Chapter 6
Summary and Looking Ahead

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Throughout the survey one can see that there is a steady growth in the research around prospective secondary mathematics teacher education. Also several of the studies were repeated in at least two of the sections due to the nature of the factors that were studied. It is difficult to write about teacher knowledge without some acknowledgment of how knowledge or lack of knowledge can impact teachers' mathematics identities. Furthermore, field experiences are contexts in which PSMTs' knowledge and identities are impacted and shaped. In addition, the survey revealed that mathematics education researchers are thinking more deeply about how to foster the growth of effective mathematics teachers in a myriad of ways.

For example, we know more about teacher education strategies that appear to have a positive impact on the development of PSMT knowledge, such as designing classroom tasks, looking closer at students' thinking, and linking theoretical models

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to teaching and learning phenomena. Initial attempts have also been made to study the actual interaction in teacher education contexts and in close relation to PSMT field experiences. However, more efforts need to be made to extend our teacher education practices in directions that address the complexity of mathematics teaching and to see teacher knowledge in the broader context of building teaching identities.

Moreover, limited literature suggests that incorporating appropriate technologies in teacher preparation programs could help PSMTs deepen understanding of content knowledge and pedagogical knowledge, and develop positive dispositions for using technology. Consistent use of technology in content and methods courses, and field experiences could help PSMTs develop an awareness of implementing reform-oriented instruction. However, much remains unknown about how to develop and implement materials and initiatives to help PSMTs develop and employ the forms of knowledge found in the TPACK framework. Systematic redesign of courses, the connection between course design, and teaching practicum need to be explored on a large scale. Thus, preparing PSMTs to teach secondary mathematics with technology is an important endeavor and an emerging research area in need of systematic studies and a global effort to develop a cohesive body of literature.

In addition, some key findings were presented related to the emergence of PSMTs professional identities. PSMTs' professional identities are largely shaped by their field experiences and content courses. Therefore, it is important to explore the linkages between the PSMTs' identities as mathematics learners and PSMTs professional future as teachers who will teach mathematical topics to secondary students. Asking PSMTs to write personal narratives is an important strategy utilized by mathematics teacher educators to learn more about the beliefs, values, and experiences of PSMTs, Conducting the survey made it evident that the development of PSMTs identities is an emergent research topic that provides important insights into why PSMTs make particular decisions (inside and outside the classroom) and into how mathematics teacher educators may assist them in developing their autonomy and agency.

The survey of the field experience literature revealed that much of the work is at a small scale and that much of the work has not been replicated in other places. While these studies provide useful beginning points for better understanding the field experiences provided to PSMTs, there seems to be little concern for carefully building theory around field experiences. The lack of common framing across the studies increases the difficulty of building more general understanding of the purpose, place, and effective use of field experiences. Despite the inherent difficulties in building larger sample sizes, attempting to do so by building on some of the promising findings from these studies seems like a worthwhile endeavor. For example, a collaboration of researchers across multiple programs may be able to create a sufficient sample size to undertake larger-scale investigations. Alternatively, phenomena might be tracked over a longer period of time with the same set of subjects in order to create more robust data sets.

As stated earlier the study of PSMTs needs to continue to grow, and more of the work needs to be published in major mathematics education journals. Links between PSMTs' knowledge, identity, use of technology, and field experiences are needed in order to capture the complexity of the process of becoming a mathematics teacher. Large scale and longitudinal studies are also needed to help us to understand the effectiveness of secondary mathematics teacher preparation programs.