

Cognitively activating mathematics lessons: A Nordic comparative study

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This presentation reports preliminary results from a video observation study of two specifically selected lessons from each country, Iceland, Norway, Sweden, and Denmark, where each lesson had rich opportunities for cognitive activation. Cognitive activation is a dimension of teaching quality that involves how teachers facilitate students' cognitive activity through challenging tasks and mathematically rich practices. Classroom observations from Iceland have shown opportunities for improvement in this dimension. Preliminary results indicate differences in both lesson content and structure, but similarities in use of group work and discussions, explicit student roles in discussions, and ways of eliciting student thinking. Ongoing analyses of these lessons seek to address implications for the "Nordic model" of instruction.

Cognitive activation

Cognitive activation has been established as one of "three basic dimensions" of instructional quality, along with individual learning support and efficient classroom management (Kunter et al., 2013). Furthermore, cognitive activation is among the dimensions of teaching most often represented in both mathematics-specific and content-generic frameworks for analyzing instructional quality (Praetorius & Charalambous, 2018). In an analysis of 12 frameworks, Praetorius & Charalambous (2018) concluded that cognitive activation consists of three aspects of teaching practice: (1) the teacher's selection of challenging tasks and use of mathematically rich practices, (2) facilitation of students' cognitive activity, and (3) supporting students' meta-cognitive learning from cognitively activating tasks. The aim of this study is to compare the manifestation of cognitive activation in mathematics instruction between Iceland and the other Nordic countries.

Method

The study is a part of a larger research initiative, *Quality in Nordic Teaching* (QUINT). The initial Nordic sample consisted of ten mathematics classrooms from each country: Iceland, Denmark, Sweden, and Norway. In each classroom, three to four consecutive lessons were video-recorded and scored on a four-point scale by trained observers in the mathematics-adapted Protocol for Language Arts Teaching Observations (PLATO; see Grossman, 2019). For this study, specific lessons were identified where the teacher offered students rich opportunities for cognitive activation, according to the PLATO scores for *intellectual challenge* (IC) and *classroom discourse* (CD). In lessons with

strong evidence for IC, the teacher provides students with activities where analytical thinking is required by explaining, justifying solutions or reasoning. In lessons with strong evidence for CD, the teacher provides students with opportunities for mathematics-related talk and the students expand on each other's ideas. The chosen lessons are analyzed qualitatively regarding the three aspects of cognitive activation, i.e. choice and implementation of tasks, activity structures and support of meta-cognitive learning (Praetorius & Charalambous, 2018). In figure 1, a scatterplot visualizes the average scores across lessons in IC and CD where chosen lessons have been highlighted.

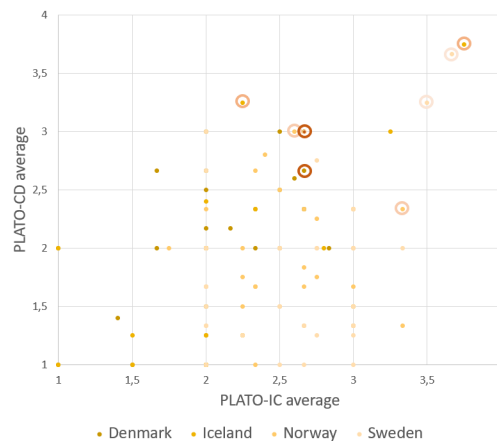


Figure 1. Scatterplot of average lesson scores in IC and CD with lessons chosen for further analysis highlighted.

Results

Analysis of data is ongoing. Preliminary results indicate differences in both lesson content and structure, but similarities in use of lesson time. A further analysis is expected to shed light on which aspects of cognitive activation were manifested in classroom interaction. Results of the currently ongoing analysis will be presented at MADIF-13 and implications for the notion of a “Nordic model” of instruction will be discussed.

Acknowledgements

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References

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