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Formative assessment: Teacher knowledge and skills to make it happen

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The study investigates a teacher's use of activities, knowledge and skills when conducting formative assessment during interaction in whole-class. This formative assessment practice includes eliciting information about student learning, interpreting the responses, and modifying teaching and learning activities based on elicited information. Results show that the teacher used activities that help students to engage in common learning activities and take co-responsibility for their learning. Furthermore, while orchestrating the activities the teacher used knowledge and skills that are complex, demanding and difficult.

Key words: Formative assessment, teacher knowledge, mathematics.

BACKGROUND

Several studies have demonstrated that substantial learning gains are possible when teachers use formative assessment in their classroom practice (Black & Wiliam, 1998; Hattie, 2009). At the heart of most definitions of formative assessment lies the idea of collecting evidence of students' thinking and learning, and based on this information modifying teaching to better meet students' learning needs. Such regulation of learning processes would require skills to elicit the thinking underlying students' oral and written responses, and the capacity to make suitable instructional decisions based on this thinking. Sufficient knowledge about the character and use of mathematics teachers' knowledge and skills when practicing formative assessment is lacking (Heritage, Kim, Vendlinaki, & Herman, 2009). The aim of this study is to identify activities, and characterize the knowledge and skills, that a teacher of mathematics uses in her formative assessment practice during whole-class lessons. The definition of formative assessment by Wiliam (2010) was used as analytic tool to identify the

formative activities. A framework based on Shulman (1986), and Ball, Thames and Phelps (2008) was used to characterize the knowledge and skills used by the teacher.

METHOD

The study is a case study of a teacher's formative assessment practice during mathematics lessons in year 5. This teacher is one of 23 teachers that participated in a professional development program in formative assessment during spring 2010. The students of these teachers significantly outperformed a control group at a distal post-test in the end of the school year compared with a pre-test in the beginning of the same school year (Andersson, Vingsle, & Palm, 2013). The lessons in mathematics was observed and audio-recorded for 2 months. In the study a number of examples of situations involving formative assessment have been analysed. The situations were chosen from interactive whole-class lessons from three different time cycles. The examples represent situations where the teacher elicits information of student thinking and learning in different ways.

RESULTS AND CONCLUSION

The main result of the study shows that the formative assessment practice is a very complex, demanding and difficult task for the teacher in several ways. For example, during short-cycle minute-by-minute formative assessment practice the teacher used knowledge and skills to elicit, interpret and use the elicited information to modify instruction to better meet student learning needs. In the minute-by-minute formative assessment practice the teacher handled new mathematics (to her), unpredictable situations and made decisions about teaching and learning situations in a matter of seconds. In addition, she also helped students' to engage in common learning activities and to

take co-responsibility of their learning. Specialized content knowledge and Knowledge of students and teaching were the most useful characters of teacher knowledge used when the teacher searched to understand students' answer and to formulate questions based on incorrect answers.

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