

Understanding Professional Preparation and Development of Mathematics Teachers in Difference Education Systems: An Introduction

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This collection of papers originated as a symposium at the annual meeting of the American Educational Research Association in New Orleans in April 2000. The symposium was organized to promote the exchange of information related to mathematics teachers training in different education systems. The symposium presentations provided glimpses of the ways in which the initial preparation and/or the ongoing professional development of mathematics teachers occurs in the United States and in several education systems in East Asia. The papers collected in this journal issue are an outgrowth of that symposium and reflect a subset of the perspectives presented here. In this special issue the reader will find analyses by scholars from the East and West of the preparation and development of mathematics teachers in Mainland China, Singapore, Taiwan, and the United States, with each education system treated in a separate paper.

The organization and publication of this set of papers builds upon and extends previous cross-national cooperative efforts. In recent decades, there has been a growing interest in documenting students' mathematics performance in an international context and exploring potentially relevant contributing factors (e.g. Beaton et al., 1996; Husen, 1967; Robitaille & Garden, 1989). Although students' performance differences often receive most of the attention, cross-national findings of differential mathematics performance have led educators in different education systems to reflect on their own policies and practices (e.g., Hoyles, Morgan, & Woodhouse, 1999; Silver, 1998). Increasingly, the focus has shifted to an examination of the nature and quality of teaching in different settings (e.g. Stigler & Hiebert, 1999).

Results from TIMSS studies and other relevant cross-system studies indicate that the U.S. students have not performed well in mathematics when compared with their counterparts from East Asia, such as Mainland China, Singapore, and Taiwan (e.g., National Center for Education Statistics, 1996). The results also suggest that the U.S. mathematics curriculum and classroom teaching are not as challenging as those in many education systems in East Asia. For example, Stigler and Hiebert (1997) report that over 60% of U.S. teachers believe

that acquiring mathematical skills (i.e., solving specific kinds of problems or using specific formulas) is important, whereas over 70% of Japanese teachers believe that mathematical thinking (i.e., exploring, developing, and understanding mathematical ideas or inventing new ways to solve problems) is important. Moreover, U.S. mathematics teachers tend to state mathematical concepts and procedures being introduced, whereas mathematics teachers in Japan tend to develop mathematical concepts and procedures. Findings such as these, and those from other cross-national examinations of teaching practice, naturally lead to more questions – about the ways in which mathematics teaching is culturally situated and constituted in different education systems and about the ways in which mathematics teachers in different education systems are prepared and supported to do the work of teaching. There have been some examinations of pre-service and in-service teacher education programs in systems that have consistently produced students with high mathematics performance (Stewart, 1991), but far less has been written about these matters than about differences in curriculum or teaching. Thus, further efforts are needed to examine the perspectives and approaches taken in preparing and supporting mathematics teachers in East Asian countries that ultimately lead to effective classroom systems in East Asia and between those in East Asia and the United States, where mathematics achievement tends to be lower. This set of papers takes one small step in that direction.

These papers are not comparative studies on mathematics teacher education, though there are some comparative elements in some of the papers. Nor are the papers a set of detailed case studies of educational systems, though some are quite complete and analytic in character. Rather, they constitute a set of rich descriptions of mathematics teachers' education in distinct education systems that offer glimpses of the culturally specific entailments of the shared practice of teacher preparation and continuing education in these education systems. As Noah (1986) has cautioned, when comparing and adopting educational practices in different education systems, one must consider the characteristics of specific systems and cultural contexts. These papers suggest some ways in which the initial preparation and ongoing professional development of mathematics teachers might be considered a culturally constituted activity in much the same way that some research has suggested important cultural features and dimensions to mathematics teaching (e.g. Ma, 1999; Stigler & Hiebert, 1999).

As a collection, these papers lay the groundwork for readers to understand the similarities and differences in the practices of mathematics teacher education in diverse contexts and how these practices relate to characteristics of the context in which they occur. Three of the four papers in this set present the perspectives and approaches of preparing and training mathematics teachers in three distinct

education systems in East Asia (e.g., The Peoples Republic of China, Singapore, and Taiwan). Another paper presents a survey of current programs to prepare mathematics teachers in the United States and examines aspects of these programs as they relate to recent national (U.S.) recommendations for mathematics education.

This collection of papers should serve as a critical first step toward much needed, systematic, programmatic research efforts to examine mathematics teacher education in an international context. Although this collection of papers is not by itself an adequate base on which to generalize within or across these complex education systems, it can contribute to the study of teacher education in different education systems because the papers offer rich descriptions of practices within each system and suggest some tantalizing comparisons that could be the subject of more rigorous and detailed further research. For example, the inclusion of the three education systems in East Asia can allow readers to enhance their understanding of mathematics teacher in East Asia and its possible impact on classroom teaching. The portraits painted by these papers suggest many ways in which teacher preparation is similar across these three education systems tend to produce higher student achievement in mathematics than in the United States, both the similarities and the differences across these East Asian systems are both worth careful scrutiny.

The papers individually and collectively offer useful and interesting information about mathematics teacher education in different education systems. Like any good collection of papers, they will answer some of your questions and provoke you to want to know more. The authors will surely be delighted if the publication of this collection stimulates more research and scholarship on this topic.

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