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Title: Enactment of Singapore's mathematical problem-solving curriculum in Primary 5 classrooms: case studies of four teachers' practices
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Abstract
The inquiry into how the curriculum is enacted in classrooms is an important one. This study addresses specifically the question: What and how do teachers’ classroom practices enact the Singapore mathematics curriculum which puts mathematical problem solving (MPS) as its central focus?

The classroom practices of four Primary 5 teachers were investigated as case studies. Activity Theory was adopted to frame the study. Classroom practices were seen as an organized activity, a constituent part of an activity system of curriculum enactment. They involved the teacher taking pedagogical actions, mediated by artifacts or tools such as word problems, and specific types of talk/discourse or routines. Such actions lead to an enacted curriculum.

The study’s analytical approach involved two levels. First, a coding scheme was developed to segment the observed lessons. There were four categories of actions, namely, heuristics-instruction, teaching concepts and skills, going over assigned work and student activities, and a fifth category of other events. The lessons were coded. The resulting segmentation, the amount of time spent in each category, and how the time was distributed over a series of lessons served as the staple data to address the question of what and to what extent do the four teachers’ classroom practices emphasized MPS. Through the coding, segments where word problems were mediated were identified for the next level of analysis. Typical episodes were selected for further investigation to address the question of how the teachers mediated word problems to bring about student learning of MPS. The main analytical approach was drawn from Cazden’s (2001) discussion on variations in discourse features, focusing on the interaction and talk about problem solving.

Through the analyses, the study provided a glimpse of what and how the four teachers enacted the curriculum. Generally, they began a topic with the teaching of concepts and skills before moving on to word problems. Such an approach suggests an underlying conception of teaching mathematics for problem solving (Schroeder & Lester, 1989). The four teachers did not use the whole range of types of problems and heuristics as suggested in the curriculum. Instead, mainly routine problems were used and the ‘use a diagram or model’ heuristic predominated. The study also found some
variation in the ways they mediated word problems. One teacher, who spent the most
time in the Heuristics-instruction category, had a traditional approach of teacher-led
talk predominated with Initiate-Respond-Evaluate (IRE) structures. Another had a
similar approach but talked about problem solving more through the action of going
over assigned work. The third had a balance between teacher-led instruction and
student presentation and discussion of their solutions. The fourth had a traditional IRE
approach but included the use of some nonroutine problems and group work.

The findings of this research should inform teacher educators, resource and
curriculum developers, and policy makers, about pedagogical possibilities that could
transform classroom practices. They also suggest the need for further research into
pedagogical actions of more teachers and the factors that bear upon them to broaden
the investigation initiated by this study.