Access to Engineering: New Project for Students and Faculty with Disabilities

The polio that struck Don Malzahn when he was 4 years old left him in leg braces and with little use of his arms. But by the fifth grade, Malzahn was motoring off to school in an electric scooter made by his dad, an engineer. A homemade swivel chair swung him in and out of the shower. At the three-story high school in his small Oklahoma town, two football players carried him between floors in a handmade seat with handles.

"Dad's philosophy was that the environment is plastic," says Malzahn, now an industrial engineering professor at Wichita State University in Kansas. "If I needed something, we made it."

But when he entered Oklahoma State University in the early 1960s, says Malzahn, "I lost that leverage."

Getting to class was an ordeal, he says. "I'd have to go a block out of my way to find someplace to get up over the curb. It took me so long, I'd have to schedule four periods between each class. "I had a lot of depression, a lot of doubts," says Malzahn. "But I'm persistent. I can hang on longer than anybody."

Still, sheer endurance shouldn't be the deciding factor in whether someone who is disabled makes it through engineering school. That's the idea, at least, behind a new 5-year project at the American Association for the Advancement of Science (AAAS) on the recruitment and retention of students and faculty at the nation's engineering schools.

Funded by the National Science Foundation (NSF) and with assistance from the Engineering Manpower Commission (EMC) of the American Association of Engineering Societies, the AAAS Access to Engineering project aims both to gather data on those with disabilities at engineering schools and to create model programs at six schools that vary by location, demographics, and other qualities.

“We want to get people with disabilities into engineering,” says Virginia Stern, director of the AAAS Science, Technology, and Disability project, under which the new project falls. “They’re a big, underused pool of talent. Engineering is basically an intellectual occupation, and no physical disability should by itself keep anyone out, she says.

How many such students and faculty are there? No one really knows, says Stern. “That’s one of the goals of the project,” she says. Finding out, however, is not as easy as it may seem.

“Who should we count? We can get the number of people who identify themselves as disabled,” says EMC’s Richard Ellis, who’s on the project’s advisory board. “But what about those who don’t identify as disabled, but might be? And do we count learning disabilities?”

A recent NSF task force report put the percentage of scientists and engineers with disabilities at anywhere from 2 to 16% of all scientists—“not quite a satisfyingly exact figure,” notes Stern.

“We have some information about the number of students with disabilities who enter engineering school, but no information on the number who exit with degrees,” says Stern. “And that’s the bottom line.”

Along with gathering this kind of data, says Stern, “we want to find out where kids are getting stopped in the pipeline” on the way to an engineering career.

“There are a lot of gatekeepers along the way who can discourage people with disabilities—parents, teachers, counselors,” she says. Malzahn agrees.

“Engineering coursework is difficult,” he says, “and some say, ‘life’s already hard; why make it harder?’ There’s another, more subtle force at work as well, he says.

“What’s lacking for many students with disabilities is the vision that they can be technically oriented individuals,” says Malzahn. “Society’s approach to the disabled is ‘you can get things done with the help of others.’

“Naturally, this leads you to focus on your social skills. It’s counter to the idea of taking direct action on your environment, which is what engineering is all about.”

Physical access to classrooms and labs is not the problem it was 15 years ago, says Stern, when AAAS’s annual meeting in Boston became the first scientific gathering in the world to accommodate those with disabilities.

Since then, a succession of federal legislation, culminating in the recently enacted Americans With Disabilities Act, has required public buildings and facilities to address the needs of people with disabilities. Usually this includes ramps, wider doors, and larger bathroom stalls with handrails.

But even these changes may not be enough, says Malzahn.

“There’s an appearance that physical barriers are coming down,” he says. “But in any given building, there may be only one doorway I can enter, one bathroom I can use.

“Why have steps at all? Round door knobs—they don’t make any sense, but they can lock me out of a room.”

Problems with dexterity can present obstacles, as well. During his undergraduate lab classes, says Malzahn, “I’d pick out the smartest guy and hook up with him. I took notes and he did double duty with the experiments.”

Thanks to his father, who made modified workshop tools for his use, Malzahn came to engineering school with some mechanical skills.

“But most students with disabilities don’t,” he says. “Without that hands-on experience, it’s hard to gain an intuitive sense for which way threads turn, for instance.”

The Access to Engineering project will address these kinds of barriers, says Stern, and search for solutions.

The project’s advisory board, of which Malzahn is a member, will meet for the first time next week (26–27 February). Visits to selected engineering schools begin this fall.

For more information about the project, contact Virginia Stern at AAAS, 1333 H St., NW, Washington, DC 20005.
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