



TSG 7

TEACHING AND LEARNING OF ALGEBRA AT THE SECONDARY LEVEL

The Organizing Team

Chair: Boon Liang Chua, National Institution of Education, Singapore

Cochair: Heidi Strømshag, Norwegian University of Science and Technology, Norway

Members:

Michael Steele, University of Wisconsin-Milwaukee, USA

Levi Elipane, Philippines Normal University, Philippines

Yali Pang, Shanghai Normal University, China

The teaching and learning of algebra at the secondary level is a well-researched field. Topic Study Group 7 aims to bring together international researchers, teacher educators and teachers who investigate students' ways of doing, thinking and talking about algebra, and investigate teachers' ways of designing and implementing the teaching of algebra at the secondary level and the knowledge needed to support effective algebra student learning. The group envisages integrating young researchers and established scholars in the field with the intention of sharing new findings and current research trends in the teaching and learning of algebra at the secondary level. In addition, we aim to foster discussion of theoretical and methodological issues challenging the field. The topic study group will engage a group of interested participants in rigorous discussions emphasizing the following themes:

- Algebraic thinking: defining and characterizing algebraic thinking in students; issues of representation, symbolization, and manipulation, and how algebraic thinking is identified and assessed; relationships between conceptual and procedural knowledge of algebra; and, how students' progress from arithmetical to algebraic thinking.
- Proving and justifying: Their role in the learning of algebra; ways of characterizing and understanding their features and processes (e.g. in expressing generality); and, sociomathematical norms and didactical contracts associated with generalizing, proving and justifying.
- Mathematical tasks: Principles of task design aiming at developing algebraic thinking, and analysis of algebraic tasks used as instruments in classroom research.

- Relationships between teacher knowledge, teaching practice, and student learning: Mathematical knowledge for teaching algebra; classroom practices that support algebra learning and their connection to teacher knowledge; links between teacher practice and changes in student learning of algebra.
- Teaching experiments and design research studies: Conditions that enable or hinder the teaching and learning of algebraic thinking; how new teaching and learning opportunities (e.g., the role of technology, the design principles used) are created and studied in terms of their impact on teachers, students and other actors; the classroom discourse during the teaching experiment; and, how the transition of research into practice is studied.