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Improving student teaching through use of video recordings as a tool in post lesson conversations

Abstract

This presentation is based on a study of student teachers' mathematical discussions with third graders, supporting the pupils' mathematical reasoning. The aim of the study is to explore how video recordings may facilitate identification of qualities and challenges in student teachers' mathematical discussions with pupils. Deciding which questions to pose and learning how to listen to and interpret pupils' mathematical ideas is acknowledged as a challenging task. Consequently, researchers contend that developing the capacity of professional noticing, *attending* to children's strategies, *interpreting* children's understandings, and *deciding* how to respond, must be an early focus of teacher education programs.

Videotaping seem to help teachers examine their ability to facilitate discussions by slowing down the fast pace of classroom life so that explicit noticing of particular aspects of the discussion can be further analyzed. In this sense, video coaching, the use of taped activities of the student teachers' own teaching, which leads to group discussions, can play an important role in field practice. A group of four student teachers were voluntarily recruited from their third year of a four-year teacher education program with special emphasis on mathematics. The student teachers together with the mentor and a lecturer in mathematics didactics planned for performing productive mathematical whole class discussions.

The data material is videotapes and transcripts from the student teachers' teaching and from pre- and post-lesson conversations in addition to the student teachers' daily reflective logs from their period of field practice. Through an inductive approach, inspired by the constant comparative method, we have identified key features in managing productive mathematical discussions that video recordings enabled the students and mentors to reflect on during the post-lesson conversation.

Extended summary

The presented teacher education project is part of a four years long intervention project where we collaborate with teachers in two primary schools to create a successful learning culture in early learning of mathematics with special emphasis on language development. In the presented study we follow a group of student teachers in their third year of initial teacher education programme having their field practice with one of the collaborating teachers. This presentation is on findings from a study of student teachers' mathematical discussions with third graders, with the aim of supporting the pupils' mathematical reasoning. The aim of the study is to explore how video recordings may facilitate identification of qualities and challenges in student teachers' mathematical discussions with pupils.

Research shows that mathematical reasoning is important for children's later achievement in mathematics (Nunes, Bryant, Sylva & Barros, 2009). Differences in pupils' mathematical

thinking and reasoning could be attributed to the type of questions that teachers ask (Kazemi & Stipek, 2001). However, questions posed within mathematics classrooms across the world fail to provide students with opportunities to reason about mathematical concepts or to explore mathematical connections (Hiebert et al., 2003). Asking questions that probe pupils' thinking is a complex skill that requires thoughtful planning, as well as analysis of the mathematical and pedagogical goal of the lesson (Manouchehri & Lapp, 2003). According to Henning and Lockhart (2003) prospective teachers pose questions quickly with few follow-ups, giving little time for the pupils to expand their answers. Thus, developing questioning skills for mathematical understanding and content knowledge is an important part of learning to teach mathematics.

As with questioning, learning how to listen to and interpret pupils' mathematical ideas is not a simple task (Chamberlin, 2005). Consequently, researchers contend that developing the capacity of professional noticing must be an early focus of teacher education programs (Sherin & van Es, 2005; Star & Strickland, 2008). Jacobs et al. (2010) define and conceptualize professional noticing as a set of three interrelated skills: *Attending* to children's strategies, *interpreting* children's understandings, and *deciding* how to respond on the basis of children's understandings (p. 172).

Work with practicing teachers in the context of video-clubs show that the teachers improved noticing over multiple experiences discussing video from their own teaching. Moreover, conversations about what the participant teachers noticed shifted from a focus on what the teacher was doing to what the pupils were saying (Sherin & van Es, 2005). Videotaping seem to help teachers examine their ability to facilitate discussions by slowing down the fast pace of classroom life so that explicit noticing of particular aspects of the discussion can be further analyzed. In this sense, video coaching, the use of taped activities of the student teachers' own teaching, which leads to group discussions, can play an important role in field practice (Masats & Dooly, 2011).

In the presented intervention study a group of four student teachers were voluntarily recruited from their third year of a four-year teacher education program with special emphasis on mathematics. With the presented theory in mind, the student teachers together with the mentor and a lecturer in mathematics didactics planned for productive mathematical whole class discussions. The executions of these discussions were video recorded, and discussed in the post lesson conversations. Thus, the mentoring followed a cycle of three phases, planning-teaching-reflection.

For research purposes, all phases were video-recorded. A video-based design encompasses the complexity and diversity of voices, perspectives and issues at play during teaching and learning in classrooms. Video makes it possible to freeze, capture and recapture in detail situations in teaching and learning processes. Moreover, in studies of language and communication, details and correct accounts are of great importance, both verbal and non-verbal expressions.

There are two kinds of data material. One is videotapes and transcripts from the student teachers' teaching and from pre- and post-lesson conversations. In the latter the videotaped discussions from the classroom, were observed and discussed. The second data source is the student teachers' daily reflective logs from their period of field practice.

Through an inductive approach, we have used procedures and techniques from the constant comparative method (Strauss & Corbin, 1998). In this process, questions and comparisons were used as main analytical tools: Did the actual teaching go according to the plan? What was in focus/present in the different phases of planning-teaching-reflection? What kinds of questions were asked in the classroom discussions? How were pupils' utterances treated? What are the indicators of the student teachers' competence as mathematical dialogue partners?

What seems to be prominent is the challenging task of understanding and interpreting the pupils' explanations and to represent this accordingly to the aim of the lesson. Even though focused in the planning session, the student teachers found it hard to select *what* to write on the smart board to capture the pupils' responses, and *how* it should be written. This indicates that the student teachers struggle with *contingency*, the ability to respond appropriately to contributions made by pupils. This is one of four categories in the Knowledge Quartet, and captures the ability to handle unplanned events (Rowland, Huckstep & Thwaites, 2005). Our findings are analysed and interpreted using Jacobs et al.'s (2010) conceptualization of professional noticing.

Our findings adds to previous research identifying some key features in a dialogue-based classroom that we would not have identified without video recordings. In the mentoring session, having video recording of the classroom discussion the mentors and the student teachers got the possibility to freeze the discussion in the classroom at crucial points and analyse the ideas made by the pupils and reflect on different possible ways to respond and different ways to represent the ideas on the smart board. The video recording was also a good tool for reflection about how to pace the discussion. Moreover, we know of no other studies in Norway who has explored the use of video in student teaching to develop student teachers ability to perform mathematical classroom discussions.

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