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Opportunity-to-learn context-based tasks provided by mathematics textbooks.

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Summary: Based on the findings of an error analysis revealing that Indonesian ninth- and tenth-graders had difficulties in solving context-based tasks, we investigated the opportunity-to-learn offered by Indonesian textbooks for solving context-based mathematics tasks and the relation of this opportunity-to-learn to students' difficulties in solving these tasks. An analysis framework was developed to investigate the characteristics of tasks in textbooks from four perspectives: the type of context used in tasks, the purpose of context-based tasks, the type of information provided in tasks, and the type of cognitive demands of tasks. With this framework, three Indonesian mathematics textbooks were analyzed. Our analysis showed that only about 10 % of the tasks in the textbooks are context-based tasks. Moreover, at least 85 % of these tasks provide exactly the information needed to solve them and do not leave room for students to select relevant information by themselves. Furthermore, of the context-based tasks, 45 % are reproduction tasks requiring performing routine mathematical procedures, 53 % are connection tasks requiring linking different mathematical curriculum strands, and only 2 % are reflection tasks, which are considered as tasks with the highest level of cognitive demand. A linkage between the findings of the error analysis and the textbook analysis suggests that the lacking opportunity-to-learn in Indonesian mathematics textbooks may cause Indonesian students' difficulties in solving context-based tasks. Based on the results of this study, recommendations are given for improving the opportunities-to-learn to solve context-based tasks as well as for doing further research on this topic.

Classification: U23 D53 D73

Keywords: opportunity-to-learn; textbook analysis; Indonesian mathematics textbooks; context-based tasks; students' difficulties in solving tasks

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