

# Preparing and orchestrating mathematical whole-class discussions in lesson study

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## Introduction

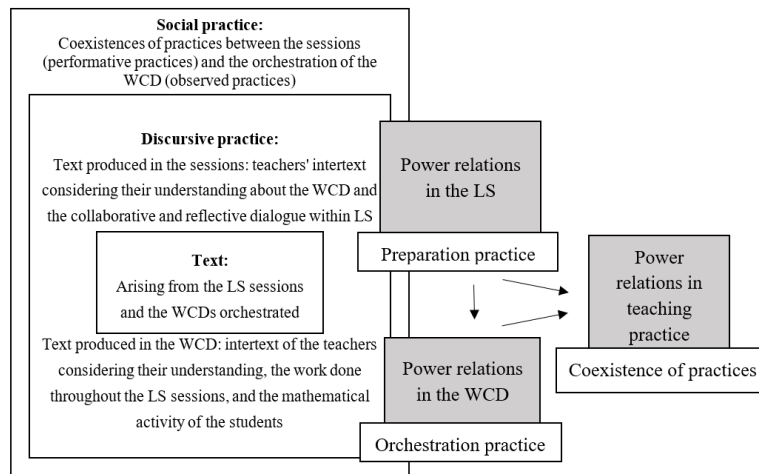
Whole-class discussions (WCD) have been relevant in mathematics education research. As result, challenges of orchestrating WCD have been identified, such as how to promote communication, and manage time and task cognitive challenge. Practices for preparing and conducting such moments have also been listed (Ponte, 2017), still orchestrating a WCD remains challenging, even in a lesson study (LS), because it requires a change in teaching methods (Takahashi, 2021). In a LS teachers plan a lesson in detail, and it is expected that the task and the structure of the lesson have exploratory features, involving a moment of WCD. In Japan, where LS originated, WCD is considered the heart of the lesson (Takahashi, 2021). Therefore, the contribution of LS to improve orchestration practice, reducing those challenges, deserves attention. Thus, we aim to identify the relations between preparing and orchestrating a WCD in a LS carried out in Portugal.

## Whole-class discussion in lesson study: The *neriage* moment

LS is a teacher professional development process where teachers collaborate in a reflective environment to improve their students' learning in different subjects. Fujii (2018) and Takahashi (2021) mention that, when it comes to mathematics learning, the lesson planned should consider problem solving and an exploratory approach. Fujii (2018) also presents a model of the LS cycle with five phases: goal setting, lesson planning, research lesson leading and observation, post-lesson discussion, and reflection. Lesson planning is the longest: teachers study the curriculum, tasks, and plan a lesson in detail. Takahashi (2021) states that students should study mathematics to learn its process. Therefore, the lesson planned in detail in a LS must have a structure and flow that promote students' mathematical thinking (Fujii, 2018; Takahashi, 2021). One moment that is planned for the lesson is the WCD, also called *neriage* – a dynamic and collaborative WCD, facilitated by the teacher and emerging from the students' solutions (Takahashi, 2021).

## Methods

This is a qualitative study and data were collected through recording of all 9 LS sessions. Sessions were transcribed and excerpts regarding WCD decisions were selected. The data were analysed through an articulation of Fairclough's critical discourse analysis and Foucault's concept of power. Discourse is thus understood as a mode of action, even if only intended (Fairclough, 1992), and intertextuality states that all discourses are anchored in previous ones (Foucault, 1980). Foucault's definition of power (1980) suggests that it forms knowledge and produces discourse, so it should be considered as a productive network. Figure 1 shows how the data were structured.



**Figure 1: Articulation of Fairclough (1992) and Foucault (1980) discourse analysis**

The first author of this paper was the facilitator. The participants were Marta and Diana, participating for the second time, and also Petra, participating for the first time (pseudonyms), who worked at the same school. The lesson was prepared for grade 5, regarding conceptions of angle.

## Results and content of the poster

The results show that when deciding the task, the teachers anticipated how the discussion around the students' possible answers would be and how this discussion would contribute to achieve the lesson goal. Therefore, there are power relations between planning and orchestrating a WCD in a LS. However, time management and students' different levels of understanding proved to be a challenge for Diana and Marta's practice, influencing the WCD. The conference poster includes photos, schemes, and text to give evidence of work on the mathematics task and teachers' dialogue.

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