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Teachers Need to Sell Mathematics Teaching:
Reaching Out to Excellent High School Students

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Why is there a critical shortage of mathematics teachers? Is it because students who excel in mathematics have many lucrative opportunities in business, industry, research, and other related professions? Is it because the conditions under which many teachers function are often dismal, to say the least? Is it because many parents (even those who are teachers) recommend against teaching for their children? And is it because teachers often direct their excellent mathematics students into other professions? Of course, the answer to all of the above questions is a resounding "yes!" We believe that since teachers have a remarkable influence over their students, they CAN make a difference in enticing their best students to consider a career in mathematics teaching, and we have designed a way to help by hosting an annual conference for high school students that celebrates mathematics teaching.

Our experience indicates that even students who love mathematics and excel in mathematics have often never seen mathematics teaching at its best. For this reason they never envision a career in mathematics teaching as interesting or exciting. Therefore, one of the primary purposes of a conference that "celebrates mathematics teaching" is to expose talented mathematics students to exciting lessons taught by inspirational and exemplary mathematics teachers. Such a conference provides a forum in which the speakers who are secondary mathematics teachers can "sell" their own profession — teaching! Each year the TIME 2000 Program (i.e., Teaching Improvements through Mathematics Education), a four-year, multi-faceted undergraduate program designed to recruit, prepare, and retain future secondary mathematics teachers[1], hosts just this type of a conference at Queens College of the City University of New York, called, "Celebrating Mathematics Teaching."[2] At its recent fourth annual conference, a record-breaking number of more than 300 high school students and 30 of their mathematics teachers as well as over 80 mathematics education undergraduates and 15 college faculty members were in attendance.

An inspirational keynote address was delivered by Cathy Seeley, President of the National Council of Teachers of Mathematics. Local and nationally-acclaimed dynamic mathematics teachers, many of whom are TIME 2000

NCTM President Cathy Seeley delivering her inspiring keynote address

[1] For more information about TIME 2000, please see Artzt & Curcio (2007), and visit www.qc.cuny.edu/time2000 .

[2] The Simons Foundation, the primary supporter for the Math for America Program, is gratefully acknowledged for funding the conference.

graduates and Queens College graduates, made exciting presentations that actively involved the conference participants, that is, the high school students, in mathematical investigations and explorations. More than 80 TIME 2000 students volunteered to prepare for and assist at the conference. Several TIME 2000 graduates returned not only to be on the program but also to participate in a panel discussion conducted by a TIME 2000 senior. The purpose of the conference, planning and implementing the conference, and effects of the conference on recruitment are discussed below.

Why Host a Conference?

Several years ago it became evident that the mathematics teacher shortage was a means of highlighting the great number of unqualified middle and high school teachers who were teaching mathematics. Unfortunately, horror stories far outweighed the Herculean efforts of the very qualified, capable, and dedicated mathematics teachers. That is what contributed to the notion of creating a conference in which the work of highly qualified, enthusiastic, and devoted mathematics teachers would be highlighted, and in fact, "celebrated." If it were indeed true that a vast number of middle and high school students were being taught by uncertified teachers, then perhaps they needed to experience some exciting lessons taught by inspiring mathematics teachers. Perhaps, such an experience would even make them consider becoming a teacher themselves! Giving mathematically capable students the opportunity to experience exciting lessons taught by local and nationally recognized enthusiastic, exemplary mathematics teachers who explicitly describe their love of mathematics teaching in a professional conference setting has proven inspirational and has shown potential as a powerful means of recruitment.

How Did We Make It Happen?

As we thought about our vision for a conference, we had several concerns. Would teachers want to give presentations even though they would not receive compensation? Would the school administrators be willing to release these mathematics teachers to participate? Would administrators and mathematics teachers find such a conference worthwhile for their students and allow them to participate? We wanted to have one mathematics teacher from each school select students who were good in mathematics and might potentially consider becoming teachers. But, would these teachers be permitted to escort the students to the conference? Would the students be able to get to the Queens College campus? Would we be able to get enough help in conducting the conference? Well, as they say in Hollywood, "If you build it, they will come!" As it turns out, the answer to all of the above questions was a resounding, "Yes!"

Selecting and inviting the teacher-speakers. We contacted the exemplary teachers who had worked for many years as cooperating teachers for our student teachers. We contacted past graduates who we knew were spectacular, passionate teachers. They were all flattered by our request to have them teach their favorite lessons. They were flattered at the idea of being "showcased." Their supervisors, the mathematics assistant principals and principals, were thrilled to have their schools highlighted in the program. And so, the teachers enthusiastically agreed to come. In fact, they thanked us for inviting them. One teacher sent the following e-mail at the conclusion of the conference:

> *The conference was wonderful! Thanks again for giving us the opportunity to present a session.*

Jacqueline Seenarraine, TIME 2000 graduate teaching at H. Frank Cary High School, with Tanica Meade, a TIME 2000 undergraduate

Some teachers have presented for several consecutive years. They absolutely love the chance to share their love of mathematics and teaching. Without exception, at the end of the day, each presenter offered to teach a lesson again the next year! In fact, because we want to reach out to other outstanding speakers, we regret when we do not invite them back.

Inviting the students and their teachers. The students and their teachers were equally excited to come. As it turns out, by our fourth year, teachers in the school were "fighting" for the chance to attend the conference with their students. As one mathematics department chairman reported,

> *Our students had a wonderful time at Queens College today. Eleana [a mathematics teacher] was like a kid again, all excited and rejuvenated! She could not say enough about the atmosphere! Thanks for providing our students and teacher with such a great experience.*

Obtaining help to prepare for and conduct the conference. All we had to do to find help in conducting the conference was to look within our own "family," our TIME 2000 students! They jumped at the chance to help. Some students stuffed folders. Other students made room signs. Some worked at the registration desk. Others escorted the high school students to their workshop rooms on campus. Others made sure the speakers had the proper materials. And, what was their reward? They attended the sessions themselves! They experienced the joy of feeling important by helping others who were younger and felt lost on a big college campus! And yes, we gave them an ice cream party at the end when all our guests left!

Student and graduate student panel discussion. One of the main features of the conference is a panel discussion conducted by the undergraduates and graduates of the TIME 2000 Program. As the high school students pick up their boxed lunches in return for submitting an evaluation of the conference, they reconvene in the auditorium to participate in a lively question-and-answer session regarding the TIME 2000 Program. The enthusiasm and passion exuded by members of the panel for choosing to teach mathematics as their profession permeate the auditorium.

Student Panel consisting of TIME 2000 undergraduates Shari, Randall, Samantha, Julio, Sarah and Ricky (all in blue shirts) and John Chae, TIME 2000 graduate teaching at Baldwin High School

Effects of the Conference on Recruitment

After the conference, several of the high school students came up to us and thanked us for giving them this wonderful day. One young lady, an honors student from one of the specialized high schools in science and mathematics in New York City, was considering applying to several Ivy League colleges, but said that she had such a wonderful time that Queens College, specifically the TIME 2000 Program, was now the only place to which she was going to apply. Other students who had never even considered mathematics teaching were so inspired by the conference that they were now rethinking their career options. In the words of one of the students:

> *I never really considered a career in math, but looking around and listening to these wonderful people really made me reconsider.*

After only four years, interest and enthusiasm for the conference have spread. With approximately 30% of the incoming freshmen indicating that attendance at one of the conferences influenced their choice in applying for the TIME 2000 Program, the effects of this recruiting strategy are starting to be manifested.

National attention continues to be focused on the poor performance of American high school students in mathematics (Rising above the Gathering Storm, 2006, p. A20; State of the Union, 2006, p. A19). With almost 60 percent of American eighth graders being taught mathematics "by teachers who neither majored in math nor studied it to pass a certification exam" (Schemo, 2006, p. A20), this is no surprise. Without mathematically competent teachers who understand how students learn and who employ instructional strategies that motivate students and engage them in meaningful learning, middle school and high school students will not be able to reach the proposed goals of the American Competitiveness Initiative (State of the Union, 2006). Although there may be many ways to solve the critical-shortage-of-highly-qualified-mathematics-teachers problem, innovative, home-grown solutions are needed to build an infrastructure to support our profession. If each of us in our own small way can use some of

the experiences described here, to highlight the excitement, joy, and value of mathematics teaching to secondary school students, perhaps we can all contribute to increasing the pool of potential, exemplary mathematics teachers.

Celebrating mathematics teaching and "selling" this profession to outstanding high school students has the potential to really make a difference!

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