ZMATH 2015c.00514

Miyazaki, Mikio; Fujita, Taro; Jones, Keith

Functions of open flow-chart proving in introductory lessons of formal proving.

Liljedahl, Peter (ed.) et al., Proceedings of the 38th conference of the International Group for the Psychology of Mathematics Education "Mathematics education at the edge", PME 38 held jointly with the 36th conference of PME-NA, Vancouver, Canada, July 15–20, 2014, Vol. 4. [s. l.]: International Group for the Psychology of Mathematics Education (ISBN 978-0-86491-360-9/set; 978-0-86491-364-7/v.4). 225-232 (2014).

Summary: Amongst important and under-researched questions are how introductory lessons can be designed for teaching initial proofs to junior high school students, and how such lessons enrich students' understanding of proofs. With a view to improving the learning situation in the classroom, in this paper we report on the various functions of introductory flow-chart proofs that use 'open problems' that have multiple possible solutions. Through an analysis of a teaching experiment in Grade 8, and by using a model of levels of understanding of proof structure, we identify the functions as enhancing the transition towards a relational understanding of the structure of formal proof, and encouraging forms of forward/backward thinking interactively that accompany such a relational understanding of the structure of proofs in mathematics.

Classification: E53
Keywords: proof; understanding of proofs; flow-chart proofs; open problems; proving