

Decision-making in planning for mathematics teaching

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Keywords: Decision-making, instructional planning.

Lesson planning, as in instructional design, is an endeavouring and fundamental practice of mathematics teaching (Kilpatrick et al., 2001). Teachers in their everyday work has to make decisions in their planning and enacting of lessons which will influence the opportunities to learn students encounter (ibid). Tasks frame students opportunities to engage in mathematical thinking and teachers decisions regarding tasks is related to goals and professional knowledge base and have implications for instructional enactment (Stein & Lane, 1996; Sullivan et al., 2013).

Regarding professional knowledge, when viewing competence in a profession as a continuum (Blömeke et al., 2015), situation-specific skills are considered as mediating processes between disposition and observable behaviour. These skills can be labelled as perception, interpretation and decision-making. This can be seen in parallel to the notion of noticing including aspects such as attending to, making sense of and responding to teaching events (Stahnke et al., 2016). From the review by Stahnke et al. (2016), it was identified that teachers' decision-making is influenced by knowledge and goals and that these mediating skills are related to instructional quality. Further, regarding tasks, it can be a challenging process for teachers to evaluate the educational potential.

Choy (2016) builds on, and extends, situation-specific skills to also include noticing in lesson planning in the FOCUS framework, with attention to task design. Within this framework, a model is proposed to attend to aspects related to tasks and students thinking and how teachers can reflect upon students' potential reasoning. The framework also attends to the teachers reasoning in how they justify their decisions in different phases of teaching, rooted in perception and interpretation. Key aspects in the planning phase include the mathematical concepts, potential student confusion and development and potential implementation of cognitively demanding tasks.

This poster aims at contributing to the ongoing discussion of mathematics teachers' professional knowledge base, by focusing on decision-making in the act of planning with a special focus on cognitively demanding tasks. The guiding research questions are: 1) What aspects of students' disposition towards a challenging task are identified by teachers? 2) How are students disposition taken into account when planning for enacting a challenging task? 3) How do teachers reason about and justify their instructional decisions when planning for challenging tasks?

Method

The data stems from a project involving 1300 students in 45 groups and their mathematics teachers in upper secondary school. The students national test in the current and previous course are used as knowledge measures. The students and their teachers answer a questionnaire during the later stage of the mathematics course. The teacher questionnaire is in focus for this poster, for which data will be generated between March and May 2023. In this questionnaire the teachers answer questions related

to their disposition towards planning for, and reflecting about mathematics teaching for their current class. First the questions attend to resources, orientation and goals. Second it attends to what teachers perceive, their interpretation and decision-making in planning. This second part is situated in presented scenarios where the teachers analyse a task that has been identified as difficult for students on a national level and teachers are asked to plan a lesson, including a cognitively challenging task, and reason around instructional decisions.

The analysis builds on the FOCUS framework identifying the mathematical concept at hand, potential confusion for students and course of action in planning for teaching. First, potential themes will be explored regarding the connection between the mathematical concept, potential confusion and course of action which will be related to what teachers perceive, their interpretation and decision-making in the planning process. Secondly, the analysis aims to uncover the reasoning and justification in decision-making and connecting this to the student group characteristics, such as knowledge and affective domains, when planning for enacting a cognitively demanding task. The analysis can thus provide insights into the professional knowledge base of teaching, focusing on the planning process and situation-specific skills. Further, the analysis aims at exploring teachers' decision-making and reasoning when planning for enacting cognitively demanding tasks, to develop further understanding of this fundamental practice of mathematics teaching.

Acknowledgment

The research is funded by the Swedish research council (grant DNR 2019-04419).

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