

A Brief Report on the Shortage of Mathematics Education Doctorates

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Introduction

Our teachers are the heart of Mathematics Education in the United States. The Mathematics teacher, at the elementary and secondary levels, is one of the most important people in preparing our students for academia, business, or vocational jobs. Yet we must remember that, during their collegiate careers, these teachers had advisors in Mathematics Education. These advisors were very instrumental in overseeing the preparation of these teachers for careers as Mathematics teachers. The background of the advisors is significant since most are experienced teachers and have a Mathematics Education doctorate. Ironically, our nation is facing a shortage of doctorates in Mathematics Education.

This article discusses the program requirements for earning a doctorate in Mathematics Education, trends regarding the number of doctoral degrees earned in Mathematics Education, the implications of the shortage of doctorates in Mathematics Education, and funding opportunities for those who are interested in pursuing a doctorate in Mathematics Education.

Admission and Program Requirements

The admission and program requirements for the doctoral degree program in Mathematics Education differ from state to state. Admission requirements at those universities in Alabama that offer

a doctorate in Mathematics Education include requiring the applicant to have a bachelor's or master's degree, preferably in Mathematics or Mathematics Education. While some universities have specific requirements regarding teaching experience and teaching certification, other universities do not. However, applicants at all universities in Alabama are required to submit Graduate Record Examination (GRE) scores, letters of recommendation, a current resume, and a Statement of Purpose. Furthermore, they must have department approval. The Doctor of Philosophy (Ph.D.) program requires completing at least 80 semester hours of coursework beyond a bachelor's degree, passing comprehensive and oral examinations, and establishing at least one year of residency. Courses such as *Research Methods* and *Foundations of Education* are required. A doctoral candidate in Secondary Education will be required to complete at least 30 graduate level semester hours in Mathematics. A dissertation containing original work must be completed and defended in the course of obtaining the doctorate. The student must complete all degree requirements within seven years of being admitted and enrolling in the doctoral program [2, 13].

Trends

Over the past decade, the number of those earning doctorates in Mathematics Education has declined. The 2006 National Research Council (NRC) survey of doctoral recipients showed that from 1995 to 2000, an average of 98 doctoral degrees were earned per year. During the period from 2001 to 2006, an average of 88 doctoral degrees were earned per year. On a positive note, the survey indicated a slight increase in earned doctorates during 2005 and 2006. The NRC surveys for the past decade further indicated that about 60% of the earned doctorates were white females [4, 7].

To make matters worse, not only do trends show that there is a decline in the number of earned doctorates, but many of those who graduate from doctoral programs do not pursue post secondary teaching positions in Mathematics Education. Research shows that about one-third of the graduates return to their previous job, approximately one-fifth search for employment outside of the United States, while still others pursue positions as consultants with publishing companies or as specialists for school districts. Only about one-half of the graduates pursue post secondary teaching positions. This trend is perpetuating the shortage of professors in Mathematics Education [8].

Implications

As the shortage of doctorates in Mathematics Education continues, many institutions of higher learning are faced with the task of having to replace retiring faculty members and faculty members who leave to accept positions elsewhere. In 2002, experts had predicted that over half of the Mathematics Education faculty members would be eligible to retire by the middle or latter part of this decade [3]. On the upside, recent and future doctoral graduates will easily be able to find faculty positions in Mathematics Education at the college/university level. A recent survey found that of the 83 positions announced during 2006, only 46 were filled [9]. On the down side, as positions continue to go unfilled, many universities will experience a void of advisors able to provide future elementary and secondary Mathematics teachers the necessary guidance. This will only perpetuate the recent shortage of well-qualified mathematics teachers in the United States. The continued decrease in Mathematics educators at the college level will also have a significant, detrimental impact on the necessary research that is needed in Mathematics Education.

Funding Opportunities

Those who are interested in pursuing a doctorate in Mathematics Education may be interested in ways to fund this endeavor. There are opportunities for those who are full-time doctoral students in the form of teaching assistantships or research assistantships. These assistantships can range from \$10,000 to about \$17,000 for an academic year [10] for universities throughout the United States. These assistantships are limited in number. Universities in Alabama that have this degree program usually have just one teaching assistantship at any given time in Mathematics Education. On the other hand, there are scholarships, loans, and grants available at both the state and national level.

Teachers that are residents of Alabama can apply for scholarships from the *Math and Science Scholarship Program for Alabama Teachers*. Applicants should be pursuing teaching certificates in Mathematics or other fields of Science. Applicants must agree to teach for five years in a targeted system. The scholarship may be used for graduate studies and is for an applicant planning to attend full-time or part-time at a four-year institution. The award amounts range from \$2,000-\$12,000 [6]. For more information contact the Alabama State Department of Education via their web site: <http://www.alsde.edu>. The Colleges of Education at both

the University of Alabama and Auburn University have various scholarships that are available [1]. To obtain more information about the scholarships offered by the University of Alabama, contact the Scholarship Steward, College of Education. For information regarding scholarships offered by Auburn University, go to the website: <http://www.education.auburn.edu>.

At the national level, the National Council of Teachers of Mathematics (NCTM) offers a limited number of scholarships and grants earmarked for teachers at the elementary and secondary levels who are pursuing professional development in graduate programs focusing on Education, Mathematics, and Mathematical Sciences [12]. For information go to the website: <http://www.nctm.org/resources/>. The American Federation of Teachers (AFT) offers a limited number of scholarships to teachers who are members of AFT and who are pursuing graduate degrees in education [5]. Information can be obtained via their website: <http://www.aft.org>.

Finally, there are scholarships for women and minorities. The Zeta Phi Beta Sorority, Inc. and National Educational Foundation offer scholarships to graduate students in both elementary and secondary education [5]. For information go the website: <http://www.zphib1920.org>. An excellent resource for finding scholarships and grants can be found in *Financial Aid for African Americans* by Schlachter and Weber [11]. These are but a few of the examples of scholarships and grants that are available to provide funding for both full-time and part-time students in Mathematics Education doctoral programs.

Summary

The intent of this article was to not only to provide information about the shortage of Mathematics Education doctorates, but also to promote interest in pursuing a doctorate in this field. Our institutions of higher learning, particularly in Alabama, need qualified Mathematics Education professors that can provide the necessary mentoring to prepare our future Mathematics teachers. As discussed in the article, the requirements are rigid and the path to completing this doctorate is an arduous task. However, career opportunities abound for those holding a doctorate in Mathematics Education today and in the future.

References

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