

ANALYZING TEACHERS' FOLLOW UPS AND FEED FORWARDS, SEEN AS A WAY TO ENABLE STUDENTS' PARTICIPATION IN MATHEMATICAL REASONING

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In an on-going study, mathematics teachers' communications with students are investigated, with an interest in how teachers' acts respond to, interact with and take forward students' mathematical reasoning. To analyze this, an analytical framework, combining follow up and feed forward, separately used in earlier studies (Brodie, 2010 and Björklund Boisturp, 2010) will be proposed. The follow ups and feed forwards are seen as providing students with opportunities, in different ways, to participate in mathematical reasoning. The framework is to be used for studying teacher-student interaction as well as interaction in whole class discussions.

INTRODUCTION

Mathematical reasoning is seen in many international frameworks as crucial for becoming mathematically proficient. My interest lies in how teachers can enable students to participate in mathematical reasoning and thereby develop their competence to justify ideas and conclusions, to create arguments and improve their conceptual understanding.

A Swedish study showed (with several exceptions and some variation) that students, in general, are offered limited opportunities to develop their competence in reasoning (Bergqvist et al., 2009). Generally, activities in the classroom focus mainly on routine tasks and mathematical procedures.

The purpose of this poster will be to propose a basis for an analytical framework that will be used in an ongoing study with an interest in mathematical reasoning.

THE STUDY

The aim of the study is to examine the teachers' use of follow up and feed forward as a means to enable student participation in mathematical reasoning and the possible effect it has on students' reasoning. Follow up is a notion used by Brodie (2010) to describe teachers' responses to students' contribution. Follow up is aiming to respond to, interact with and take forward student contribution. Feed forward as a notion has been used by Björklund Boisturp (2010) as an act related to future acts by the student and/or the teacher, which can create opportunities for mathematical reasoning.

Research questions

- How does the use of different types of follow up and feed forward enable student participation in mathematical reasoning?
- Does the use of follow up and feed forward change when the teachers participate in a collaborative development project?

- How do the different types of follow up and feed forward affect students' reasoning?

METHODOLOGY AND ANALYTICAL FRAMEWORK

Data is gathered from school development projects, seeing collaborative learning as a means to improve teaching. Lessons are video recorded in such a way that the teacher's actions, when interacting with individual students and in whole class discussion, will be captured as well as chosen students' interaction with each other.

For analyzing the follow up and feed forward provided by the teachers, notions from earlier studies will be combined in an analytical framework. Some follow up (Brodie, 2010) attempt to transform the student contribution. It could be by asking the student to elaborate on his/her idea or by the teacher contributing something new which the student uses or by the teacher making her own mathematical contribution. Other follow up maintain student contribution, without any intervention, in the public realm for others to elaborate on. To the analytical framework will also be added notions presented by Björklund Boistrup (2010), for example feed forward as guiding and challenging. The above-mentioned type of follow up and feed forward will, from a socio cultural perspective (Lerman, 1996), be seen as enabling student participation in mathematical reasoning and learning.

Students' ability to reason, as a possible effect of the follow up and feed forward given by the teacher, will be analysed adopting a multimodal perspective where the use of different communicative modes will be taking account for (see e. g. Björklund Boistrup, 2010).

REFERENCES

- Bergqvist, E., Bergqvist, T., Boesen, J., Helenius, O., Lithner, J. Palm, T. & Palmberg, B. (2009). *Matematikutbildningens mål och undervisningens ändamålsenlighet*. Göteborg: NCM och UFM.
- Björklund – Boistrup, L. (2010) *Assessment discourses in mathematics classrooms: a Multimodal social semiotic study*. (Doctoral Thesis from the department of Mathematics and Science Education) Stockholm: Stockholm University
- Brodie, K. (2010). Working with learners' mathematical thinking: towards a language of description for changing pedagogy. *Teaching and Teacher Education*, 27, 174-186.
- Lerman, S. (1996). Intersubjectivity in mathematics learning: A challenge to the radical constructivist paradigm? *Journal for Research in Mathematics Education*, Vol. 27(2), 133-150.

