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Each One, Teach One



WILLIAM YSLAS VELEZ
UNIVERSITY OF ARIZONA,
TUCSON
9 JULY 2004

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Other colleagues and I have long shared the view that the best way to truly change the situation for minority students is to use our scientific knowledge as a tool for their empowerment.

In my May 2004 article, "[Are We Talking Enough?](#)", I pointed out one impediment to achieving diversity in the university setting: the lack of conversations dealing with diversity in departments. Other colleagues and I have long shared the view that the best way to truly change the situation for minority students is to use our scientific knowledge as a tool for their empowerment. By giving personal testimony about our paths through our studies and our profession, we hope to engage students in conversations about scientific careers. Conversations, and the stories that we can recount about our interest in science, can be powerful motivators. We want to present the scientific enterprise not as a collection of facts, but as a living enterprise--an enterprise that is very much a human activity.

One organization, in particular, provides opportunities for these conversations about diversity among its membership. The Society for Advancement of Chicanos and Native Americans in Science ([SACNAS](#)) has the blueprint for helping facilitate these discussions. It is my sincere hope that other associations, serious about dealing with the lack of diversity in academic departments, will follow its lead.

Sharing Common Goals

Our mathematics department has three colloquia per week, Tuesday (mathematics education), Thursday (pure mathematics), and Friday (applied mathematics). Even though there are many invited speakers, it is rare to have a member of a minority group among them. In April 2004 we had the uncommon occurrence of two Chicano mathematicians giving colloquia. In the first week [Richard Tapia](#) of Rice University

gave the applied mathematics colloquia; in the third week Carlos Castillo-Chavez of Arizona State University (ASU) gave both the pure and applied mathematics colloquia. Quite by chance, in the second week I was invited to give a colloquium talk at the University of New Mexico.

I mention these invitations because I was struck by a common behavior that all three of us exhibited. Upon being invited to give a colloquium talk, each one of us asked to be given the opportunity to give an extra talk for undergraduates. Richard gave a talk on the mathematics of drag racing, Carlos gave a talk on the application of mathematical models to homeland security, and I gave a talk on how prime numbers are used in modern communication systems. Each one of us, independent of the others, used our mathematical knowledge to show the beauty of our subject and its relevance. Each one of us also requested that we be given the opportunity to talk informally to the students, to be able to hold conversations with them, to tell our stories.

As I listened to these two speakers interact with students, I was struck by the fact that they did not use just their mathematical knowledge to impress upon the students the necessity of pursuing advanced degrees. They used the sum of their life experiences. At the end of their interactions with the students, the students knew about the speakers' family life, the career paths of their children, the hurdles they had to overcome in order to achieve their goals. The speakers established a personal connection with these students.

Why did each of us feel compelled to use these visits as vehicles to motivate undergraduate students to pursue further mathematical studies? How is it that all three of us volunteer our time to work with students? The three of us all come from the Chicano community. We all come into contact with minorities in our lives. We interact with our cousins and nieces and nephews and understand the problems our communities face. But, it would be ridiculous to think that a social conscience is restricted to the minority community of mathematicians. I can assure you that our goal in seeking a Ph.D. in mathematics was to have the opportunity to learn, to create, to apply, and to teach mathematics. It was not to become a mathematical social worker; however, the reason we did these things relates to our knowledge of how one organization promotes diversity.

The SACNAS Way

One common feature in our backgrounds is that all of us became members of SACNAS early in our careers. This organization is dedicated to increasing the number of minorities pursuing advanced degrees in the sciences. As active participants in annual SACNAS conferences, we accepted the challenge of making mathematics comprehensible to a large audience of undergraduate students, most of whom had only taken a semester or two of calculus. We were called upon to join our colleagues in the other sciences to present a linkage between their science and mathematics.

SACNAS sponsored K-12 faculty to attend the national conference and we actively participated in developing workshops for K-12 faculty on mathematical themes. And then there are the students! The SACNAS conference brings in hundreds of undergraduate students and we were given the opportunity to talk with them, to share our aspirations, our successes, and our failures, and to provide advice and guidance.

SACNAS provided us with the opportunity to have rich conversations about how to use our mathematical knowledge to enrich the lives of others. SACNAS is a stunning example of an organization that has succeeded in bringing together the many constituents of the scientific enterprise with the goal of increasing the number of students pursuing degrees in the sciences. More scientific organizations should follow this model of providing its membership with the mandate of using their knowledge and scientific creations to motivate our citizenry to pursue scientific studies.

National scientific organizations should attend a SACNAS conference to determine what could be incorporated into their own national meetings in order to help their membership have meaningful conversations about diversity.

William Yslas Vélez is a professor of mathematics and University Distinguished Professor at the University of Arizona in Tucson. His column to administrators and faculty members, "Suggestions for Achieving Diversity in Academia," appears on MiSciNet every other month. He may be reached at velez@math.arizona.edu

The editors suggest these related resources at Nextwave:

- **An Open Letter to Administrators and Faculty**
Micella Phoenix DeWhyse, 15 October 2004, UNITED STATES
- **Are We Talking Enough?**
William Yslas Vélez, 14 May 2004, UNITED STATES
- **The Role of Academic Departments in Diversity Issues**
William Yslas Vélez, 12 March 2004, UNITED STATES
- **Colleges, Universities, and Communities**
William Yslas Vélez, 9 January 2004, UNITED STATES
- **The Desire to Achieve**
William Vélez, 26 November 2003, UNITED STATES
- **Perspectives: Lack of Diversity in Science**
Robin Arnette, 5 September 2003, UNITED STATES
- **Recruitment and Retention of Minority Students Makes for an Innovative Degree Program**
Alaina Levine, 22 November 2002, UNITED STATES
- **Retaining Students in Your Graduate Program**
William Aspray and Andrew Bernat, 14 June 2002, UNITED STATES
- **The Ohio State University-Recruiting and Retaining Students of Color**
Rose Wilson-Hill, 22 February 2002, UNITED STATES

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