

Chapter 6

Summary and Looking Ahead

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A vivid discussion about the theory concepts and the role of theory in mathematics education began at the end of the 1970s. This was embedded into a broader discourse about the nature of the “*Didaktik der Mathematik*” (“Didactics of Mathematics”/mathematics education) and its core subject: the mathematics to be learned and taught. In the 1980s, different theory traditions began to develop in research in the German field, while some meta-theoretical considerations emerged from research within specific paradigms. This German discussion was re-addressed during the TME conferences beginning in 1984, where Steiner presented a program (the TME program) for the foundation of mathematics education as a scientific discipline on an international level. The Networking of Theories approach, established in 2006 to deal with the growing diversity of theories in Europe, can be regarded as a “spiritual TME-successor.” It had forerunners in the German field: early examples in the German community stem from Bauersfeld, and Steiner has documented that already the TME conferences had provided space for the dialogue about comparing and contrasting theories in the field. Two theory strands with scientific routes in German-speaking traditions were presented. These theoretical approaches were networked in a case of learning fractions to investigate how they could be related. This case shows the theories’ complementary nature, providing a micro-view on a specific moment within a larger view on the learning activity.

What can we learn from this survey for the future of teaching and learning mathematics in Germany and internationally?

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- The discussion on suitable theory concepts and how they may be developed in a home-grown way goes on and should be renewed again and again.
- This discussion is deeply interrelated to the nature and the development of mathematics education as a scientific discipline. As the TME program has stressed, the awareness of what mathematics education is about should be raised and kept alive, reconsidering and deliberating relevant topics/problems and relating them to the practice of teaching and learning mathematics, which is ever changing.
- There seems to be a scientific necessity for meta-theoretical considerations, whether within a theory culture or across theory cultures in mathematics education; top down, such as was proposed by the TME program; or bottom up by research with the networking of theories approach. How this practice will go on will depend on the kinds of problems to be explored in the field.
- The two theories presented are not only analysis tools fitting a suitable aim and theory concept, they also have a past history of which the community of mathematics education should be aware—this holds true for many theories in mathematics education.
- It is worthwhile to reconsider ideas from past research in order to learn more about continuity and change in our scientific discipline and the practice of teaching and learning, in each country as well as internationally.

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