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COMMISSION INTERNATIONALE DE L'ENSEIGNEMENT MATHÉMATIQUE

(THE INTERNATIONAL COMMISSION ON MATHEMATICAL INSTRUCTION)

WHAT IS RESEARCH IN MATHEMATICS EDUCATION, AND WHAT ARE ITS RESULTS?

DISCUSSION DOCUMENT FOR AN ICMI STUDY

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As mathematics education has become better established as a domain of scientific research (if not as a scientific discipline), exactly what this research is and its results are have become less clear. The history of the past three International Congresses on Mathematical Education demonstrates the need for greater clarity. At the Budapest congress in 1988, in particular, there was a general feeling that mathematics educators from different parts of the world, countries, or even areas of the same country often talk past one another. There seems to be a lack of consensus on what it means to be a mathematics educator. Mathematics education no longer means the same as *didactique des mathématiques* (if it ever did). French *didacticiens* refuse to translate their *didactique des mathématiques* into "mathematics education": a special English edition of the journal *Recherches en Didactique des Mathématiques* bears the title "Research in *Didactique* of Mathematics." *Die Methodik* (or the Polish *metodyka,* the Slovak *metodika,* and the like) have become obsolete. Does *research* mean the same as *recherche* or *investigación*? How do these words translate into other languages? Standards of scientific quality and the criteria for accepting a paper vary considerably among the more than 250 journals on mathematics education published throughout the world.

Despite this lack of consensus, publications appear that endeavor to depict the "state of the art" in mathematics education research. Individuals try to construct didactical theories. But reviewers never have trouble demonstrating the one-sidedness or incompleteness of such publications. Attempts to describe

research in mathematics education or *didactique des mathématiques* or whatever other name is used may resemble the accounts of the legendary blind men exploring the legs of a huge elephant.

The ICMI study *What is research in mathematics education, and what are its results?* does not seek to describe the state of the art. Nor does it intend to tell anyone what research in mathematics education is or is not, or what is or is not a result. Instead, the organizers of the study propose to clarify the different meanings these ideas have for mathematics educators — to pinpoint the different perspectives, goals, research problems, and ways of approaching problems. The study will bring together representatives of the different groups of researchers, allow them to confront one another's view and approaches, and seek a better mutual understanding of what we might be talking about when we speak of research in mathematics education.

Some Questions About Research

Such a wide-ranging discussion is badly needed in a community increasingly divided into specialized groups and cliques that are not always tolerant of each other. Besides mutual understanding within the community, however, there is also a need to explain the domain to representatives of other scientific communities, among which the community of mathematicians seems to be the most important. Nicolas Balacheff has observed:

> Most of us want to develop this research field within the academic community of mathematicians; this implies both the explanation of our purpose on a social ground (is there any need to develop such research?) and its relevance within the narrow academic world. For this reason, although it is not my sole concern, I have in mind the question of scientific standards, theses, publications, congresses, the employment of young academics in the field, and the connection between our research and research done in other fields.

Thus we need an "inner" identification of the research domain of mathematics education, as well as an outer vision from the perspectives of other domains.

One external domain, for example, is sociology. How is mathematics education organized and institutionalized? Where is research on mathematics education conducted? Where are theses on mathematic education defended? If a mathematics educator employed by a mathematics department has acquired his or her habilitation degree in, say, a department of pedagogy or philosophy (such a degree being unavailable at the employing institution), is he or she accepted as a full member of the community of mathematicians that awards doctoral or master's degrees in mathematics? Are mathematics