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# A Brief Introduction to STEMTEC

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The Science, Technology, Engineering, and Mathematics Teacher Education Collaborative, or STEMTEC, has been the STEM Education Institute's largest and most visible program. Funded in 1997 by the NSF Collaboratives for Excellence in Teacher Education program, it was an ambitious project designed to produce more, better prepared, and more diverse K12 science and math teachers.

The original \$5,000,000 grant was later increased by \$500,000 for scholarships and by \$80,000 for the support of an international conference on STEM education. The principal investigators were Morton Sternheim (STEM Ed), Allan Feldman (Education), Richard Yuretich (Geosciences), Sue Thrasher (Five Colleges Public School Partnership), and Charlene D'Avanzo (Ecology, Hampshire College).

The original collaborative included UMass, its Five College neighbors (Amherst, Hampshire, Mount Holyoke, and Smith Colleges), and Springfield Technical, Holyoke, and Greenfield Community Colleges. Subsequently other Massachusetts colleges and universities with science and math teacher education programs were invited to participate, raising the total to 21 colleges and universities, along with a large number of school districts. In 2002 we received \$600,000 for STEMTEC II, a three-year follow-on grant intended for summative evaluation and new teacher support.

One of two key elements of STEMTEC was an ambitious course redesign effort. The other was a "student program" designed to attract students to science and math teaching and to provide convenient pathways to licensure. Both reflected the fact that most students who eventually become science or math teachers do not make that decision until late in their undergraduate careers or sometime after graduation.

We opted to focus on improving the courses future science and math teachers are likely to take in order to provide models of good teaching and to increase all students' interest in science or math and reduce the high attrition from STEM majors. Ultimately six groups of faculty participated in summer or academic year institutes with various formats. These explored student-active teaching methods, including inquiry-based teaching, cooperative learning, project and problem-based learning, and alternative assessment methods. Nearly 200 college faculty overall participated and revised at least one course. They were aided by the availability of Minigrants for materials, equipment, and student assistants. Over 50 K12 teachers also took part, serving as pedagogy experts and helping in the course redesign efforts. A variety of academic year follow-up sessions and summer conferences allowed participants to share their ideas and successes. The impact of this effort is clearly visible today in many courses taught by STEMTEC faculty and others.

The student program had several components. We encouraged faculty to include some kind of teaching experience as a course requirement or an option. We created courses on various campuses for STEM majors on teaching and learning. We awarded scholarships to students who had an interest in STEM teaching, and provided them with teaching experiences and various kinds of support. Finally, we created new pathways into science and math teaching, with new transfer programs at the community colleges, an education minor at UMass, new licensure options at the other four year colleges, and a summer/fall program for accelerated licensure.

As noted above, the follow on program, STEMTEC II, consisted of summative evaluation and new teacher support. New teacher support has included new teacher dinner or lunch meetings, the Science and Engineering Saturday Seminars new UMass M.Ed. options including an online seminar course for new teachers, and the Tuesday STEM Ed seminars. All but the new teacher dinner or lunch meetings were expected to continue for the foreseeable future.