Having a disability can actually benefit a STEM career

By Margo Pierce

What can someone who is unable to walk, hear or see or in some way function like the majority of able-bodied individuals contribute to science, technology or engineering? In STEM fields, which tend to be highly competitive and intellectually challenging, any kind of disability could be viewed as an impossible barrier. How could someone with a disability possibly work in a lab?

Ask Cary Supalo. He'll tell you that so-called disabilities can be STEM assets.

"In all my undergraduate lab work at Purdue (University) in the chemistry department, I did not break any glassware at any point on the road to my degree completion," says Supalo, a post-doc research scientist at Purdue who has been completely blind since the age of 7. "I had to be very organized in my workspace and really pay attention to where I put things and to communicate to my group members that they had to be verbally explicate as to where they put things. Because if they didn't, guess what's going to happen?"

Throughout most of his lab classes in high school and college, Supalo worked with a lab partner. He would explain the steps his partner was supposed to follow when conducting experiments or doing other work; that person would follow those steps, reporting back the results that were observed. But Supalo wanted hands-on experience in college, so he got creative.

"We did some bench-top organization of lab equipment – we kept all the chemicals away from the edge of the bench and away from the sink and had a trash receptacle within an arm's reach of where we worked," he says. "… And I had to pay more attention to detail.

"People with disabilities are innate problem-solvers," says Cary Supalo, who has been completely blind since age 7. Here Supalo is giving a presentation in Dortmund, Germany of how to properly light a Bunsen burner without vision. (Photo: Courtesy of Independence Science)

"Not having the direct, hands-on experience in this area, I think, is a major contributing factor as to why people with disabilities that use laboratory assistants as their interface with the completion of the laboratory goal don't end up pursuing a career path in science, technology, engineering and math.

"Put a non-disabled kid though a college degree program in science and … prohibit him from doing any of the laboratory manipulation. He's told what happens, but what's the likelihood that he's going to want to be a scientist? And it also goes back to a theory of…can they actually do it themselves? And the laboratory assistant mechanism, subconsciously or directly, reinforces that notion that they can't."

Some of the most frequently cited barriers to people with disabilities entering STEM fields are a lack of preparation for disabled students; access to programs, their facilities and appropriate equipment; and acceptance by educators and people in the workplace, employers and co-workers. The current numbers reflect the hard truth about the difficulty in overcoming these and other hurdles. Only 6.5 percent of "employed scientists and engineers" had a disability, according to the National Science Foundation's most recent data (2008). The definition of disability encompasses everything from a physical handicap (paralysis, blindness, cerebral palsy) to mental and emotional handicaps (attention deficit disorder, schizophrenia, bipolar disorder.)

Supalo, however, believes a disability makes a person uniquely qualified for STEM work.

"People with disabilities are innate problem-solvers," he says. "They've had to overcome their challenge and we … should give them the opportunity to apply their problem-solving skill sets to scientific questions."

He's not the only one who views a disability as an advantage.

"I agree that disabled individuals are uniquely qualified in the area of problem solving and creative thinking, simply because of the everyday challenges we face in our personal and professional lives," says Erica Penn, a scientist with Becton, Dickinson and Co. who is deaf. "This allows us to become more flexible and willing to try new things, to improve our interactions with the world around us.

"I truly believe my disability has taught me to focus a great deal and also to think and work much more independently than if I did not have a disability. Individuals with disabilities provide different and unique insights into the sciences based on their life lessons and experiences. For example, my deafness has given me a great visual acuity and concentration/focus that non-disabled individuals may not have.

"I have been fortunate to learn persistence and consistency in my studies and workplace relationships. I truly believe my disability has taught me to focus a great deal and also to think and work much more independently."

As the president of the Foundation for Science and Disability, Penn is actively helping others with disabilities to leverage their skills. The group describes itself on its Facebook page as "an affiliate of the American Association for the Advancement of Science (AAAS) in order to promote the integration of scientists with disabilities into all activities of the scientific community and of society as a whole and to promote the removal of barriers in order to enable disabled students to choose careers in science." In addition to providing scholarships to students with disabilities, some of the volunteer members also serve as mentors through the AAAS Entry Point! program, which offers "internship opportunities for students with apparent and non-apparent disabilities in science, engineering, mathematics, computer science and some fields of business."

Having a role model was important to Supalo, who worked with a blind chemist throughout his academic career. Finding such a guide to facilitate the academic work and entry into the workforce is easier than ever before, according to Penn, because of those with disabilities who were determined not to be stopped by their limitations or the biases of others.

"Perhaps discrimination was more prevalent in the past, but also opportunities were fewer in the past for disabled individuals. Current, academically successful individuals with disabilities have greater opportunities for employment in the STEM field," Supalo says. "As long as disabled students successfully pursue and matriculate in their bachelors and masters (and even Ph.D.s) in scientific fields, then more doors will open for them as the first stepping stones to a successful scientific career."

An important element to that access can only come from disabled individuals who can prove that any kind of disability doesn't automatically eliminate the possibility of success. Supalo had an opportunity to illustrate how being a scientist with a disability is an asset for accomplishing this goal.

"I was contacted by a blind student wanting to take a freshman-level chemistry lab course at her school," Supalo says. "(The) really small, private school prohibited her from taking the course because of safety reasons.

"The blind student had arranged a two-hour meeting with me to meet with their three faculty. I walked into the meeting, and you could cut the tension with a knife. They were not happy to be there, they didn't understand how a blind person could do this work. I started talking about my graduate research … making transition metal supported oxide catalyst for various reactions. … I was talking not only about what I was learning, but I also talked about how I did it.

“When that faculty realized I could speak the same language that they could speak, we had a common ground. By the end of that two-hour meeting I had persuaded this faculty that it was a good opportunity for this blind student to take this lab course, and they were all genuinely excited about it.”

In addition to developing software and lab tools to make it possible for the visually impaired to work more independently, Supalo teaches educators how teachers can include students with these disabilities in their course work, including such practical matters as how to light a Bunsen burner. And who better to explain these things than someone who has lived it?

Supalo also cautions educators that being treated like non-disabled students is also essential. When he explains this, his experience as a disabled person underscores the logic of not being over-protective.

“It’s OK for a person with a disability to fail at what they want to do. So often people with disabilities are coddled and sheltered and highly scaffolded and protected from failure that they never fully experience it,” he says. “As we all know, some of our best learning experiences can come from failures, and it’s OK for a person with a disability not to succeed. Sometimes they learn from their failure and move forward.”

What worries Supalo more than a disability are those who ignore their limitations or are unwilling to learn to accommodate them.

“When you have people in the scientific community, especially in the student ranks, (who) think they know everything, those are the dangerous people.”

Published: July 16, 2012 – Driving Force Blog
http://membercentral.aaas.org/blogs/driving-force/having-disability-can-actually-benefit-stem-career?page=0,0