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Empowering Science Teachers

AT ANY ONE TIME, THERE ARE THOUSANDS OF U.S. GRADUATE STUDENTS WITH STRONG SCIENCE expertise and an interest in education who would be more than qualified to stem the critical shortage of secondary chemistry, physics, earth sciences, and biology teachers, but who will most likely never set foot in a high-school (precollege) classroom. Instead, nearly all of them are choosing to pursue research rather than to teach the science that fascinates them to young people. To change this situation, and the widespread lack of understanding and appreciation for science in the United States, it is critical to pinpoint the major source of the problem.

A look at teaching in Finland is a useful place to start. Finland attracts and retains the best and the brightest to precollege teaching careers. There are 10 applicants for every teaching post in that country, corresponding to a 1-in-10 acceptance rate into teacher training programs.* In 1994, Finland established a Teacher Researcher Network to connect college education research faculty and precollege teachers, and to involve classroom teachers directly in education research. Finnish precollege teachers thereby become equipped to formulate changes in curricula.† This not only empowers classroom teachers but also appropriately treats them as education experts, further raising their social status.

Unfortunately, the United States is headed in the opposite direction. Too many precollege teachers work in a “command-and-control” environment, managed by those who lack any real understanding of how to improve the system. Yet the teachers who know how to make improvements are rarely empowered to do so. It is not surprising that an annual poll of U.S. teachers found that only 44% were “very satisfied” with their jobs in 2011, the lowest level recorded in the survey’s 28-year history.‡ Science teachers rarely become superintendents in the nation’s 14,000 school districts. In one state, only 6 of 189 district superintendents had ever taught science in the classroom.§ And yet science teachers have expertise that is important for wise system governance. We recommend that school districts select outstanding teachers to serve on a Science Teacher Council. This council should set criteria for hiring new precollege science teachers, assessing and promoting such teachers, achieving state science standards, and properly assessing student achievement.

Science teachers’ professionalism also rests on their continual active involvement in science through structured collaborations with scientists. There are successful model programs in the United States (but far too few), such as the Partners in Science Program of the M.J. Murdoch Charitable Trust, California State University’s Science Teacher and Researcher Program, and Columbia University’s Summer Research Program for Science Teachers, where teachers partner with researchers in academic or industrial settings. Teachers often coauthor papers with their research colleagues and present findings at scientific meetings. And as local science faculty and researchers in industry become aware of the circumstances in which precollege science teachers work, many become active supporters of the teachers in their community. This support is crucial when rewards for teaching and broader school funding issues are at stake.

It will take time to reverse the diminishing professional status of precollege science educators in the United States, but surveys of the current generation of young people new to the workforce reveal that they are looking for challenges, problems to solve, and most importantly, a profession in which they can make an impact early on in their careers. Education would certainly fit the bill if the United States, like Finland, treated teachers as real professionals.

– Sheila Tobias and Anne Baffert

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*J. Burris, *Science* **335**, 146 (2012). †<https://www.jyu.fi/edu/laitokset/okl/tutkivaopettaja/teacherresearcher>. ‡www.metlife.com/about/corporate-profile/citizenship/metlife-foundation/metlife-survey-of-the-american-teacher.html. §S. Tobias, A. Baffert, *Science Teaching as a Profession: Why It Isn’t. How It Could Be*. (National Science Teachers Association Press, Arlington, VA, 2010).

