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Formative assessment in Swedish mathematics classroom practice

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Using formative assessment has woken interest in many countries because of the potential effect on student achievement. To investigate Swedish teachers' use of formative assessment in mathematics, this study used classroom observations and teacher interviews of 38 mathematics teachers. The teachers used formative assessment, but additional formative activities could support teachers to better take advantage of the potential in using formative assessment.

Keywords: Formative assessment, mathematics education.

BACKGROUND

Several studies have demonstrated that substantial learning gains are possible when teachers introduce effective formative assessment (e.g., Black & Wiliam, 1998; Hattie, 2009). Despite many reform initiatives concerning formative assessment taken in different parts of the world (Tierney, 2006) a more extensive use of formative assessment is still desirable (Cizek, 2010). To be able to estimate possible learning gains for Swedish students in mathematics, and need for additional content in teacher education and in-service training we need to know the characteristics of current Swedish mathematics teaching in relation to formative assessment.

Effective formative assessment can be conceptualized as practice based on an adherence to the fundamental idea of using evidence about student learning to adjust instruction to better meet student needs, and a competent use of the following five key strategies (Wiliam, 2010):

- 1) Clarifying, sharing and understanding learning intentions and criteria for success;

- 2) Engineering effective classroom discussions, questions, and tasks that elicit evidence of learning;
- 3) Providing feedback that moves learners forward;
- 4) Activating students as instructional resources for one and another;
- 5) Activating students as the owners of their own learning.

PROJECT DESCRIPTION

The study is a part of a larger research project on professional development in formative assessment in mathematics. Participants were 38 randomly selected primary and secondary school teachers. Using interviews and classroom observations, we investigated those teachers' classroom practices to answer the following research question: *How do mathematics teachers in the municipality use formative assessment in their classroom practices?* Using the framework of one fundamental idea and five key strategies in the analysis, we identified actions of the teachers that we called formative assessment activities.

RESULTS

The findings show that most teachers use 11 to 15 formative assessment activities, distributed over the five key strategies as well as the fundamental idea of formative assessment. There are only minor differences between the primary school and secondary school teachers in the extent and the ways the teachers use formative assessment. The overall picture of the mathematics teachers' current use of formative assessment shows both strengths and weaknesses. For example, the teachers adjust their instruction in several ways as a consequence of information about

students' learning. However, the potential of the adjustments are not fully utilized since the teachers often collect such information rather seldom and not from the whole class. In addition, the teachers do not use questions or tasks consciously connected to specific learning intentions.

DISCUSSION

The study shows that the mathematics teachers use formative activities in their classrooms and that similarities predominates differences between the two groups of teachers. However, additional formative activities could support teachers to better take advantage of the potential in using formative assessment. For example, the teachers could use more goal-target questions and tasks that all students answer on mini whiteboards. The identified room for improvement implicates the need for formative assessment to be included in teacher education and in-service training for teachers.

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