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► **To cite this version:**

Sara Presutti. Relevance and adaptations of a lesson study process within the context of initial teacher education in the canton of Vaud, Switzerland. Twelfth Congress of the European Society for Research in Mathematics Education (CERME12), Feb 2022, Bozen-Bolzano, Italy. hal-03744285

HAL Id: hal-03744285

<https://hal.science/hal-03744285>

Submitted on 2 Aug 2022

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Relevance and adaptations of a lesson study process within the context of initial teacher education in the canton of Vaud, Switzerland

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Keywords: Lesson study, initial teacher education, didactical situation.

Research context and aim

Lesson study (LS) is a model of teachers' professional development that originated in Japan at the end of the 19th century and gained popularity outside Asia almost a hundred years later. Since then, it has been at the centre of a growing interest by researchers in mathematics education, both in the case of in-service and pre-service teaching.

In the latter context, a large amount of experimentation has been made over the past twenty years. Research on this topic shows a variety of promising results for prospective teachers, such as increasing knowledge in and for teaching (Ni Shuilleabhain & Bjuland, 2019). Nevertheless, some issues have been highlighted, such as the risk of simplifying the process, and the subsequent changes in key features of LS itself (Ponte, 2017).

The PhD project outlined in this poster takes place in the context of the training program held at the Lausanne University of Teacher Education, in the French-speaking part of Switzerland, for pre-service mathematics teachers at the secondary level. The project aims to describe and analyse an LS-based class to pursue the following double-folded objective. On the one hand, it seeks to investigate the relevance of introducing LS in this particular context and the potential learning outcomes to prospective teachers. On the other hand, it intends to explore the adaptations and changes needed for LS to fit in with this new setting. For this poster proposal, I focused mainly on the first objective.

Theoretical background

Investigating the relevance of introducing LS into a new context can be done from multiple points of view, such as analysing pre-service teachers' knowledge or perspective-taking. In this doctoral research, these aspects are taken into account together with the study of the characteristics of LS as a didactical situation, according to Clivaz's research (2018) and the Theory of Didactical Situations (TDS, Brousseau, 2002).

In particular, Clivaz considers that in LS teachers are engaged in some *adidactical* situations, in which they can acquire new knowledge under the pretext of designing a lesson, which, in TDS terms, constitutes the *milieu* of these situations. To analyse a situation's potential, Hersant (2010) identified three properties of the *milieu*, namely the capability to provide feedback, bring out the desired knowledge and ensure that the knowledge needed to enter the situation is available to the learners.

Moreover, Hersant extended TDS investigation on situations where the *milieu* is less robust, and the didactical contract is more binding. This seems to be the case of LS when applied to initial teacher education. In fact, pre-service teachers' limited teaching experience makes the situation's *milieu*

weaker. At the same time, the new setting implies constraints including a strict schedule, partially established content and evaluation, which entail a stronger didactical contract. In this case, Hersant analysed the didactical contract according to four dimensions: the mathematical domain, the didactical status of the knowledge at stake, the distribution of responsibility between the learners and the teacher and the characteristics of the didactical situation.

Methodology

The experimental design of the research is that of didactical engineering, in accordance with the TDS framework. The study of the LS class has been hence organised into three parts: *a priori* analysis of the *milieu*, data collection, *a posteriori* analysis of the *milieu* and the didactical contract.

The LS-based class included 12 sessions with five prospective lower-secondary school mathematics teachers. The class was organised around studying a teaching problem and the subsequent preparation, teaching and discussion of a research lesson related to it. The mathematical topic, chosen in advance, was that of integers. A university trainer with experience in LS served as the facilitator, while experienced schoolteachers supported the group's work during certain LS phases.

Data collected consists of the video recordings of each session and preparation meeting, the lesson plan, the prospective teachers' notes, and the documents shared within the group. These are used to reconstruct the situation's *milieu* during *a posteriori* analysis and examine the four dimensions of the didactical contract. To gain better insight into the participants' learning, *a posteriori* analysis will be supported by the course final assessment, and it will be completed by semi-structured interviews.

Since the data collection was postponed due to Covid-19, data analysis is at a preliminary stage. Some expected results include a dynamic description of the situation's *milieu* and an evaluation of LS potential as a didactical situation, despite some limitations due to the initial teacher training setting.

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