ADEA AMERICAN DENTAL EDUCATION ASSOCIATION

Charting Progress

DECEMBER 2008

A Monthly Newsletter from ADEA Executive Director Richard W. Valachovic, D.M.D., M.P.H.

In this month's letter, Dr. Rick Valachovic, Executive Director of the American Dental Education Association, introduces us to a civil rights pioneer and asks us to journey back to middle school for a discussion of where the work of forming tomorrow's practitioners begins.

Math Literacy: A New Civil Right for an Information Age

Literacy in math affects the health professions just as much as it does the information technology sector.

When we think about the dental education pipeline, undergraduates in college typically come to mind, but ideally preparation for a career in dentistry or the allied dental professions begins much earlier. Too many of today's college students are taking remedial and other courses that they could have taken in high school. For some, this delays the start of their professional studies, while many more are discouraged from pursuing a professional degree at all.

"All too often, teachers and guidance counselors don't encourage them, and parents don't realize the impact of early choices," says Sue Sandmeyer, ADEA Associate Executive Director for Knowledge Management. "Many people who don't come from well-educated backgrounds don't realize that they start to create their career path in ninth grade."

ADEA and its partners have taken some steps to remedy this situation, and I'll tell you about those later. First, I want to acquaint you with a man who has made it his mission to see that all middle school students are ready to begin a college preparatory math sequence when they arrive in high school. His name is Robert P. Moses, and he believes that "the absence of math literacy in urban and rural communities throughout the country is an issue as urgent as the lack of registered black voters in Mississippi was in 1961."

Moses took part in that earlier struggle, and he has spent much of the last 25 years applying the lessons he learned in Mississippi to his current campaign to institute algebra classes in middle schools. Moses sees math literacy, specifically algebra, as the gateway to economic access. In an era when technological skills are an increasingly integral part of jobs throughout the economy, math literacy becomes nothing less than the most pressing civil rights issue of our time. In his words, "people who don't have [algebra] are like the people who couldn't read and write in the industrial age."

As Moses points out in his 2001 book *Radical Equations*, co-authored with Charles E. Cobb, Jr., we can easily perceive the shift from the industrial age to the age of information technology through the ubiquitous presence of computers. We tend to forget, however, that math is "the hidden culture" behind the computer. It won't be long before the vast majority of jobs require use of computerized devices, yet far too many of our young people enter the job market without critical technical skills or the foundation in mathematics needed to attain them.

The problem affects the health professions just as much as it does the information technology sector, and it begins long before students arrive at college. Students who don't receive adequate math and science education in elementary and secondary school find themselves at a huge disadvantage. In conversations with faculty and others at large universities, Moses collected anecdotal evidence that most minority students were in remedial math classes during their freshman year.

Moses began his work to promote math literacy in 1982 when he received a MacArthur Foundation "genius" award, primarily in recognition of his civil rights work. This allowed him to spend time in his daughter's eighth-grade public school class in Cambridge, Massachusetts, teaching algebra to a handful of students. Soon Moses found himself in the role of parent-organizer as well as that of math teacher, leading a grassroots effort that stands in sharp contrast to traditional top-down attempts at educational reform.

In the three years that followed, teachers and parents rallied to the cause of offering algebra to all middle school students. Some parents began attending algebra classes themselves on the weekend. And Moses found ways to make algebra more accessible. He developed a curriculum involving experiential learning that not only boosted the children's enjoyment from learning math, but placed their scores on the citywide algebra exam second highest in the system. This external validation spurred the school system to implement the new curriculum in other schools, and the Algebra Project was officially recognized. Today the project is over 20 years old, and thanks to the generosity of foundations and the commitment of forward-thinking teachers and administrators, it has reached thousands of students in more than 200 middle schools.

As most of you know, ADEA devotes considerable resources to ensuring a robust pipeline of students. We have committed to working with every U.S. dental school to increase the number of underrepresented minorities in dental and allied dental professions and in academic dental institutions, knowing that this will lead to more access to care for underserved populations and a better education. With members of minority racial or ethnic groups expected to make up 50% of the U.S. population in 2050, progress must be made now if we are going to have enough minority practitioners in place to meet the nation's health care needs.

Where do we begin? We start by generating interest in dental and allied dental fields and by making sure students are prepared to succeed once they arrive at our institutions. ADEA operates a website, ExploreHealthCareers.org, funded by a generous grant to ADEA from the Robert Wood Johnson Foundation, provides far more than exposure to a day in the life of various health professionals. Among the wealth of information the site provides is a description of the specific academic requirements for each career. People who visit the site thinking "I want to take care of people" may discover there is a lot more to being a nurse, for example, than they imagined. The site makes clear that they can't achieve their career goals without science and math.

ExploreHealthCareers.org also contains profiles of over 500 pre-enrichment programs at the high school and college level. One of these is the Summer Medical and Dental Education Program (SMDEP), a free academic enrichment program for students from disadvantaged backgrounds co-sponsored by ADEA and the Association of American Medical Colleges (AAMC) also funded by a major grant from the Robert Wood Johnson Foundation. According to Dr. Dave Brunson, Associate Director of the ADEA Center for Equity and Diversity and Co-Deputy Director of SMDEP, who oversees the program for ADEA, SMDEP's math component (calculus and pre-calculus) has posed challenges for program administrators because students differ greatly in their mathematical abilities. A number of the 12 SMDEP sites use a "track" system to tackle the differences; others incorporate the math component into their physics or organic chemistry courses. The SMDEP campuses have not come to a consensus as to which way is best, but they all agree on the importance of young people receiving formal math enrichment.

This year, ADEA embarked on a new effort to increase the diversity of the dental workforce through a program called "Moving Forward: Bridging the Gap." A generous grant awarded last fall to ADEA by the Josiah Macy, Jr. Foundation is funding the development of a flexible seven-year dental curriculum modeled on one currently used in medicine. The curriculum will serve as an innovative tool with which to prepare underrepresented minority and low-income students for the practice of dentistry.

This project came on the heels of the ADEA/W.K. Kellogg Foundation Access to Dental Careers program. This effort to encourage the entry of underrepresented minorities into dental education resulted in the enrollment of 160 students from targeted populations, increasing their presence at the 15 participating schools an impressive 50%.

ADEA also addresses pipeline issues at the faculty level. With generous support from the W.K. Kellogg Foundation, ADEA provides monies for seven academic models to recruit, develop, and retain minority faculty in U.S. dental schools through the ADEA Minority Dental Faculty Development Program.

In 2008, ADEA established a research agenda to further support our pipeline efforts under the direction of Dr. Eugene Anderson, ADEA Associate Executive Director for Educational Policy and Research. Using ten years of Integrated Postsecondary Education Data System (IPEDS) data, we are exploring national, regional, and state-by-state trends in bachelor's degrees awarded in biological, life, or physical sciences. This is an important research step along the way to identifying potential dental school applicants and understanding paths taken by these students. Two other rich longitudinal data sources, the National Center for Educational Statistics' Beginning Postsecondary Students Longitudinal Study (BPS) and the Baccalaureate and Beyond Longitudinal Study (B&B), may factor into identifying critical factors that can help explain students' decisions to pursue dental degrees and help us strengthen the pipeline.

Can we do more? Absolutely. Some dental schools invite young people onto campus to learn the value of oral health and gain exposure to health careers. This is great, but as Dr. Jeanne Sinkford, ADEA Associate Executive Director for Equity and Diversity,

points out, "Unless kids get math concepts earlier, they have nothing to build on. I'd like to see our schools become involved in the pipeline at an earlier age, middle school at least. Elementary school is even better." We might even ask, why not redefine the educational pipeline so that it begins with kindergarten? Which brings me back to Robert Moses.

"The traditional role of science and math education has been to train an elite, create a priesthood, find a few bright students and bring them into university research. It hasn't been a literacy effort," Moses writes. "Schools must commit to everyone gaining this literacy as they have committed to everyone having a reading-writing literacy."

According to the Algebra Project website, the organization is at the forefront of a nascent national drive toward high-quality public school education for all. However one might achieve this goal, I think we can all agree that a sound educational foundation is essential for preparing students for the careers of the 21st century. According to the U.S. Bureau of Labor Statistics, employment in education and health services is projected to grow by 18.8% by 2016, the greatest increase for any employment sector. That means that 5.5 million new jobs must be filled with people literate in math as well as reading. It behooves us all to think creatively about reaching students at earlier ages and to address this need with the urgency that Moses has brought to the Algebra Project.

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