam™ invention earned them a trip to the 2013 White House Science Fair to present their invention to President Barack Obama.

For a group of students who had to clear out an old photography darkroom just to have a workspace for their InvenTeam, this was truly the Big League. Little did they know that just a few years later, another Lemelson-MIT InvenTeam invention would add a U.S. patent to their growing roster of achievements.

Williamston is a small rural community in Michigan with a population of just under 4,000 residents. The high school first introduced the Math and Science Academy in 2007, officially welcoming its first freshman class in the fall of 2008. The academy featured a technology course, but Dan Schab, math teacher and then-director of the Math and Science Academy, felt students needed more opportunities to prepare themselves for science, technology, engineering and math (STEM) in college and their careers.

Schab spotted a small advertisement in an education magazine in 2010 for the Lemelson-MIT InvenTeam initiative, which awards an up to \$10,000 grant to high school students to follow an invention from idea to working prototype. That year, Williamston High School was chosen as a finalist and Schab was invited to attend the Lemelson-MIT Program’s EurekaFest event at the Massachusetts Institute of Technology (MIT) in 2011 to learn more about InvenTeams. However, Williamston High School didn’t win the grant that year. Schab didn’t give up. He continued to work with his 11-student team that fall with enough insight to help them make another go at the grant.



Their persistence paid off. The students won a grant for their Offshore Rip Current Alert (ORCA) System invention. Each year, the dangerous rip currents of the Great Lakes result in drowning deaths. The students created a solar-powered buoy that could detect rip currents and alert swimmers in real time. The invention caught the eye of the director of the Great Lakes Research Center at Michigan Tech University. The director had previously taught at the University of Michigan and had been supportive of the students' work on ORCA.

Schab was amazed by the students' success, including the trip to the White House Science Fair, considering they had no tools or expertise when they first pursued the InvenTeam grant. He credits the Williamston community, including manufacturer Bekum America Corporation, for filling in the knowledge and material gaps for design and fabrication.

“ We don't have the facilities or equipment that many of the larger schools have. We knew to win the grant, we'd have to show the community support. ”

– Joe Rasmus

Schab shared that advice with Joe Rasmus, a math teacher who assumed the Williamston High School Math and Science Academy directorship after Schab's retirement in 2013.

By then, the students who won the 2012 InvenTeam grant had graduated and were pursuing education in mostly – though not all – STEM fields. One student studied a non-STEM discipline, accounting, in large part because of her role as accountant for the InvenTeam, managing the team's budget and finances.

Schab also warned Rasmus about the time commitment required for InvenTeam educator leads, estimating he put in well over 1,000 hours. With his role as head of the academy and family responsibilities, Rasmus admits the InvenTeam project is an added demand. He says he wouldn't

trade “the bond he formed with that group of students” for anything. “It's beyond what you would have in a regular classroom,” he says.

Rasmus acknowledges that Schab's experience with the InvenTeam has proven invaluable to his team, which won the second InvenTeam grant for Williamston High School in September 2015. They considered several ideas on how to solve real-world problems and settled on a device to help students with disabilities who struggled to open their school lockers. Their inventive device allows students with disabilities to program their locker combination once and set it atop the traditional lock so it can automatically turn the lock knob for them each time.



The students, who still were using the old darkroom as their workspace, posted a nameplate on the door labeling it the “InvenTeam” room. Over the years, the teams had been able to amass some key technology, including a 3-D printer. They still rely heavily on their relationship with community partners to take their invention over the finish line.

One relationship in particular has proven invaluable to the 2015-2016 InvenTeam. Trent English, a local patent attorney and parent to Williamston students in lower grades, had been watching the InvenTeam's successes over the years as well as the media coverage. He emailed Rasmus to offer his legal services after he read a local news article about the team. The team reached out to him as they got closer to EurekaFest, where they showcase and present their completed invention to the MIT community. He donated all costs associated with securing a patent and, in October 2017, the team was awarded U.S. Patent No. 9,803,390.

“When you put it down in writing, it’s amazing how quickly things have progressed at Williamston High School,” Schab says. “Back in 2011, we were looking through online catalogues trying to find parts that would fit our needs. In 2016, the Williamston InvenTeam 3D-printed the parts they needed. In 2011, I am cleaning out an old dark room to use as a work space. In 2017, Joe and his team are granted a [utility] patent for their work.”

Ramus current class of students is already asking questions about the InvenTeam initiative and expressing interest in being on a team. He also uses the InvenTeam experience to entice younger students to focus on STEM and to consider attending the Math and Science Academy. And Schab says he’s always willing to help from the sidelines of retirement.

“ It’s very clear to me that the InvenTeam initiative has had a significant, positive impact on not only the student members of our two InvenTeams, but also the teachers involved, and in many ways our wider school community. InvenTeams helps you become a better teacher. I learned to raise my expectations for students and what they can do and how powerful the collaboration aspect is. The knowledge and enthusiasm you share is unmatched. ”

– Dan Schab

ABOUT LEMELSON-MIT INVENTEAMS™

Lemelson-MIT InvenTeams are teams of high school students, educators, and mentors that receive grants up to \$10,000 each to invent technological solutions to real-world problems. The InvenTeam initiative is administered by the Lemelson-MIT Program, a sponsored program under the School of Engineering at the Massachusetts Institute of Technology. The Lemelson-MIT Program is funded by The Lemelson Foundation. Learn more at lemelson.mit.edu

