

Editorial

Persistence

Eudora Welty, the famous writer, was once asked what should be done by society or government to encourage young writers. Her response, which surprised the questioner, and me when I heard it, was “Nothing”. Welty contended that a person who was really a writer would be persistent enough to overcome whatever obstacles were in the way, needing no interference or support from others.

Clearly persistence and hard work are important for success and even for creativity. Quite often the reason people don't solve problems is not that the problems are too difficult, but rather that people don't try long enough or hard enough. In the field of chemistry, this becomes evident from statements made by famous chemists in the Impact series of interviews that appeared in this *Journal* in the 1970s. Here are some examples.

You can get to the big problem only by way of the staircases of the small ones.

Melvin Calvin

Certainly I try to identify intelligence and creativity and very importantly, industry; that is, the willingness to work hard which leads to dedication.

Glenn T. Seaborg

My idea of intuition is that it is merely an exceedingly careful...an excruciatingly detailed cross-examination of all the facts.

Robert S. Mulliken

I maintain that an intelligent person can learn all sorts of things besides his specialty if he works at it.

Harold Urey

I have very little sympathy for people who are brilliant but refuse to work hard.

Linus Pauling

Welty implies that there is little we as teachers can do about this, because persistence and its corollary creativity are inherent characteristics. But I wonder whether they cannot be cultivated and enhanced. In accepting the Northeast Regional Award in High School Chemistry, Richard Brown shared advice for new teachers (see page 1361 of this issue). The first thing on his list was to set high expectations for yourself and for your students, and it seems to me that this might be just what is needed.

A commentary in the local newspaper titled “Why do students try to be mediocre?” is bound to attract the attention of the editor of a pedagogical journal. Several retiring high school teachers were interviewed and provided a clear message that students are under considerable pressure to do the bare minimum. One of them said, “It's very uncool to excel in school.” But another related that as students became more and more apathetic, she was forced to become more aggressive and assertive as a teacher. This produced good results, and students who had the satisfaction of meeting her standards were grateful.

Claude Steele, a professor of social psychology at Stanford, claims that for many students there is an effect he calls “stereotype vulnerability”. If in some way or another students in an identifiable group receive a message stereotyping their group as one that will perform less well than another group, those students indeed perform less well. There is evidence that minority students, female students, and white male students were all susceptible to stereotype vulnerability. For example, when female students were told that men usually scored higher than women on a math test they were about to take, the female students did not score as well as the male students. When no such stereotyping was done, the women scored about the same as men.

Perhaps we can do more than Eudora Welty implied we could. Setting high standards and rewarding persistence and effort may well help students to develop ability and even creativity. One such prescription is provided by psychologist Lauren Resnick, director of the Learning Research and Development Center at the University of Pittsburgh, in *Daedalus*, Fall 1995, Volume 124, Number 4.

Resnick lists several characteristics of an educational system that assumes that effort can create ability: clearly defined achievement standards that are publicly announced and applicable to everyone; externally set exams graded by people other than the students' own teachers, together with external quality control of course grades; real payoffs for success and celebrations of achievement; allowing students more or less time (and other resources) to achieve a pre-established standard, rather than measuring level of achievement within a given period of time; and assuring all students the right to expert instruction.

By assuming that our students are capable of achieving well and letting them know that is what we expect, we may well be contributing to their ability to achieve. Certainly we and they will be better off than if we assume the worst and they confirm our expectations. We can (and should) start in our own classrooms and laboratories and achieve our own successes, but a much greater goal could be reached if we worked in concert to influence others in the educational system and the public at large. Our entire society could be improved if it were to adopt higher standards and reward those who achieve them, thereby helping to convince its members that hard work and persistence pay off at least as well as chance and aptitude.

JWM

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