The contribution of academic mathematics studies to teaching mathematics in secondary schools: The case of knowledge about the discipline of mathematics

This study investigates the relevance and contribution of academic mathematics courses to secondary school mathematics teaching. The study examines this topic from the perspective of knowledge *about* the discipline of mathematics. The study consists of two parts. The first part focuses on mathematicians who teach academic mathematics to mathematics teachers and on the question of what these mathematicians want to teach teachers about the discipline of mathematics. The second part focuses on mathematics teachers who learn academic mathematics from mathematicians and on the questions: what these teachers learn about the discipline of mathematics in academic mathematics courses; and how this knowledge contributes to their teaching. Data sources included interviews with five mathematicians and 14 mathematics teachers. Data were analyzed using methods of grounded theory and content analysis.

The study found that expanding teachers' knowledge about the discipline of mathematics was one of the participating mathematicians' main objectives. They referred to nine characteristics that can be grouped into three key aspects: (1) the essence of mathematics, (2) doing mathematics, and (3) the worth of mathematics. Almost all the participating teachers reported on contribution of the academic mathematics studies to their knowledge about the discipline of mathematics and on changes in their teaching that concern their new knowledge. Teacher reports were related to the same aspects and characteristics that were found in the mathematicians' interviews. However, whereas all of the participating mathematicians addressed all three aspects and almost all nine characteristics, great diversity was found in the aspects and characteristics that were identified in different teacher interviews. Additionally, teachers attributed different importance to the reported contributions to teaching.