

## PREFACE

In recent years, the role of symbols and models has become a central topic of attention in (research on) mathematics education. This attention is spread over research communities with a wide variety of theoretical viewpoints. To create a platform where theorists and researchers could present and discuss various viewpoints, an international conference on symbolizing and modeling in mathematics education was held in Utrecht, the Netherlands, in 1998. This conference was organized and sponsored by the Freudenthal Institute, the University of Massachusetts-Dartmouth, Peabody College of Vanderbilt University, and the Royal Dutch Academy of Science. The presentations and discussions at the conference formed the starting point for this book.

The invited speakers were scholars with a special interest in symbolizing, modeling or tool use, and instructional design. An explicit instructional-design perspective was offered by the domain-specific instruction theory for realistic mathematics education (RME), with which many of the attending scholars were familiar. This special position of RME was not coincidental, since the initiative for the conference had come from the Freudenthal Institute, the cradle of the RME approach. We may note, however, that the RME approach reflects a view on mathematics education that is widely endorsed in the international mathematics education community, for instance under names like ‘reform mathematics’, or ‘inquiry mathematics’, and in documents like the ‘NCTM Standards’. Characteristic for this reform mathematics is to choose starting points for mathematics education in problem situations that are experientially real for the students. These problem situations should create the opportunity for the students to engage in informal, personally meaningful mathematical activity. Subsequently, students are to be supported in developing their own informal situated solution strategies into more formal mathematical insights and procedures under their own steam. The question, however, is how to support and guide this process of knowledge construction without interfering with students’ initiative and intellectual autonomy.

The position of the editors of this book is that symbolizing, modeling and tool use play a key role in the answer to this question. We therefore made the role of symbolizing, modeling and tool use in mathematics education the central theme of this book. This theme is approached from different angles and different perspectives. One dimension is that of setting, varying from the study of informal, spontaneous, activity of students, to an explicit focus on instructional design, and goals and effects of instruction. Another dimension is the theoretical framework of the researcher, varying from a constructivist framework, to socio-cultural theory,

cognitive-psychology and instructional-design theory. We hope that this book will show that these approaches provide compatible perspectives.

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