



**HAL**  
open science

## Planning a lesson in lesson study: The role of the facilitator

Paula Gomes, Filipa Faria, Micaela Martins

► **To cite this version:**

Paula Gomes, Filipa Faria, Micaela Martins. Planning a lesson in lesson study: The role of the facilitator. Thirteenth Congress of the European Society for Research in Mathematics Education (CERME13), Alfréd Rényi Institute of Mathematics; Eötvös Loránd University of Budapest, Jul 2023, Budapest, Hungary. hal-04412205

**HAL Id: hal-04412205**

**<https://hal.science/hal-04412205>**

Submitted on 23 Jan 2024

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

# Planning a lesson in lesson study: The role of the facilitator

Paula Gomes<sup>1</sup>, Filipa Faria<sup>1</sup> and Micaela Martins<sup>1</sup>

<sup>1</sup> Instituto de Educação, Universidade de Lisboa, Portugal; [paula.gomes@office365.ulisboa.pt](mailto:paula.gomes@office365.ulisboa.pt)

*Lesson study is a collaborative professional development process focused on student learning. This process requires skilled facilitation, yet research on the facilitator's role is limited. This qualitative research aims to characterize the facilitator's role during the lesson planning phase by analysing the facilitator's actions in two lesson studies carried out in Portugal. Data collection includes field notes, audio recordings, and document collection. The results highlight the importance of careful preparation by the facilitator of the lesson study sessions, drawing on teachers' experiences and selecting appropriate resources to address their concerns, such as encouraging discussions on task design to foster student learning. Anticipating and being receptive to teachers' ideas, allowing them to intervene and build knowledge collaboratively, and adjusting the planning were also considered crucial.*

*Keywords: Lesson study, facilitator's role, collaboration, mathematics teaching.*

## Introduction

Lesson study (LS) is a professional development process grounded in collaboration among teachers and is part of everyday life in Japanese schools (Fujii, 2018). A common feature of using this process outside Japan is the presence of a facilitator who facilitates the LS sessions and seeks to contribute to collaboration and reflection as the basis of the work to enhance the development of teachers' knowledge (Clivaz & Clerc-Georgy, 2020; Lewis, 2016). The role of the facilitator "is quite complex given the need to balance teacher support with teacher empowerment" (Hourigan & Leavy, 2021, p. 3). Furthermore, some facilitators have limited or no experience either in participating or in leading LS and there is limited literature on facilitating LS (Lewis, 2016; Mynott & Michael, 2022). Thus, it is quite important to conduct research to support LS facilitators. Therefore, we aim to characterize the facilitator's role in the lesson planning phase. Accordingly, our research question is: What are the facilitator's actions that may be identified in preparing, leading, and adjusting the LS planning sessions, and how they may be useful to enhance learning opportunities for teachers?

## Facilitating lesson study

In LS, teachers work collaboratively in a reflective environment to improve their practices, focusing on student learning. Their work on the detailed preparation, leading, and reflection on a lesson, the *research lesson*, is quite different from other formative processes where "teachers are the passive receivers of expert knowledge" (Hourigan & Leavy, 2021, p. 1). In Japan, LS is embedded in the professional culture and is supported by experienced teachers and by knowledgeable others with expertise in the content, teaching, and in LS (Hourigan & Leavy, 2021). In other countries, as a scarce number of teachers and facilitators have previously participated in LS, the facilitator lack the prior experience to effectively facilitate LS (Lewis, 2016). Research shows that the facilitator's role is complex as it requires a balance between being an expert, a teacher trainer and a member of the LS group guiding the teachers while giving them space to express their questions and to build knowledge collaboratively (Clivaz & Clerc-Georgy, 2020; Lewis, 2016; Mynott & Michael, 2022). The

facilitator needs to have knowledge about LS, content and pedagogy, and to understand the many facets of school life and teaching (Clivaz & Clerc-Georgy, 2020; Hourigan & Leavy, 2021). The facilitator also has to select resources, while considering the challenges pointed by the teachers, but he/she cannot script completely the sessions in advance because the agenda is based on teachers' assessments of their students' needs and their teaching challenges (Lewis, 2016). Therefore, as pointed by Lewis (2016), leading LS sessions is challenging and requires prior preparation.

The role of a facilitator can be compared to that of a teacher who plans a lesson in which the students' learning emerges from student-student and teacher-student interaction. Just as the teacher orchestrates the whole-class discussion based on students' work through different actions, the facilitator's actions in leading the LS sessions are based on teachers' interventions. These actions of the facilitator depend on the LS phase, as each of them has different purpose. During lesson planning, teachers are expected to carefully explore the learning goal and to plan the lesson in detail, without losing the focus on student learning (Fujii, 2018). So, the facilitator has to "follow the lead of teachers in the moment ... because so much of lesson study is entwined in experience, and because teachers' interests and needs drive the process" (Lewis, 2016, p. 530).

Just as a teacher plans, teaches, and adjusts the lesson considering students' work in a mathematics class, the facilitator prepares, leads, and adjusts the LS sessions. *Preparing the session* involves selecting the resources that will be analysed to foster discussions among the teachers (Lewis, 2016), such as articles or videos, tasks to solve and analyse, and samples of students' work. As the teacher can anticipate the students' work, the facilitator can anticipate the teachers' contributions and define which aspects should be highlighted in a particular session. Shaughnessy et al. (2021) proposed a framework involving discussion leading practices which include "eliciting contributions, probing student thinking, orientating students to thinking of others, and making contributions" (p. 455). Similar, by *leading the session*, the facilitator can make contributions or elicit teachers' contributions to engage several of them to participate and to keep the discussion on track (Clivaz & Clerc-Georgy, 2020). It is also important to guide teachers toward the thinking of others and probe their thinking so they can elaborate their ideas and respond to each other's contributions. However, as LS work is a result of the ideas of different teachers with different experiences, it is essential that the facilitator pays special attention to *adjusting the plan* for the next sessions or even in the ongoing session, based on the challenges and needs pointed out by the teachers and on their work (Lewis, 2016).

## Methods

This is a qualitative and interpretive research in which fieldnotes, audio recording of the LS sessions (S<sub>x</sub>) and document collection (tasks and lesson plans) are the data sources. All names used are pseudonyms. We draw on the work of two facilitators that were novice in this role. This was the first time that Facilitator A (second author) led a LS and it was the second time for Facilitator B (first author). Both facilitators read and discussed articles about LS and its potential for the development of teachers' knowledge. As there was no LS with in-service teachers in Portugal for them to participate, they discussed about LS and how to facilitate it with experienced LS facilitators.

In both LS, the teachers voluntarily engaged and decided to pay particular attention to the development of students' mathematical communication and reasoning processes. From this decision,

the facilitators suggested that the teachers planned lessons in which the teacher proposes tasks for which students do not have an immediate solution and orchestrates whole-class discussions in which students explain their strategies and reflect on those of their peers. Facilitator A prepared and led one of the lesson studies (LS1) whose participants were four 6<sup>th</sup> grade teachers, all with more than 20 years of teaching experience. Although the teachers already worked together to design instruments for students' assessment, this was the first time they participated in a collaborative professional development process. During the planning phase, the teachers solved and analysed tasks on direct proportion, as it was the mathematical topic that they selected for the research lesson. Facilitator B prepared and led the other lesson study (LS2) with secondary school teachers, with whom she had previously worked. The teachers, all with more than 15 years of teaching experience, decided to plan a lesson for grade 11 students on the topic of arithmetic progressions.

To characterize the facilitator's role, we analysed the actions of two facilitators based on two existing frameworks. The first was based on Shaughnessy et al.'s (2021) ideas about discussion-leading practices, and the second was based on Lewis's (2016) ideas about the facilitator's role in preparing and adjusting the LS sessions. Through a deductive and inductive coding process, we identified a set of actions (Table 1) that we used to characterize the facilitators' role.

**Table 1: Facilitator's actions during the lesson planning phase of LS**

Preparing	<p>[P1] <i>Selecting resources</i> to suggest read/analyse/discuss, as papers, tasks or lesson videos.</p> <p>[P2] <i>Anticipating participants' contributions</i>, as their ideas about tasks, whole-class discussions or students' reasoning processes.</p> <p>[P3] <i>Defining the aspects to highlight</i>, as structure of the research lesson, representations or reasoning processes, by preparing questions or other contributions.</p>
Leading	<p>[L1] Making contributions, as redirecting, revoicing and highlighting the main aspects, to keep the discussion on track.</p> <p>[L2] Eliciting teachers' contributions, asking a teacher to share his/her ideas and engaging several teachers to participate, to bring out what has been said.</p> <p>[L3] Orienting teachers towards the thinking of others, posing questions about others' ideas, asking to comment or add what has been said or done, encouraging to respond to others' contributions.</p> <p>[L4] Probing teachers' thinking, asking to clarify or elaborate their ideas and posing questions, to get teachers to explain their thinking.</p>
Adjusting	<p>[A] <i>Adjust</i> the plan of the session, considering the analysis on the previous session(s) and/or the participants' contributions.</p>

When analysing the influence of these actions on teachers' professional development, focusing on collaboration and development of knowledge, three dimensions of analysis emerged: resources selected by the facilitator, design of the task for the research lesson, and planning the research lesson. To ensure the quality of the data analysis, all authors separately coded the data and regularly met to discuss and reach a consensus.

## Results

### Resources selected by the facilitator

In LS1, the facilitator selected two videos to illustrate different ways to orchestrate whole-class discussions [P1]. She selected one video in which the teacher had a predominant role and one centred on the students' role, anticipating that teachers would identify and reflect on this difference [P2]. In addition, she planned to highlight several aspects, namely the management of students' participation and the strategies they could use [P3], preparing questions to ask such as "Does the teacher on the video emphasize the answer or the solution strategy?". When the discussion about the first video began, two participants tried to understand the teacher's goals in the whole-class discussion:

Patrícia: Does he [the teacher] only want to foster oral communication? ... [when] our students draw up posters, it was easier for them to explain their reasoning. ... but with help...

Catarina: ... We should have solved the task.

Facilitator A: ... Regarding the task, I'll show you again just in a moment. Let's just finish this [video] excerpt [L1]. (S5)

The facilitator structured the session focusing on orchestrating the whole-class discussion, but she did not anticipate that the teachers would feel the need to solve the tasks explored in the videos. In the session, she showed and read the tasks more than once, and tried to highlight the aspects of the whole-class discussions that she had planned [L1]. However, it might have been important to give the teachers time to solve the tasks before focusing on orchestrating the whole-class discussion [A].

In LS2, the facilitator selected tasks [P1] where students could use several strategies, encouraged teachers to solve them by thinking like students, and asked them to share their strategies [L2]:

Jonas: This helps us to think, discuss, and see other paths [of solving the task] ... I was amazed by the strategy of triangular numbers because I couldn't see that ... I really guide students to the answers. I don't have these opportunities to get surprised because I don't give [the students] many opportunities in these kinds of tasks. However, I think I have to. (S2)

The teachers' reflections on their practice, based on the work they did, led the facilitator to adjust the plan for S3 [A], proposing a similar work to that of S2 and encouraging the teachers to identify possible students' difficulties and changes in the tasks. In S3, the facilitator proposed reading articles about students' reasoning processes and designing tasks to promote them [P1]. In S4 the facilitator asked the teachers to share their ideas [L2] on their readings or to comment the contributions of others [L3], and highlighted the challenge related to selecting tasks [L1]:

Facilitator B: Does anyone want to add anything? [L3]

Manuel: I think the difficulty is to find tasks to take into the classroom ... and the lack of practice we have [in teaching lessons organised as the one they were planning].

Facilitator B: So, we have the tasks that Alberto had also mentioned ... this difficulty in finding tasks that fit this work. [L1] (S4)

Although the teachers identified selecting tasks as a challenge, adjusting the planning of the sessions from their interventions and reflections enhanced the discussions about task design and enactment.

These examples show the importance of the facilitator's role in preparing the LS sessions, particularly by selecting resources to meet the LS goals, and in adjusting the plan based on teachers' concerns.

## Design of the task for the research lesson

In LS1, the facilitator proposed tasks to explore direct proportionality [P1], since this was the content that teachers wanted to work with. In S6, the teachers selected and adapted a task whose context was the rental of bicycles from two different companies, one of which had a constant price/time ratio, both represented in tables. When preparing S7, the facilitator identified possible changes to the task, considering the lesson goal, and adjusted the session planning [P3, A] to analyse the task once again, particularly the wording of the questions, before focusing on the lesson plan:

- Facilitator A: I was looking at the task once again... “Which of the companies should the students choose for their tour? Explain your reasoning.” ... I wonder if this question could be unfolded or adapted? [L4] The question may not support students to explore the numerical relationships of each table, and only lead them to conclude that for an X period it is more economical to rent [bicycles] of a certain company [L1].
- Patrícia: Right, the students may think “I ride 20 minutes, then 20 minutes more”.
- Rita: ... Maybe it’s the second question of the task, the one we ask about if they can predict [the price to pay for the time spent riding a bicycle]. (S7)

When planning the session, the facilitator prepared questions to promote discussion about the appropriateness of the task for students’ work [P3], such as asking if the questions could be unfolded or adapted [L4]. The facilitator also felt the need to contribute to highlighting aspects of the goal of the task they adapted and how its wording could influence students’ mathematical activity [L1]. Once the task was adapted, the lesson plan was then analysed.

In LS2, between S3 and S4, the teacher Alberto shared several tasks which, in his view, students could solve after they had “understood and mastered the concepts of arithmetic and geometric progression” (S4). One task was about a girl who saved 25€, one week later she saved 5€ more than the week before, and so on. One question was about the amount saved in the eighth week and another about the money she kept one year later. The facilitator adjusted the preparation of the session for teachers to analyse the tasks proposed by Alberto and to discuss how to adapt them [A], considering the articles she had selected [P1] and the curriculum guidelines:

- Facilitator B: We could perhaps look at the document of the principles for task design from Alberto’s proposal. [L3] ... I would give the floor to Alberto... [L2]
- Alberto: [One can] modify the statement in something that is not clear to the student...
- Sofia: To meet what we have just seen, namely the generalization ... instead of giving [the task] at the end [of the topic] we could try to do the generalization ... another question where we ask the students to try to come up with the expression that allows them to calculate the money she saved in the  $n$ -th week ... I don’t know to what extent they may come up with the general term before the topic is taught.
- Facilitator B: ... Sofia has made a challenge here: starting from what the students already know, make a generalization [L1] ... Could the task be proposed before the students learn the expression of the general term of an arithmetic progression? [L3]
- Manuel: If you give that [the task] at the beginning [of the topic], you must give some hints.
- Facilitator B: Do you think that’s necessary, Manuel? [L4]
- Manuel: I think so. They will add up 5 and 5 and 5 ... and they will see some regularity there. Only then, they have to connect it to the first [term]. (S4)

Thus, the tasks proposed by one of the participants influenced the preparation of S4. Teachers’ interventions, like Sofia’s one, influenced the way the facilitator led the session, making contributions [L1], asking teachers to share their ideas [L2], posing questions [L4] and trying to get teachers to

comment on Sofia's suggestion [L3], while keeping the discussion focused on students' knowledge. After some discussion, they reformulated the task and use it to introduce the topic.

In both LS, analysing and adapting tasks to meet the lesson goals supported teachers' reflection on the potential of tasks in which students can use various strategies which can be analysed and compared in the whole-class discussion. With this in mind, the facilitators adjusted the sessions according to the teachers' proposals, using them as a starting point for work in the next sessions.

### **Planning the research lesson**

In one of the videos that the teachers watched during LS1, the students were asked to note their different solving strategies on posters. Between S6 and S7, the facilitator asked teachers to write the lesson plan from a plan model, previously suggested by her to highlight important aspects of the lesson [P1, P3]. In this planning model, teachers were guided to plan the different moments of the lesson, anticipate the students' strategies and difficulties and the teacher's actions, and a possible blackboard organization. Since teachers only wrote "Put the posters on the board", without anticipating the students' productions or the sequence of the posters, the facilitator decided to raise these issues:

Facilitator A: I noticed that you opted for the posters for organize the board. [L1]

Patrícia: [But] making the posters will take forever.

Facilitator A: But... why the posters? [L4]

Patrícia: It was to be visual, so it wouldn't take too long to go through the students' productions to the board. ... If they use different strategies ... we should discuss them.

Facilitator A: ... [Should we opt for] posters just to show the students' work? [L4]

Patrícia: It would be easier to present, but more challenging to do in 50 minutes. (S7)

The teachers' choice to use material they saw in the videos led the facilitator to reflect on the influence of the selected resources on planning, therefore this was an aspect that she decided to highlight [L1]. Asking teachers why they made that decision was an intentional action from the facilitator, which led the teachers to reconsider the decision taking into consideration time management and effectiveness [L4]. The students would be exploring the tabular representations presented in the task, so the teachers decided to put those representations on the board. Then, they planned to note the regularities found by the students next to the tables, so the relationship could be explored in the whole-class discussion.

In one of the LS2 sessions, teacher Manuel shared his concern about the interventions he could make to support the students while solving the task and during the whole-class discussion: "What I am worried about is what I have to say for them [the students] to get there [to make the generalization]" (S4). As that was a common concern, still in S4, the facilitator suggested they read again the text about fostering students' reasoning processes [A], paying special attention to the teacher's actions. Thus, the facilitator adjusted the plan for S5 [A] to address the teachers' concerns and to discuss possible teacher interventions before planning the whole-class discussion:

Facilitator B: Students may come up with an incorrect answer...what can they learn? [L4]

Alberto: It is important to present incorrect examples ... the student can rethink what he/she wrote...

Facilitator B: ... Students will record their answers without erasing their classmates' answers. ... At the end, we can compare the various strategies [L1] ... the equivalence between  $25 \times 3(n - 1)$  and  $22 + 3n$  ... what if a graphical representation arises? [L2]

- Alberto: ... We could make an analogy between the equation of the straight line and the general term of the succession...
- Jonas: Then you would direct them all to work that way ... there wouldn't be much diversity [of strategies]. (S5)

Adjusting the plan and leading the session through making or eliciting teachers' contributions [L1, L2] and through probing teacher's thinking [L4], the facilitator led the teachers to rethink their practice, such as not standardising students' strategies or exploring incorrect answers.

Since research points to orchestrating whole-class discussions as challenging for teachers, both facilitators paid attention to the planning of these moment by encouraging teachers' reflection on the use of the board and on their possible interventions and actions to promote student learning.

## Conclusion

When *preparing the sessions*, the facilitators selected resources for teachers to collaboratively analyse to meet the goal of each LS and the concerns that the teachers had. Analysing articles and videos through *making contributions*, *eliciting teachers' contributions* or *orienting them toward the thinking of others*, supported by *anticipating the participants' contributions* and *defining aspects to highlight*, fostered important discussions about task design and orchestrating whole-class discussions. Regarding the tasks, a challenge that the teachers identified was selecting and enacting tasks in which the students could follow different solving strategies. The tasks that the facilitators selected and the way they led the sessions promoted discussions about their potential and fostered collaborative work on adapting tasks to promote student learning. Since teachers play an important role in "supporting students' engagement and learning through discussion" (Shaughnessy et al., 2021, p. 452), the facilitators also focused on encouraging the teachers to prepare them in detail.

As in LS the "teachers drive the agenda and co-design the learning opportunities in real time" (Lewis, 2016, p. 538), the facilitator may need to *adjust the planning* during the session or for the following sessions. However, making that decision in the busy pace of the session is challenging, especially for novice facilitators. In this study, we illustrated how two novice facilitators made different decisions to adjust the LS according to the concerns identified by the participants. One sought to keep the focus on the role of the teachers and the students in the whole-class discussion, even if the teachers felt the need to solve the task before analysing it (LS1), which illustrates the importance of the facilitator's role in keeping the discussion focused to promote the development of teachers' knowledge. The other decided to adjust the LS plan so that the task design was based on the intervention of a participating teacher (LS2). This case shows the importance of the facilitator being receptive to the participants' ideas and adjusting the sessions to their concerns.

The role of the LS facilitator is indeed complex (Hourigan & Leavy, 2021). It is about *carefully preparing each session* promoting a collaborative environment on the planning of a lesson and seeking the teachers to focus on student learning. Additionally, the facilitator needs to consider that the plan can be *adjusted* according to the work, discussions and uncertainties or challenges pointed out by teachers, both from a session to the next and while leading the LS session, which was also pointed out by Lewis (2016). What resources could be useful to promote discussions among teachers, foster collaborative work, and enhance their knowledge development? What might be too challenging for teachers, as orchestrating the whole-class discussions, and how to help them to overcome those



challenges? The facilitator's role is also about *leading the sessions*, finding a balance between being directive (Clivaz & Clerc-Georgy, 2020), by making contributions and providing teachers with expertise, and being an invisible leader, by orientating teachers towards the thinking of others and probing their thinking, letting teachers intervene and to build knowledge collaboratively. So, when to take the role of a leader, the role of a member of the group or both? What kind of interventions should the facilitator make? And, when to make those interventions to keep the discussion focused but without losing the participants' insights? And finally, the facilitator's role also stands on *adjusting the sessions* considering the work, discussions and concerns identified by teachers, both from a session to the next and while leading the LS session, which was also pointed out by Lewis (2016).

Reflecting on our role as facilitators, as a leader and a group member, and on the interventions and concerns pointed by the teachers, allowed us to adjust the plan, seeking to get teachers to do rather than tell them what to do, to rethink the resources we could use and to anticipate what might be too challenging for teachers, reducing the complexity of the in-the-moment decisions during the LS.

## Acknowledgment

This work is supported by national funds through FCT – Fundação para a Ciência e Tecnologia and by IE-UL – Instituto de Educação da Universidade de Lisboa by a grant to Filipa Faria (UIDP/04107/2020), Paula Gomes (SFRH/BD/145118/2019) and Micaela Martins (SFRH/BD/143869/2019). We also thank to our supervisors, João Pedro da Ponte, Margarida Rodrigues and Marisa Quaresma for their valuable contributions to the development of this paper.

## References

- Clivaz, S., & Clerc-Georgy, A. (2021). Facilitators' roles in lesson study: From leading the group to doing with the group. In A. Murata & C. Kim-Eng Lee (Eds.), *Stepping up lesson study: An educator's guide to deeper learning* (pp. 86–93). Routledge.
- Fujii, T. (2018). Lesson study and teaching mathematics through problem solving: The two wheels of a cart. In M. Quaresma, C. Winslow, S. Clivaz, J.P. Ponte, A. Ní Shúilleabháin, & A. Takahashi (Eds.), *Mathematics lesson study around the world* (pp. 1–21). Springer. <https://doi.org/10.1007/978-3-319-75696-7>
- Hourigan, M., & Leavy, A.M. (2021). The complexities of assuming the 'teacher of teachers' role during lesson study. *Professional Development in Education*, 1–14. <https://doi.org/10.1080/19415257.2021.1895287>
- Lewis, J.M. (2016). Learning to lead, leading to learn: How facilitators learn to lead lesson study. *ZDM – Mathematics Education*, 48(4), 527–540. <https://doi.org/10.1007/s11858-015-0753-9>
- Mynott, J.P., & Michel, D. (2022). The invisible leader: Facilitation in Lesson Study. *Educational Process: International Journal*, 11(3), 48–61. <https://doi.org/10.22521/edupij.2022.113.3>
- Shaughnessy, M., Garcia, N.M., O'Neill, M.K., Selling, S.K., Willis, A.T., Wilkes, C.E., Salazar, S.B., & Ball, D.L. (2021). Formatively assessing prospective teachers' skills in leading mathematics discussions. *Educational Studies in Mathematics*, 108(3), 451–472. <https://doi.org/10.1007/s10649-021-10070-z>