

Equivalent algebraic expressions in the 7th grade: Teaching approaches and cognitive demands in three beginning algebra textbooks

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Abstract

Recent research on learning algebra emphasizes the importance of employing tasks that pose higher-level, and diverse cognitive demands. These tasks offer students ample opportunities for a deeper and more extended understanding of mathematical concepts, processes, and relationships. This research compares three beginning algebra textbooks, designed to comply with the new National Mathematics Syllabus. The comparison is made by analyzing both types, and levels of the cognitive demands posed by the tasks that relate to the topic of equivalence of algebraic expressions. The analysis of types was based on a framework developed by Friedlander and Arcavi (in press), whereas the analysis of levels of cognitive demands was based on a framework developed by Stein et al. (2000). The findings revealed considerable differences among the three textbooks with regard to both diversity and levels of cognitive demands required by tasks.

In addition, the research examined and found possible relations between the categories of the analyses of cognitive demands by type and by level.