Future of Science & Mathematics Teacher Development

Arizona is facing a growing shortage of qualified science and mathematics teachers. There is an urgent need for the University of Arizona to greatly increase the number of science and mathematics teachers we produce, as highlighted in the 2009-13 UA Strategic Plan. That plan calls for us to prepare 135 science and mathematics teachers each year by 2013. That is a five-fold increase from our current numbers. The Strategic Plan also includes this directive: Recruit and retain prospective teachers by increasing our financial support and by establishing STEM Teachers for Arizona, which will expand and leverage existing resources to attract students to become STEM teachers. To meet these goals, it is clear that we need to scale-up our current recruitment and retention efforts.

Science and math teacher preparation at UA occurs both in the College of Science and the College of Education. The College of Science has been preparing secondary science teachers at the undergraduate level since 2000; in that time, 79 students have completed the program. At the graduate level, since 2000, the College of Education’s department of Teaching and Teacher Education has prepared 84 science teachers in the Teach Arizona MA/certification program (formerly called Teach for Tucson.) Also since 2000, the College of Agriculture has prepared 41 agricultural education teachers, many of whom are also certified in science. The Math Department has been responsible for undergraduate secondary mathematics teacher preparation since 2004; a total of 48 math teachers have been prepared in that time. Teach Arizona has prepared 26 math teachers since 2000. All of these programs have gained a reputation in the Tucson secondary education community for preparing highly qualified science and mathematics teachers. While the retention of University-of-Arizona-prepared science and math teachers is high (71% for science teachers and 75% for math teachers prepared in the College of Science, and 76% for science and math teachers prepared in the College of Education), the number of teachers we prepare is clearly not enough to meet the current and future demand for science and mathematics teachers.

In addition, science and math education faculty are housed in several different departments in the College of Science and in the College of Education. These faculty members are involved in science and math education research and in preparing the next generation of science and math education scholars through doctoral programs in both colleges.

Charting a Future Course

In order to increase and improve our production and preparation of science and mathematics teachers, and incorporate the concept of STEM Teachers for Arizona, we propose a Center for Science & Mathematics Teacher Development (CSMTD). The CSMTD will support and sustain the important collaborations needed in order to increase the number of teachers we prepare to enter teaching and to improve and increase the professional development we provide for currently practicing science and math teachers. We propose to establish or extend strategic collaborations with other programs on campus, such as the College of Education’s Teach Arizona program, the teacher preparation program in the College of Agriculture and Life Science, the General Biology Master’s Program, the Institute for Mathematics and Education, and the professional development programs offered for teachers in the biological sciences by the BIO5 Institute. The CSMTD will provide an intellectual infrastructure to coordinate and focus collective activity that results in the professional development of both preservice and inservice science and mathematics teachers for southern Arizona. One particularly important aspect of
professional development will be furthering our existing partnerships with the high-needs districts in the Tucson area, both in placement and mentoring of preservice teachers, and professional development of inservice teachers.

Current faculty members in the College of Science Teacher Preparation Program (TPP) have appointments in various departments within the College (Biochemistry & Molecular Biophysics, Chemistry, Mathematics, Molecular & Cellular Biology, and Physics), but work together as an interdisciplinary program to administer the CoS TPP, teach its courses, and advise its students. Science and math education faculty members in the College of Education have appointments in the department of Teaching and Teacher Education but work with faculty members in the College of Science. Similarly, we envision the CSMTD functioning as an interdisciplinary program across several units and a few colleges, with participating faculty members working together to improve science and mathematics teacher development. The current TPP faculty members have become integral parts of their respective departments, so it will be important to retain these departmental appointments. However, the faculty members affiliated with the CSMTD would be involved in future strategic hiring efforts in STEM education, professional development program planning for teachers, targeted efforts to enhance teacher recruitment and retention, and collaboration on grant writing for funding of research and outreach STEM education projects.

The presence of the Center for Science and Mathematics Teacher Development would formalize and expand existing collaboration among the Colleges of Education, Science, and Agriculture and Life Science, making us more competitive for external funding. For example, preliminary conversations with the Helios Foundation have indicated their interest in supporting strategic initiatives from across campus. In addition, a Decision Package was submitted to the Governor’s Office in 2007, requesting expanded funding for science and mathematics teacher development; those funds, if allocated, it could be used to establish the CSMTD and fund STEM Teachers for Arizona.

Report prepared by
Ingrid Novodvorsky, Director, College of Science TPP
Bruce Johnson, Chair, Teaching & Teacher Education