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New school aims to impact both education and employment barriers

By Laurie Trotta Valenti, Ph.D.

[The Help Group](#) has long known that many of its students love technology. The particular learning style of people diagnosed with autism often includes heightened visual discrimination skills and the ability to focus deeply. But recently, leadership also began to take notice of studies* by economists indicating that by 2018 the U.S. will experience a severe shortfall of workers to fill some 8.65 million jobs in high technology fields such as computers, biotechnology, robotics, cybersecurity, and more. They realized that, because of the predicted shortfall of workers, the abilities often observed among their students could soon become highly marketable among employers in these industries. They believed that their students could excel at those jobs.

But they also knew that capable students with unique needs can falter in traditional schooling that leads to skilled technology careers. This is often due to learning and social differences. Upon graduation, the number of unemployed people among this group can be as high as 85 percent.**

To address this gap, The Help Group team decided to develop a new program that caters to the *strengths* of high-functioning students, helping them cultivate skills and enter the pipeline to high technology fields, and ultimately helping fill the nation's gap for skilled workers. "There was a disconnect," says Ellis Crasnow, Ph.D., director of STEM3 Academy. "We have learned that to succeed with an innovative idea you must take risks, albeit calculated ones. Sometimes it's putting together things that seem at first glance not to fit, but in the end, work. We believed our

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students could advance through rigorous curricula if presented in the right environment.”

The idea first took shape in 2014 as a [Science, Technology, Engineering, and Math \(STEM\)](#) pilot program for middle and high school students at The Help Group’s [Village Glen School](#). With a small grant from [W. M. Keck Foundation](#), Crasnow, then the principal at Village Glen, oversaw installation of an Innovation Lab and Makers Space (areas for woodworking, electronics, computers, 3-D printers, Computer Numeric Control [CNC], Computer Aided Design [CAD], and other machines/resources). Within the pilot program, which consisted of computer science, robotics, rigorous math, and English courses, teachers observed students who had often been secluded come together and collaborate on team projects for the first time.

Part of the pilot program was the creation of a robotics team that competes in [FIRST Robotics](#), a national competition to conceptualize, build, program, and operate a robot. Pilot students vied shoulder-to-shoulder with the general population and took home the Rookie Award, enabling them to participate in the national competition. The success of the robotics team was a significant catalyst in garnering wider interest from parents of students not included in the initial pilot program. Encouraged by the success of the program and enthusiasm from parents, The Help Group conceptualized a new model for educating its students in grades K-12. The STEM3 Academy was born.

STEM3 Academy



View of the STEM3 Academy Innovation Lab with students working on projects

Using the lessons of project-based learning gleaned from the STEM pilot, the curriculum for [STEM3 Academy](#) was developed by fusing existing general and advanced placement STEM classes with 21st century skills of collaboration, creativity, critical thinking, and communication. As the school is the first of its kind, this is an



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ongoing development process. A clinical team from The Help Group works with STEM3 Academy educators to help students meet their goals based on strengths, needs, and abilities. Attention is given to pacing and collaborative projects involving building and engineering. Each course is developed as a prototype and refined as it advances through the process. “There is constant tweaking going on behind the scenes,” says Dr. Susan Berman, COO for The Help Group. Dr. Berman is one of the architects of the model, along with Dr. Crasnow and Dr. Diane Flannery, senior director of design and strategy. “A school is made of a thousand moving parts, and making one change triggers other changes.”

In the lower grades, classes focus on basic skills of building and making. Projects become increasingly more complex through the high school level, when students work with sophisticated technology, including a CNC machine, CAD (SolidWorks), power tools, and other technological resources. All classes are infused with hands-on, project-based challenges. For example, a student recently wrote a program to graphically illustrate the passage of travelers in *The Odyssey*. This combined computer science and English language arts, two disciplines that rarely go together. Many projects have real-world applications. In another project, a team designed and built a mobile hydroponic garden and interned with an IT department to apply their knowledge in a practical setting. Others have engaged in engineering challenges at [NASA’s Jet Propulsion Lab](#). Through projects like these, students become adept at technology skills such as coding, engineering, software, application development, robotics, and game design.

The STEM3 curriculum includes partnerships with business and industry. Most recently, [Raytheon](#) and [Northrop Grumman](#) have established relationships, which include inviting students to participate in their corporate student engineering days and visiting the school’s campus to discuss roles of different professionals. Northrop Grumman has provided financial support to assist with the robotics team and procurement of school supplies while Raytheon underwrote the STEM3 Academy’s [2016 Innovation Fair](#). Students benefit from job skills development to connect to future employment.

STEM3 Academy opened its high school in fall 2015 with about 25 students. STEM middle school opened in January 2016, and the elementary levels opened in August 2016. A new program for post high school young adults will be unveiled in 2017. Sustained growth will continue for the next three years, with the Academy ultimately enrolling about 115 students across all grades. Funding for STEM3 Academy comes from the W. M. Keck Foundation and donations from organizations like Raytheon and Northrup Grumman. School space was provided on renovated property already owned by The Help Group.

Early results from the first high school class indicate lower absenteeism, higher enthusiasm, and accelerated class participation compared to students' previous performance in those areas. 100 percent of STEM3 Academy students went on to college, and 75 percent chose STEM majors. The STEM3 model remains a work in progress, and The Help Group is considering next steps for scaling and expansion.

“Our advice is to look at the strengths of your community and take a step back to think where those strengths might be applied,” Berman says. “Start small and build out, and don’t be afraid to tinker with it until you have something truly special.”

* Studies showing coming shortfall of technology workers:

1. Revisiting the STEM Workforce (<https://www.nsf.gov/pubs/2015/nsb201510/nsb201510.pdf>)
2. “Short on STEM Talent,” US News and World Report, 15 September 2014. Retrieved from: <http://www.usnews.com/opinion/articles/2014/09/15/the-stem-worker-shortage-is-real>; Rothwell, “Still Searching,” 1.
3. National Academies, “Rising Above the Gathering Storm”; Council on Competitiveness, “Innovate America”; Business Roundtable, “Tapping America’s Potential.”
4. Shortfall in educated U.S. workers to worsen -study (<http://www.reuters.com/article/usa-economy-jobs-idUSL2N0F21JS20130626>)

** Employment rates of young adults with autism:

1. Young Adults With Autism More Likely To Be Unemployed, Isolated (<http://www.npr.org/sections/health-shots/2015/04/21/401243060/young-adults-with-autism-more-likely-to-be-unemployed-isolated>)
2. National Autism Indicators Report: Transition into Young Adulthood (<http://drexel.edu/autisminstitute/research-projects/research/ResearchPrograminLifeCourseOutcomes/indicatorsreport/#sthash.31Xld4lN.OTMdvVKa.dpbs>)

On a recent survey, CARF recognized STEM3 Academy for exemplary conformance to the standards stating, “The Help Group has truly achieved out of the box student learning with its STEM3 learning.”

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