

Chapter 8

Mathematics Teacher Education and edTPA: Complex Assessing

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ABSTRACT

The development of the educative teacher performance assessment (edTPA) might be considered as beginning over a century ago as mathematics, mathematics teacher education, and the teaching profession strove to improve student learning. Professional teaching organizations such as the National Council of Teachers of Mathematics, the National Board of Professional Teaching Standards, industry, and government agencies have been seeking ways to improve teaching, to differentiate among teacher candidates to predict who will be successful teachers and who will not, and to raise the level of student achievement of all students. Along with these goals is the aspiration of recognizing teaching as a profession. To achieve this, complex assessment is necessary. Assessment of teachers, students and teacher preparation programs is necessary. edTPA could lead the way.

INTRODUCTION

The advent of performance assessment for teacher educators is a multifaceted endeavor. This endeavor has been at least a decade in development and encompasses research on the historical development of teaching in the content area, on the desire to see education become a true and recognized profession, and on the making of what would best be considered quality teaching and learning.

This chapter looks at a specific performance assessment, the edTPA, and its special relationship with the content area of mathematics. Mathematics is complex. It can elicit visceral responses from people who feel they are not “good at math” or can challenge people to solve or conjecture responses to problems. It causes both confusion and creativity with the effects of both success and failure.

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Mathematics education as a field of study is also complex. The challenges in mathematics teaching and learning have caused developments in P-12 schools, colleges, teacher preparation programs, and teacher certification. Throughout the history of mathematics education, it can be seen that there have been attempts to improve mathematics teaching and learning for children, for college students and for teachers.

These improvements come from an emphasis on learning mathematics with conceptual understanding, procedural fluency and mathematics reasoning and problem solving. The performance expectations of edTPA are in keeping with expectations of the common core state standards, the standards for teachers expected in National Board Certification, and society's desire to have students who are college and career ready in mathematics.

The challenges that have faced mathematics teachers and teacher educators have resulted in many changes to content, pedagogy, and assessment over time. The most recent answer to the challenge is the edTPA. Although edTPA faces criticism, it may be the best development in solving the puzzle of mathematics education and in creating quality teaching and learning experiences.

HISTORY OF MATHEMATICS EDUCATION AND MATHEMATICS TEACHER PREPARATION

As the professional fields of mathematics and education made their debuts in the 1890s, courses in the teaching of mathematics began to evolve. Where no institutions had previously included these courses, the advent led to some interesting developments at the first five schools to embrace these fields of mathematics and education.

The University of Michigan, in 1892, led the way in their attempt to train high school mathematics teachers by establishing “teachers seminaries” – one in algebra and one in geometry. This was soon followed by Ypsilanti's Michigan State Normal School which developed a program devoted to the strong academic and professional preparation of teachers. While this program included components similar to the “teachers seminaries” of the University of Michigan, it also included historical developments of the fields of algebra and geometry. In addition, this program included a required course entitled Professional Training in Arithmetic.

The University of Chicago and Teachers College in New York were the next on the scene with attention being paid to mathematics and education. While Chicago worked primarily on the formation of its mathematics department, they did pay special attention to the pedagogy of mathematics. While this focus began with a lecture series, it wasn't long until a position was established for the assistant professor of mathematical pedagogy. At around the same time, Teachers College's mathematics department had a threefold mission: “to prepare students to teach mathematics in elementary and secondary schools, to provide the introductory-level courses in algebra and geometry required of all students for admission to junior-year status, and to supervise mathematics instruction in the affiliated Horace Mann School” (Donoghue, 2013, p. 164).

Syracuse University rounded out this initial list of five schools to embrace mathematics and education. The mathematics department provided students an opportunity to learn the pedagogy of mathematics for those students who intended to teach mathematics.

Other institutions followed suit and began to offer specialized training in the preparation of mathematics teachers so, by the end of the first decade of the twentieth century, there were at least twenty-five institutions involved.

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