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An analysis on the level of cognitive demands of mathematical tasks set up by pre-service elementary school teachers.

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Summary: This study analyzed the characteristics of mathematical tasks including the level of cognitive demands set up by pre-service elementary school teachers. 50 pre-service teachers in G university of education who participated in their 4 weeks teaching practicum were selected as subjects. They planned and implemented a mathematics lesson with their lesson plans. Lesson plans, videos of their lessons, transcripts of the videos were gathered and the characteristics of mathematical tasks used in their lesson are analyzed. Through the analysis, several conclusions were drawn as follow. First, 78% of the subjects use modified tasks in mathematics textbooks. Since the modification or the construction of mathematical tasks gives a good chance for constructing mathematical task knowledge for teaching, more chance should be given to pre-service teachers to construct new tasks or modify tasks in mathematics textbooks. Second, types of modification done by pre-service teachers were categorized as number change (15.6%), situation change (78.1%) and material change (6.3%). As *O. Chapman* ["Mathematical-task knowledge for teaching", J. Math. Teach. Educ. 16, No. 1, 1–6 (2013; doi:10.1007/s10857-013-9234-7)] emphasized the importance of MtKT, pre-service teachers must have more MtKT by understanding the characteristics of mathematical tasks. Third, the level of cognitive demands required by mathematical tasks were relatively low. 74% of mathematical tasks were lower cognitive demands and only 26% was higher cognitive demands. The level of cognitive demands of tasks in mathematics textbooks tended to be lowered by the directions given right after the tasks were given. In this respect, the structure of mathematics textbooks need to be changed.

Classification: D50 D30 D49

Keywords: pre-service elementary school teachers; mathematical tasks; level of cognitive demand