

DUTCH TEACHERS' PROFESSIONAL DEVELOPMENT WITH LESSON STUDY: THE CONTEXT OF COUNTING PROBLEMS

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This study presents Lesson Study research outcomes from seven Dutch mathematics secondary school teachers from different schools. The teachers collaboratively prepared two successive research lessons, assisted by an expert teacher trainer and a school process organiser. Teachers' classroom experiences revealed that counting problems are hard for students. Making and ordering a selection with respect to repetition create students' insecurity and frustration. In collaboration we choose Lesson Study alerting the mathematics teachers to focus on students' reasoning (Lewis, Perry, & Murata, 2006). We relate the teachers' professional development in terms of external influences, classroom practices and internal knowledge, beliefs and attitudes (Clarke & Hollingsworth, 2002). The research instruments consisted of teacher learner reports based on the video-taped Lesson Study cycle aspects: preparation, teaching and live observation with discussion / reflection and evaluation. In the learner reports the teachers were asked to highlight what happened and to describe **what** they learned and **from what** they learned: exactly what happened, who was involved, did you expect this and why, what were the effects on you personally, and did you design new plans based on this experience? The data were structured and paraphrased in order to make these accessible. Teachers' written answers were marked by condensed statements representing what was learned and from what was learned.

The results show that the preparation of the Lesson Study made the teachers aware, in line with Verhoef, Coenders, van Smaalen and Tall's (2013) research outcomes, of the fact that students use tricks, highlighted in their textbooks, to solve counting problems. The teachers discussed their classroom practices of students' use of not understandable formulas being aware of students' lack of systematic counting and writing out. The live observation reveals teachers' classroom experiences and student learning as well as the importance of imaging, as reported in Verhoef, Coenders, van Smaalen, Pieters and Tall's (2014) research outcomes. Teaching made the teachers aware of students' uncertainty and the positive effects of playing out. The reflection and evaluation show teachers' awareness with the focus on carrying out the collaborative prepared lessons and the reasoning about teaching and learning strategies.

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