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

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LaUDiM

Language Use and Development in the Mathematics classroom

The reason for the intervention

Productive mathematical discussion:

Discussion where the pupils can reason in mathematics and develop a deep understanding for mathematical concepts.

- To listen to and interpret pupils mathematical ideas is demanding

  (Chamberlin, 2005)

- To stimulated pupils thinking by asking questions is a complex skill which demands good planning

  (Manoucheri & Lapp, 2003)

- Student teachers ask few follow-up questions and give the pupils little time for explaining their answers

  (Henning & Lockhart, 2003)

- Student teachers have difficulties responding to unexpected responses from the pupils

  (Nilssen, 1995)

Research question and intervention

How can video recordings facilitate identification of qualities and challenges in student teachers' mathematical discussions with pupils?

Planning-session

Mathematical discussions

Video supported post-lesson mentoring session

Why video as a learning tool?

- Joint video analysis/discussions develop teachers ability to focus on the pupils thinking and learning

  (Coles, 2013; Sherin, 2004)

- When discussions are based on video recording teachers tend to talk in a more focused, deepened and analytic way about teaching and learning

  (Borko mfl., 2008; Coles, 2013).

- Video sessions give teachers time and new opportunities to notice and explore patterns of interaction in mathematical dialogues

  (Sherin & van Es, 2005).

Data material

- Transcribed video recordings from 4 mathematical discussions between one of the student teachers and a class of third graders
- Transcribed video recordings from pre- and post-lesson mentoring sessions where the mathematical discussions were the topic. Participants here: four student teachers and two mentors (one teacher and one mathematics teacher educator)
- Logs written daily by 4 student teachers during the five weeks of student teaching.
- Notes written by observing researchers from pre- and post-lesson mentoring sessions.

Analysis

Inductive analysis inspired by the constant comparative method (Stauss & Corbin, 1998)

Tools in the analysis:

- Questions
- Comparisons
- Tables

- Sequenced the classroom discussions.
- Coded the dialogues with single or pairs of pupils by open coding.
- Identified and compared challenges across all dialogues concerning time to think, follow-up questions and interpretation of pupils responses.
- Analysed the video-based post-lesson mentoring sessions based on when the video was stopped and what the topic in the discussion was.
- Compared findings in the classroom discussions with utterances in pre- and post-lesson mentoring sessions and the logs.
  - Experiences with mathematical discussions
  - Use of video
- Compared findings from the post-lesson mentoring sessions with utterances about video as a mediating tool in the students logs.

Findings

The analysis shows that both the student teachers and the mentors identified challenges linked to interpreting and representing the pupils thinking as a key challenge.

There were 3 interrelated categories:

- Predict
- Choose
- Represent

Cathrine's dialogue with Sarah about 36 + 40

C: 36 plus 40 (writes 36+40 on the smart board). Now I will give you time to think.

…….

C: Sarah, would you like to tell us what you found out?

S: Eh…. That it makes 76.

C: That it makes 76. Tell me how you figured that out? How did you make 76 out of these numbers?

S: Because I added together the tens first and then I added the ones.

C: So, you added the tens first. How many tens do we have in this task? (Points at 3 in 36).

S: 70, I mean 7.

C: What did you say?

S: Or 3.

C: Three tens. And here (points at 4 in 40)?

S: 4.

C: Four tens (writes =). And then you found that it makes….?

S: 70

(Pupils in the back:: «no, 76»)

C: 70 (writes 7 on the board). And where did you get the number 6?

S: From 36.

C: From 36, so, from this number? (Points at 36)

S: Yes.

C: (Writes 6 behind 7 at the board)

36 + 40 = 76

Excerpts from Catherine's log:

«It was so difficult to interpret the pupils' utterances and to decide how to respond based on that interpretation. Some answers comprised elements which I hadn't considered. It what difficult to respond offhand.»

«When I stood there, in the classroom, I remember thinking: 'How on earth can I elucidate this pupil's idea?'»

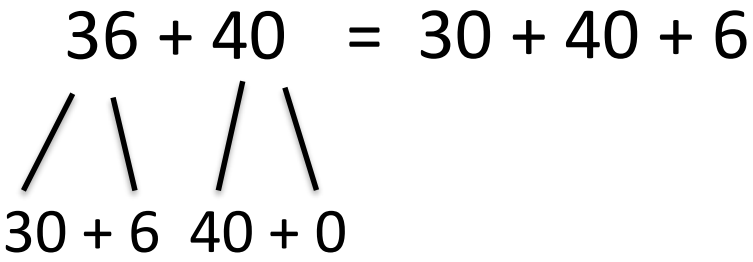
How was this handled in the post-lesson mentoring session?

The mentor from the university:

«What could possibly have been written on the smart board?»

Catherine:

«I could have left something on the board representing what the kid had told.»



Sarah:
"Because I added together the tens first and then I added the ones."

Cathrine's dialogue with Jenny on 36 + 43

C: I think we take one more task. And that is nearly the same, it is 36 plus 43 (writes 36 + 43 on the smart board, and places it under 36 + 40). Think about it individually for some seconds. When you have found an answer, don't do anything, just think about it.

(Quiet for 15 seconds)

C: Tell your working partner how you solved this problem.

(The pupils talk in pairs for 75 seconds, Cathrine listens to some of the pupils)

C: Okey. Did any of you think that this number (points at 43), is three more than this number (points at 40 in the former task), and then added three to the answer? Did any of you think like that? (Some of the pupils raise their hands) Some. But in what other ways did you think? Did any of you solve the problem in a completely different way? I would like to listen to you two (points at Jenny and her partner).

J: I did like 3 plus 4 that makes 7, and that makes 70. And then I took 76, and then I just took 3 more and that makes 79.

C: Yes. So, first you thought it makes 70 (writes =70 on the board), and then you saw that we have 76 here (points at 36), and then you added 3 to 76 (points at 3 in 43), so it makes 79 (wipes out 70 and writes 79).

36 + 40 = 76
36 + 43 = 79

How was this handled in the post-lesson mentoring session?

The mentor at the primary school:
«Now when I see it, I think that you possibly could have written

$36 + 40 = 30 + 40 + 6 = 76$

$36 + 43 = 70 + 6 + 3 = 76 + 3 = 79$

36 + 40 = 76
36 + 43 = 79

J: I did like 3 plus 4 that makes 7, and that makes 70. And then I took 76, and then I just took 3 more and that makes 79.

C: Yes. So, first you thought it makes 70, and then you saw that we have 76 here, and then you added 3 to 76, so it makes 79.

Discussion: Mathematical discussions

- To represent the idea in a way that the pupil recognizes – and thereby confirm the pupils thinking – takes a lot of planning. It is important to be able to *predict* possible answers.
- To represent the pupils' thinking in the whole class discussion in a way that can develop the other pupils' understanding the teacher needs to be able to select which strategies to present and in which order.
- The teacher as an interpreter
  - Understand
  - Translate

Contingency:

Knowledge-in-*inter*action as revealed by the ability of the teacher to 'think on her feet' and respond appropriately to the contributions made by her students during a teaching episode.

(Rowland, Huckstep & Thwaites, 2005).

Discussion: Video as a tool

«The video made the mentoring effective and very instructive (lærerik). We could easily go into a situation and be specific. Looking at the video we had a common point of departure for ours discussion. We were able to discuss specific utterances from the pupils in way that would be impossible if we had to try to remember the words. In that way the video also made is easier to talk about alternative use of the blackboard.»

«In posterity when we saw the video, we were able to listen to the pupil's words ones more and decide which representations that would fit in the actual situation.»

«The pupils' thoughts and how I handled them came into focus. In other words, the video helped us approaching emerging problem without becoming personal.»

«It is easier to hear whether my utterances are understandable and good, or not.»

Ryan, Jonathon (2012) *Importance of researching teachers' beliefs and practices: Stimulated recall.* In: Culturally Responsive Research and Pedagogy Symposium 2012, 13-15 November, 2012, Hamilton, New Zealand. (Unpublished)

Sherin, M.G. & van Es, E.A. (2005). Using video to support teachers' ability to notice classroom interactions. *Journal of Technology and Teacher Education, 13*(3), 475-491.