

3. WHAT ARE THE SPECIFIC RESEARCH QUESTIONS OR PROBLÉMATIQUES OF RESEARCH IN MATHEMATICS EDUCATION?

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3. WHAT ARE THE SPECIFIC RESEARCH QUESTIONS OR *PROBLÉMATIQUES* OF RESEARCH IN MATHEMATICS EDUCATION?

Mathematics education lies at the crossroads of many well-established scientific domains such as mathematics, psychology, sociology, epistemology, cognitive science, semiotics, and economics, and it may be concerned with problems imported from these domains. But mathematics education certainly has its own specific *problématiques* that cannot be viewed as particular cases or applications of those from other domains. One question the ICMI study might address is that identifying and relating to each other the various *problématiques* specific to mathematics education.

There are certainly two distinct types of questions in mathematics education: those that stem directly or almost directly from the practice of teaching and those generated more by research. For example, the question of how to motivate students to learn a piece of mathematics (inventing interesting problems or didactical situations that generate a meaningful mathematical activity), or how to explain a piece of mathematics, belong to the first kind. The question of identifying students' difficulties in learning a specific piece of mathematics is also directly linked to practice. But questions of classifying difficulties, seeing how widespread a difficulty is, locating its sources, or constructing a theoretical framework to analyze it already belong among the research-generated questions. The problem is, however, that a difficulty may remain unnoticed or poorly understood without an effort to answer questions of the latter type; that is, without more fundamental research on students' understanding of a topic. Is it, therefore, possible to separate so-called practical problems from so-called research-generated problems?

Is it possible to admit the existence of two separate types of knowledge: the theoretical knowledge for the scientific community of researchers and the practical knowledge useful in applications for teachers and students? It might be helpful to reflect on the nature of these two types of knowledge, on relations between them, and on whether it would be possible to have a unified body of knowledge encompassing them both.

4. WHAT ARE THE RESULTS OF RESEARCH IN MATHEMATICS EDUCATION?

Any result is relative to a *problématique*, to the theoretical framework on which it is directly or indirectly based, and to the methodology through which it was obtained. This relativity of results, though commonplace in science, is often forgotten. One often interprets findings from biology, sociology, or mathematics education as if they were a kind of absolute truth. The reason