

A Professional Program for Preparing Future High School Mathematics Teachers

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Introduction. There has been growing attention in recent years to ensuring that every K-12 student is taught by a high-quality teacher. Additionally, the Common Core State Standards for Mathematics (CCSSM) place additional demands on teachers (see <http://www.corestandards.org/Math/>). This has led to a call for greater professionalism for teachers in admission standards, in their education, in their responsibilities and in their status [1, 2]. The recent Mathematical Education of Teachers II report (MET II) from the Conference Board of the Mathematical Sciences [3] has many recommendations to foster such professionalism among teachers of mathematics (see <http://cbmsweb.org/MET2/index.htm>). As in the first MET report, the high school chapter of the MET II report calls for a greater connection between the college mathematics taken by future teachers and the high school mathematics they will teach. The MET II recommendations, if widely adopted, will have a powerful impact on the future preparation of high school mathematics teachers.

The traditional mathematics major is a liberal arts education that is concerned foremost with the power of mathematical reasoning and theory. Its graduates are prepared for a range of careers and graduate study. On the other hand, teacher education is focused on preparation for a teaching career. Mathematics for teaching has been

took a course in algebra [13]. Jkuvtkecm{."jki j"uejqn" o cvjg o cvkeu"vgcejgtuø"eqmgikcvg"gfwevion focused on the in-depth study of high school mathematics including advanced topics such as spherical trigonometry [6].

upon graduation. For mathematics departments that prepare few high school mathematics teachers or where other factors make or primary recommendations impractical, we offer suggestions for various ways to accommodate the spirit of the primary recommendations with fewer changes along with a capstone course for teachers to connect their major courses with high school mathematics.

systems. Mathematicians are encouraged to address issues of diversity, equity, and multiculturalism in the courses they teach, for example, by integrating a historical perspective of these issues into content courses, but they can also address them by fostering classroom climates that encourage all learners.

Methods of teaching high school mathematics. In states where the certificate spans both middle and high school grades, methods for teaching both grades 5-8 and 9-12 should be included, preferably in separate courses. Issues of classroom management, not limited to behaviorist approaches, must be addressed in a professional program. These may be included in a methods course, in a separate course, or in other courses in the program.

Student teaching. Two phases of student teaching are appropriate. The first should coincide with a methods of teaching mathematics course, to allow for close supervision during the first student teaching experience. The second phase should be a semester-long experience. It is beyond the scope of this report to recommend models for student teaching, but a model that involves close collaboration between a master teacher and the preservice teacher is encouraged.

Comment on technology. The use of technology in mathematics education is an important issue for a professional program to address. Technology in the classroom has both productive and cognitive uses. While it may be appropriate to include a course in educational technology, the cognitive uses of technology in mathematics teaching and learning must be addressed. The caution is that if technology is viewed as an add-on rather than an integral part of learning mathematics, pre-service teachers will not develop sufficient knowledge of how to teach mathematics with technology in a meaningful way. A course that deals only with uses of

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