Orchestrating whole class dialogues – a case study of a teacher of second graders

Vivi Nilssen, Institutt for lærerutdanning, NTNU

Basic mathematical proficiency implies the ability to communicate about mathematical ideas, to argue and reason. Teachers play a vital role in shaping this discourse through signals they send on which ways of thinking and knowing that are valued (Anghileri, 2006). The role of the teacher is to promote mathematical understandings through the orchestration of small group and whole class discussions where students actively participate by making explicit their thinking, by listening to contributions made by classmates and indicating when they do not understand an explanation and by asking clarifying questions. This will also help the teacher to monitor the understanding of individuals. Most teachers lack specific strategies to conduct dialogic teaching. Moreover, the literature on successful dialogic teacher strategies in the early school years is scant (Muhonen mfl, 2016). Thus, more research into teachers' proficiency in mathematical communication is needed (van Oers, 2013).
Problem formulation: How do one primary school teacher orchestrate whole class dialoges?

The point of departure for the study is sosiocultural theory as developed by Vygotsky and his followers. Of special interest is Leont'evs (1981) three levels activity theory; the level of overall *activity*, the level of constituent *actions* and the level of *operations* by which the actions are carried out. Energizing motives, the driving forces, is the criterion for activities. Actions are the processes subordinated to conscious goals. Operations depend directly on the conditions under which a concrete goal is attained; what particular means the teacher uses to achieve the goal of the action.

An analysis of whole class dialogs revealed how a teacher used pupils' written work from previous lessons as tools (Burheim, Nilssen & Rønning, 2016). Using a case study methodology (Stake, 1995) I chose to dig into the mathematical theme "edges and vertices" (kanter og hjørner) in order to identify the connection between the two different kinds of work, and explore how the teacher creates settings to encourage the pupils to reason and argue like mathematicians. Data material is whole class dialogs, pupil-pupil dialogs, pupils' written work and interviews with the teacher.

Preliminary findings show that Leont'evs three strata opens up and makes visible the different kinds of actions and operations that seems to be necessary in order to facilitate and conduct a successful whole class dialogue. An example is how there on the operation level are tasks that cannot be fulfilled without sharing of ideas, making the pupils thinking visible which is a goal on the action level.

Conducting whole class dialogs is acknowledged as challenging both for experienced and inexperienced teachers. This is mainly so due to improvisational aspect, you never know what the pupils bring into the situation. This study sheds light on how the teacher prepare for this unknown aspect through actions and operations performed in previous lessons.