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► **To cite this version:**

Valérie Batteau. Professional development of primary teachers during a lesson study in mathematics. CERME 9 - Ninth Congress of the European Society for Research in Mathematics Education, Charles University in Prague, Faculty of Education; ERME, Feb 2015, Prague, Czech Republic. pp.2945-2946. hal-01289659

HAL Id: hal-01289659

<https://hal.science/hal-01289659>

Submitted on 17 Mar 2016

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Professional development of primary teachers during a lesson study in mathematics

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We study the evolution of primary teachers' practices in mathematics by analyzing the effects of a professional development training called lesson study (LS) in Lausanne, Switzerland. We answer the following question: what practices will change and what will resist change?

Keywords: Teachers' practices, lesson study, professional development.

LS is a field of research and professional development in Asia, in US and in Northern Europe (Lewis & Hurd, 2011; Yoshida & Jackson, 2011). LS is a collective and reflexive process that involves a group of teachers and coaches. LS has four steps to a cycle (Lewis & Hurd, 2011): the group studies a mathematic subject (step 1), prepares a lesson plan (step 2), one of the teachers conducts the lesson while others observe (step 3), and finally, the group analyses and may revise the lesson (step 4), with the option of teaching it again.

Teachers' practices are analysed using the theoretical framework: the double approach (Robert & Rogalski, 2002, 2005) based on a French didactical approach and an ergonomic approach (Leplat, 1997) based on activity theory. In the ergonomic approach, the main goal is to distinguish prescribed work (the prescribed task, or what the teacher must do, planned together during step 2) and real work (the conducted task, or what the teacher does in reality, enacted during step 3). To appropriate the prescribed task, the teacher should modify it. We study the teacher's activity as a process of modifications between tasks (Leplat, 1997; Mangiante, 2007). The prescribed task includes the mathematic task, the mathematical knowledge, the lesson plan and the planning material. Leplat (1997) adds two tasks: the represented task (how the teacher represents the prescribed task and what he thinks

the group attends of him) and the redefined task (the teacher redefines his task according to the prescribed task and his own professional goals).

In this framework, teachers' practices are seen as a complex, coherent and stable system. Regularities are observed in teachers' practices during three important moments of teacher's activity (process of devolution, regulation and institutionalization (Brousseau, 1997)) and correspond to teachers' strategies and choices.

METHODOLOGY AND DATA ANALYSIS

The prescribed task is analysed *a priori*, which means we study the mathematic knowledge at play in the task, the possible resolutions and the didactical variables.

From the conducted task, we analyse the proceedings and the students' offered activities. We set up indicators to describe the teachers' practices in order to categorise their practices in i-genre. We define the represented task and the redefined task from research data (particularly with collective sessions enacted during step 2 and step 4).

We transcribe all video data (lessons and collective sessions) and we analyse with indicators (in Nvivo) video data, written documents and students' productions during the LS cycle.

SAMPLE

The group consists of seven primary teachers ranging from experienced, voluntary and generalist teachers, and two coaches. The LS process occurs over two years with two collective sessions occurring per month.

FORMAT CHOSEN

We present a figure of the LS cycle with first analysis, indicators and results applied to teacher's practices by visual material. Next to visual material there are short sections: (1) Context of the research and theoretical framework, (2) Research questions, (3) Methodology and (4) References.

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