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Durand-Guerrier, Viviane; Boero, Paolo; Douek, Nadia; Epp, Susanna S.; Tanguay, Denis
Argumentation and proof in the mathematics classroom.

Hanna, Gila (ed.) et al., Proof and proving in mathematics education. The 19th ICMI study. Berlin: Springer (ISBN 978-94-007-2128-9/hbk; 978-94-007-2129-6/ebook). New ICMI Study Series 15, 349-367 (2012).

Summary: Studying the relationships between argumentation and proof could help teachers and students deal with the tension between the process by which a student develops a proof and the requirements the teacher places on the final product. This tension results from the need for students to experience freedom and flexibility during an initial exploratory phase whilst ultimately producing a proof that conforms to specific cultural constraints involving both logical and communicative norms. The chapter explores the issue of whether the activity of developing proofs under a teacher's guidance can be used to introduce students to meta-mathematical concepts such as proof, definition, theorem, axiom, and theory. It also tries to clarify the perspectives underlying its specific proposals, to give insight into their richness, and to provide a basis for further research and innovation.

Classification: E50 D30 D40

Keywords: relationships between argumentation and proof; developing proofs; logical norms; communicative norms; introducing meta-mathematical concepts; designing learning environments; learning activities; teachers' role

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