

Justifications and explanations of mathematical claims in 7th grade textbooks

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Abstract

This study analyzes six 7th grade Israeli mathematics textbooks, developed in accordance with a new national curriculum that was published by the Israeli Ministry of Education in 2009. The study focuses on examining the textbooks' approaches to justifications and explanations of mathematical claims.

This study aims to examine two different aspects of the subject: (1) The justifications and explanations presented in the textbooks to main mathematical claims, and (2) the opportunities provided by the textbooks for students to justify and explain their mathematical work. Both aspects were examined in two central topics of the 7th grade curriculum: equation solving in algebra and triangle properties in geometry.

In the examination of the justifications presented by the textbooks we found that all textbooks present justifications to all mathematical claims examined in this study. Furthermore, based on the theoretical framework suggested by Stacey and Vincent for analyzing justifications presented in mathematics textbooks (Stacey & Vincent, 2009), we noticed that some books present for several claims justifications of more than one type. Moreover we found differences between the types of justifications presented by the textbooks in the geometric topic and the ones presented in the algebraic topic.

In the examination of the opportunities provided by the textbooks for students to justify and explain their mathematical work, we found considerable differences among the textbooks in the percentages of tasks in which the students are required to justify or explain their answer, mainly in the algebraic topic. Additionally, in all textbooks larger percentages of tasks that require justification or explanation were found in the geometric topic than in the algebraic topic. Analyses of the nature of the tasks that require justification or explanation – whether the tasks include a given mathematical claim for students to justify or not – also revealed substantial differences among the textbooks.