

Research and Innovation in the Educational Sector – FINNUT

Responsive Pedagogy and Student Learning

– The impact of teachers' feedback practice on students' learning outcome in Mathematics

The main goal of the current project is to examine in depth the relationship between teachers' responsive pedagogy, defined as feedback practice, and students' learning outcome in Mathematics, defined as achievements, self-regulation skills and self-efficacy. Formative feedback is in the current project understood as a means to scaffold students' learning sensitively so that they are supported in making meaning and understanding for themselves based on 'where they are' and 'where to go' to reach future goals.

Aims and research questions

The project emphasizes the development of knowledge about how to understand and assess student learning and their adaptation of the learning environment and develop new learning- and teaching methods to meet the students' needs. This is what we call *responsive pedagogy*. Students' learning, well-being and self-esteem is addressed by adopting a broad definition of learning including achievements, self-regulation (e.g. Pekrun et al. 2011; Pintrich, 2000; Zimmermann, 2000) and self-efficacy (e.g. Bandura, 1997; Schunk & Pajares, 2002), all of which relate to motivation for schooling (e.g. Deci & Ryan, 2000). Finally, teachers' assessment practices, which we have limited to feedback practices in the current project, are a central topic in the Norwegian and international educational discussion. A great deal of international research has explored the relationship between assessment and learning outcomes as measured by tests; however there is little Norwegian research examining this relationship. Moreover, while we acknowledge the importance of studying the impact of assessment on students' achievements, we assume there is more to learning than content achievements with regard to empowering students. Students' belief in their own capacity to learn and their skills in regulating their own learning are crucial to developing life-long independent learners. The perception of student learning used in this project is illustrated in the attached figure.

Further, the project combines teachers' professional learning and rigorous research, which is crucial to move education forward and to develop new understandings of what we see as *The Black Box in Education*: the interplay and relationship between teaching and learning, between teachers' actions and students' responses and actions.

The overall research question is:

- What is the relation between responsive pedagogy (feedback practice) and student learning (achievements, self-efficacy and self-regulation)?

Sub-questions are:

- What are the differences between teachers' and students' perceptions of feedback practices?
- What is the effect of the intervention (working with teachers on feedback practices over a period of 7 months)
 - a) in terms of closing the gap between teachers' and students' perceptions of feedback?
 - b) in terms of improving learning?

Theoretical Perspectives

The project is grounded in sociocultural perspectives on learning and assessment (Greeno, Collins, & Resnick, 1996; Vygotsky, 1986; Wertsch, 1991). We have, however, taken into account the critique raised against this perspective for not sufficiently including individual aspects of learning (Hodkinson, Biesta, & James, 2008; Shepard, 2000). The study draws on both socio-cultural and cognitive perspectives on learning by including concepts from the socio-cognitive theory tradition which we consider useful when investigating such complex phenomena as learning and learning outcome, where individual and social aspects are closely interwoven. The project is situated within Bandura's (1997) theory of self-efficacy which implies that, in order to learn, students have to be able to trust that their own competence will enable them to succeed. Self-efficacy is related to learning since it is a strong predictor of students' motivation for learning. Students have to feel accepted and believe in themselves to develop self-regulation competence to make use of the autonomous learning space.

Methodology

The project is quasi-experimental and intervention-oriented in its nature, and aims at developing new and innovative oriented knowledge both as regards subject didactics in Mathematics, general didactics and research methodology.

It is contextualised in 10 schools located at various centres on the west coast of Norway, in 9th-grade Mathematics teaching/ learning situations. Approximately 40 Mathematics teachers and 1000 students (4 ninth grade classes in each school) form the intervention group. The same number of teachers and students from the same district will be used as a control group.

In order to seek answers to a wide range of research questions using sample groups of various sizes, different methodological approaches are used. The overall research question and sub-questions 1 and 2 require a quantitative approach applying well-known and widely-recognised survey instruments. To examine in depth what happens during the intervention within the experimental group, a qualitative approach is required, including observations, video recordings, and interviews.

The intervention phase lasts for 7 months and includes 3 meetings of all 40 teachers in the experimental group and more frequent meetings with the 20 "inner-circle" teachers (1 from each school). The meetings with all the teachers will have 3 main foci: 1) Presenting research-based information about assessment and the relation between feedback and learning. 2) Discussing the 9th grade curriculum in Mathematics in order to reach an agreement regarding the four main themes to be taught; discussing teaching approaches including feedback practice; and developing assessment instruments for the base-line and post-tests and for each theme during the intervention. 3) Systematic use of dialogic video inquiry connected to videotaped lessons in order to develop the teachers' individual and collective reflections as regards responsive teaching (Seidel, 2014; Seidel, Gröschner, Kiemer, & Pehmer, submitted 2014).

Project Organisation and Management

The current project group consists of Prof. Dr. polit *Knut Steinar Engelsen* (project manager), SHUC; Prof. Dr. *Kari Smith* (research leader), NTNU and UoB; and the Associate Professors: *Frode Haara* (intervention leader), SFUC; *Siv Måseidvåg Gamlem* (post.doc), VUC; *Ingrid Helleve*, UoB; *Anne-Kristin Rønsen*, SHUC, and *Ann Karin Sandal*, SFUC.

Web address for project: <http://prosjektsider.hsh.no/respmath/>
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About the programme

The *Programme for Research and Innovation in the Educational Sector – FINNUT*, is a ten-year research initiative on education. The programme finances research projects on themes linked to ECEC, primary and secondary school, upper secondary education and training, higher education and adult skills. The main goal of the programme is to develop new high-quality knowledge that is relevant for policy development, administration, the practice field and the individual, to contribute to renewal of the research field, and to encourage innovation in the educational sector.

For more information go to: www.forskningsradet.no/finnut

