



TSG 16

REASONING, ARGUMENTATION AND PROOF IN MATHEMATICS EDUCATION

The Organizing Team

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There is international recognition (see Stylianides and Harel, 2018) of the importance of reasoning and proof in students' learning of mathematics at all levels of education (elementary, secondary, university) and in all tracks (general, vocational). Indeed, reasoning, argumentation and proof are at the very heart of mathematical activity, playing a crucial role in learning processes. There is also international research-based evidences showing that many students face difficulties with reasoning about mathematical ideas and constructing or understanding mathematical arguments. Particularly, when these arguments meet the standard of proof, and that teachers often lack of adequate resources for helping their students to develop skills in reasoning, argumentation and proof. Although the existing body of research offers important insights into this area, there are still many open questions for which theoretical and empirically based responses are needed.

We invite submissions of theoretical or empirical research reports on any topic related to reasoning, argumentation and proof in mathematics education, including mathematics interaction with other disciplines (e.g. Computer Sciences, Physics, Economy etc.). The reports can relate to any level of education: elementary, secondary and university (including pre-service teacher education, or in-service teacher professional development).

Below is a non-exhaustive list of topics the reports could address:

- Historical, philosophical, epistemological aspects of reasoning, argumentation and proof in mathematics and in mathematics education.

- Theoretical and methodological approaches to examine epistemological, cognitive, and didactical issues in the teaching/learning of reasoning, argumentation and proof.
- Assessment, curricular, social, or cross-cultural issues related to the teaching/learning of reasoning and proof.
- Classroom-based practices aiming to support learning of reasoning and proof. The place of reasoning and proof in textbooks or other curriculum materials.
- The role of technology in the teaching/learning of reasoning and proof and issues of teaching and learning mathematics in the digital area.
- Issues of reasoning, argumentation and proof in the teaching and learning of mathematical modeling and of mathematics in educational contexts where mathematics is taught as a tool for other fields, including vocational education.
- Students' or teachers' knowledge and beliefs about reasoning and proof.

References

Stylianides, A.J. & Harel, G. (2018). *Advances in Mathematics Education Research on Proof and Proving. An international perspective*. Springer, ICME-13 Monographs.