

Comprehensive Program Review (CPR)  
Follow-Up Report  
Improvement of the Mathematics Education (Secondary) Program since 2003

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### Evidence of Program Quality Enhancement

The program has successfully implemented the two newer courses of the Advanced Perspective on School Mathematics sequence, each of which engages candidates in a deeper understanding of grades 6-12 mathematics. The courses require candidates to use multiple technologies while investigating secondary mathematics through problem solving and reasoning, and each emphasizes the clear communication of mathematical thought through varied representations. The courses are particularly noteworthy due to their direct correlation the requirements of the new state K-12 mathematics curriculum, the Georgia Performance Standards [GPS], particularly in the areas of problem solving, communication of mathematical thought, and the increased need for flexibility in mathematical thinking by teachers in the secondary mathematics classroom.

Previous program reviews highlighted the need for additional study of historical mathematics as well as additional opportunities for candidates to use technology to investigate mathematics. In order to address this need, a new course was designed and implemented, MAED 3475 Historical and Modern Approaches to Mathematics. This course is now a program requirement. It will also help candidates meet the requirements of the new GPS by emphasizing connections both within and outside mathematics and the use of technology to investigate mathematics.

The creation of new national standards by the National Council of Teachers of Mathematics (and used by NCATE) provided another motivation and opportunity to reexamine the KSU mathematics education program. Faculty review indicated a need for further study by candidates in the area of middle grades mathematics (grades 6-8). The certification our program completers attain is for grades 6-12, so significant experiences with the mathematics and students in these grades are required elements for the program. A new required course, MATH 2595, is now implemented. This course focuses on the new middle grades content, much of which was previously taught in the high school curriculum, and the course meets national standards with respect to its content and instructional activities, including the use of manipulatives and technology and emphasis on problem solving and flexibility of mathematical thinking.

KSU mathematics education faculty were, and still are, heavily involved in the creation of elements of the new state of Georgia K-12 mathematics curriculum and the efforts of its implementation, including inservice teacher professional development. The activities of the faculty have directed enhanced the mathematics education program, as faculty have used their experiences with the new curriculum to inform their KSU teaching and scholarship activities. We have begun to infuse the program with information about the new standards and are placing even more emphasis on extended learning and discovery learning tasks for candidates. These elements will assist our candidates as they move into their field experiences since they will have experience with the kinds of activities that we will want them to use in their teaching.

### Evidence of Program Productivity Enhancement

KSU continues to compete with the University of Georgia for having the most mathematics education program graduates in the state. KSU and UGA far exceed other institutions in producing highly-qualified and in-demand secondary mathematics teachers. The chart below gives the number of program completers since the last CPR report. Currently, the KSU mathematics education program boasts 151 declared majors, the largest amount since the last CPR report in 2003.

| <i>Academic Year</i> | <i>Program Completers</i>                             |
|----------------------|---|
| 2003                 | 21  |
| 2004                 | 18  |
| 2005                 | 25  |
| 2006                 | 18  |
| 2007                 | 23<br>(includes anticipated spring<br>2008 graduates) |

The KSU mathematics education program is in such high demand that courses previously taught only once a year are now being offered twice each year and many courses are now available during the summer semester. Particularly noteworthy is the need to now offer the MAED 4416/4417 methods and practicum course during spring semester in addition to its traditional fall-only offering.

#### Accomplished Action Plans and Priorities

Faculty have addressed the ongoing plan to maintain and improve the mathematics education program by the implementation of the program elements previously described. We are encouraged that our efforts have been worthwhile as the passing rate for the required GACE (Georgia Certification Exam) is 100% for program completers.

The mathematics education faculty have expended significant effort over the last two years to redesign and implement program assessments to address the new NCATE accreditation standards. Considerable time and effort has also been expended to learn and implement the new electronic portfolio system as required by the PTEU. Once completely integrated into the program, data collected from the assessments using the electronic system will allow for a more complete look at the mathematics education program using the collected information and thus add to our efforts to maintain and improve the system. The ability to timely collect and analyze data using the new system will also provide a better opportunity to track candidate retention, progress, and graduation rates.

Our program faculty continue to take very active roles in the Professional Teacher Education Unit [PTEU] including providing leadership in many areas. These areas include the aforementioned electronic portfolio system, as well as collaborative efforts on common unit courses and policies and the numerous service commitments needed to maintain the unit and program accreditation.

Many goals of the mathematics education faculty are constant: continuation of collaborative efforts with mathematics and statistics faculty to provide candidates with meaningful learning experiences directly related to future classroom effectiveness, and demonstrating expertise in the areas of teaching, scholarly activity, and service. It is clear that our program completers have a great reputation in the community for their content knowledge as well as pedagogical skills. This fact provides evidence that mathematics education, mathematics, and statistics faculty collaborate well to graduate candidates with high levels of content and pedagogical knowledge. Since 2003 the mathematics education faculty have demonstrated their teaching skills (as evidenced by awards bestowed), contributed scholarly writings and presentations (including at

the national level) and participated in many service activities at the department, college, university, local, state, and national levels. The mathematics education faculty at KSU are considered experts in their field and are frequently called upon to use that expertise in a variety of ways to advance the teaching and learning of mathematics.

Since 2004, the Department of Mathematics and Statistics has been able to add 6 new full-time tenure-track faculty and 4 full-time instructors. The new faculty members are diverse with respect to gender, race, and ethnicity, thus helping to meet the department's goal of hiring more diverse mathematics education faculty. The increased personnel has allowed new opportunities to grow the program, including meeting the goals of the addition of a master's degree program and an alternative certification program for second degree students. It also has allowed KSU to implement a professional doctorate program earlier than scheduled.

#### Action Plans and Priorities Requiring Completion

Two ideas that will enhance the KSU mathematics education program even more include providing candidates an opportunity to earn advanced certification in teaching with technology and providing induction activities to support our graduates as they begin their teaching careers. The first steps toward the technology certification have been taken with the new program requirements of course with more intensive technology requirements. Over the next 3 years, with the full implementation of the new electronic portfolio system and additional classroom technologies (including interactive whiteboards), we expect to be able to claim our candidates have advanced experience in teaching mathematics with technology. Currently mathematics education faculty members are collaborating with classroom teachers and instructional lead teachers (including some already in the KSU professional doctorate program) to secure grant funding to provide beginning teachers with an induction program that will positively impact teacher retention rates. In 3-4 years it is hoped that this idea will be funded and making significant impact.

#### Program Viability

The KSU mathematics education program continues to be viable and is nationally recognized for its program elements. The program should be enhanced due to its ability to offer the "best of its kind" when compared with other local, state, regional, and national programs.

The program advances the KSU 2007-2012 Strategic Plan by its future delivery of off-site and online courses, continued use of learner-centered instruction, increased focused on identifying and advising interested students earlier, and continued efforts to secure external funding for projects related to the teaching and learning of mathematics by both preservice and inservice teachers. The mathematics education faculty will continue to provide study abroad opportunities, such as the one to Japan in May 2008, and will seek additional ways to improve student learning during continuous program reviews.

The mathematics education program seeks to meet the goals of the KSU Quality Enhancement Plan in a variety of ways and have identified some resources needed to improve our ability to better meet those goals.

1. A full-time accreditation/program administrator – this person would be able to track our candidates individually with respect to learning competencies and will be a valuable advising resource readily available for candidates
2. Reduced costs for study abroad learning opportunities – mathematics education faculty are able to directly correlate these learning experiences with candidates' future classroom teaching, and reduced costs would make it more likely for candidates to participate in study abroad learning
3. Additional teaching/learning technology – specifically, interactive whiteboard technology
4. Assistantships for graduate students so they can participate full-time in teaching, research, and service opportunities with mathematics education faculty

These resources would allow mathematics education students to be better tracked in the program and expand the types of opportunity as well as participation levels in experiences related to the KSU mathematics education program.

In order to enhance the quality and productivity of the mathematics education program, it is desired that graduate students be provided financial support to engage in teaching, research, and service opportunities directly related to their graduate studies. These students will provide support for faculty to engage in more scholarly work, as well as provide opportunities for students to continue to meet the PTEU goal of producing teacher-leaders.

Several key staff positions are needed to meet future KSU and Board of Regents goals relevant to the mathematics education program. The MAT program will be moving to the College of Science and Mathematics, and our mathematics education element of that program is strong and requires a graduate administrative assistant. To reach the goal of future online courses and programs, a staff/faculty member qualified to design courses and programs with that type of delivery will be needed, along with appropriate technical support staff.