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Challenges for the development of lesson study in Portugal

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We analyse conflicts manifested in a lesson study in Portugal and the factors influence them, to understand how they affect the realisation of this process. The participants are eight grade 5 mathematics teachers and data were collected through audio recordings of sessions and individual interviews at the end of the lesson study. The results provide evidence of different kinds of conflicts: of participating teachers with teacher educators, of participating teachers among themselves, inner conflicts of participants themselves, of participating teachers with their school context, and of participating teachers with the formative process. The factor which most influences conflicts is expertise, but these conflicts are easily solved or lead to development of learning. Conflicts arising from lack of physical time caused by schools are most difficult to overcome and have the greatest consequences on the quality of lesson study.

Keywords: Lesson study, professional development, conflicts, mathematics teacher.

Introduction

Lesson Study (LS) is a collaborative and reflective professional development process that is based on teachers' practice and focuses on students' learning (Stigler & Hiebert, 1999). In this process, teachers work collaboratively to investigate a learning problem of their students' by studying different resources, planning a lesson, observing that lesson and reflecting on it, always focusing on students' learning (Fujii, 2016). LS has been used for over a century in Japan, where it is highly recognised by teachers and educators (Shimizu, 2014), was discovered by the West more than twenty years ago and has been expanding all over the world. Research has shown that it can promote teachers' professional development with impact in different areas, such as knowledge (Ponte et al., 2022; Ni Shuilleabhain & Clivaz, 2017), collaborative relationships (Ponte et al., 2019), teachers' reflection (Quaresma & Ponte, 2019) and teachers' beliefs (Lewis et al., 2019). However, the results of LS adaptation outside Japan are very diverse and not yet sustainable (Takahashi & McDougal, 2018). As noted by Watanabe (2018), there are many groups and schools that carry out LS for a period, but then abandon the process. Mynott (2019) stresses the need to know the results of LS, including those that present serious problems and not only those that present positive results. To this end, he considers the determining role of dissonance and the factors that influence it. The existence of dissonance or conflicts is essential for there to be moments of potential learning in LS and are crucial to changes in practices, but they may have a positive or negative effect on the development of the process and the learning of its participants (Hodgson & Wilkie, 2022; Mynott, 2019; Quaresma & Ponte, 2021).

Theoretical framework

LS is a professional development (PD) process that is practice based, student centred, close to small research on teachers' professional practice and is carried out in a collaborative way (Fujii, 2016). It has been used all over the world, proving to be a powerful PD method for transforming teaching (Estrella et al., 2020). However, most of these implementations, outside Japan, are associated with research or projects with a limited duration where teachers participate sporadically and not as an

ongoing system that can help improve teaching gradually (Watanabe, 2018). Adapting LS to other cultures faces some challenges. Takahashi (2011) warns that it can be difficult for teachers to learn a new curriculum approach (such as structured problem solving), as they become involved in the new professional development process, which can be “similar to asking teachers to solve a new problem with a tool that they have never seen before” (p. 81). Difficulties with time seem to most contribute to these limitations, which is visible both in the involvement in carrying out a LS cycle and in the oversimplification of the process. Another issue is expertise, regarding professional aspects and in particular, limited understanding of the model and the collaboration (Mynott, 2019; Watanabe, 2018).

As Mynott (2019) mentions, the outcomes of LS are still not clear enough. He analyses cases of LS carried out in England to show its outcomes, highlighting the need to analyse the challenges to the development of this process, considering not only the successful cases, but also those where the issues were not overcome. He finds four possible outcomes for LS: (i) there is no dissonance, but the participants do not see value in the work developed and the learning potential is very small; (ii) there is dissonance, but it causes dysfunction and/or disruption to LS compromising also its learning potential; (iii) there is dissonance, there are moments of potential learning, although there are also some events that limit its effect (this is the most common outcome); and (iv) dissonance causes moments of potential learning that are not limited (this is more in the field of hypotheses).

Learning opportunities which can have a transformative impact on practice usually arise from the perception, reflection and solution of dissonance, conflicts, or differences among members of a given professional community (Hodgson & Wilkie, 2022; Mynott, 2019). In previous studies (Quaresma & Ponte, 2021) we sought to find out how collaborative relationships are constituted in a lesson study and what problems may emerge in their development. We concluded that the development of collaborative relationships is strongly influenced, positively or negatively, by conflicts that arise, essentially, since the participants do not know the LS. We identified three types of conflicts: (i) of participating teachers with teacher educators; (ii) of participating teachers among themselves; and (iii) inner conflicts of participants themselves. Some conflicts had a negative effect on group relations, as the decision about who would teach the research lesson, whilst others had a positive effect, as the observation of the research lesson or the development and adaptation of challenging tasks. Understanding LS as a practice-based professional learning process where many conflicts may arise, stemming from a different PD process and experimenting with new teaching approaches (Hodgson & Wilkie, 2022), as well as that the use of LS outside Japan requires adaptation to the culture of each country. Therefore, it is important to know what conflicts occur more generally in LS cycles, and what factors influence them, since the identification and possible solution of these conflicts is crucial for the wide implementation of LS worldwide.

Methods

This research is a qualitative and interpretative case study (Yin, 2014) of a group of teachers who participated in a LS in the 2021-22 school year. The group had eight teachers from four different schools in a municipality near Lisbon who enrolled in a teacher education course offered by the local in-service teacher education centre. The teachers signed up voluntarily and, in the first session, they mentioned that they wanted to reflect on their practice, to find new strategies to motivate their students or to learn new

strategies to teach mathematics. Seven of them were teaching mathematics in grade 5 (all names are fictitious): Afonso, Carmen, Catarina, Gonçalo, Maria, Sara, and Rosa. Another teacher, César was teaching science but was co-teaching in grade 5 mathematics lessons. They had between 17 and 37 years of experience, most of them were working in the same school for several years. Except Carmen and Afonso, all the others come in pairs from the same school. The LS took place between November and May and had 12 sessions of 2.5 hours with Marisa as the facilitator. The teachers were always very involved and participative in the sessions, they all experienced in their lessons the tasks analysed in the LS sessions and shared these experiences in sessions 4 and 12. Only Afonso had a very irregular participation, being in about half of the sessions. Sessions 1 to 7 were dedicated to study and planning; in S8 we had the research lesson; in S9 we had the post lesson reflection; in S10 the teachers shared their experiences with another LS group and in S11-12 they planned, conducted, and reflected on one lesson.

Data were collected through audio recordings of sessions and individual interviews at the end of the LS. For data analysis strategies, we use content analysis (Bardin, 1979). Data analysis began by identifying significant moments in the sessions and interviews, that is, moments in which teachers' discourse may signal conflict, as manifestation of a contradiction or an inconsistency (Harvey & Nilson, 2022) that significantly influences the development of the work, reflection, and apparent solution (Hodgson & Wilkie, 2022). To analyse the conflicts, we use the framework of Quaresma and Ponte (2021): (i) conflicts of participating teachers with teacher educators, (ii) conflicts of participating teachers among themselves and (iii) inner conflicts of participants themselves. Inductively, from the data, we added (iv) conflicts of participating teachers with their school context and (v) conflicts of participating teachers with the formative process. Based on Mynott's (2019, p. 119) research we further sought to find out how these conflicts were influenced by the following factors: "time (physical time and degree of commitment); collaboration (space to collaborate, skills to collaborate, desire to collaborate and understanding of professional conflict); and expertise (pedagogical, content, subject, and LS method knowledge)".

Results

The teachers did not know LS. In S1, the facilitator presented this formative process, and, in S2, she sought to know the interpretation that the teachers had and their possible concerns. The teachers identified the phases and objectives of the different phases. However, they were uneasy about the high number of sessions for planning a lesson. Sara considered that she could not do this in her daily life:

Sara: Well, I immediately reflected on all these dates to plan a task. It should be interesting, of course, it is an interesting model and will probably bring results. However, maybe, to apply weekly and daily in our classes is utopian. (S2)

While Sara identified limitations in the transposition of the planning mode presented in the LS for her daily practice, Maria considered too many sessions to plan just one lesson:

Maria: No. It was strange to have so many sessions to plan a lesson. We're probably going to do something else, aren't we? Not just plan. (S2)

At this early stage when teachers did not yet know LS, they seemed uncomfortable with the time and planning model that was not in line with their experience, so this is a conflict of participating teachers with the formative process. To deal with this, in the following LS sessions, it was explained that, in

fact, this is a very particular approach, that we would do more things and deepen knowledge in various areas, which seemed to settle the issue. A few months later, new curriculum guidelines were introduced aimed at a student-centered teaching approach. Thus, in a consensual way, the exploratory approach, already known to almost all teachers who had known this from a previous teacher education national program, was selected. Only Carmen, who at the time was working in adult education, had no ideas about this teaching approach. Although she did not know the LS nor the exploratory approach, in S1, Carmen offered to teach the research lesson, saying that she liked to have that experience. Naturally, this made her practice a focus of the group's attention in several sessions. In S2, the teachers questioned the articulation that Carmen and her school colleagues made of the various curricular orientations used, with which they did not agree:

Sara: The planning they presented earlier the first part was... That is, the grade 5 textbook is oriented according to the [former curriculum] ... And I'm talking about my school. What we did was, and especially now that the order came out in July, we withdraw it completely and we are working only on the [new curriculum] Why? Because it was coming exactly... we thought it was explicit that we approached all this ... But usually, we don't follow the textbook... (S2)

This LS was carried out in a phase of curriculum change. This created a conflict of participating teachers among themselves, based on the different knowledge they had about the new curriculum. There was a tense atmosphere during the session, but Carmen considered this sharing interesting because she did not know about the new curriculum orientation that her colleagues already seemed to have adopted. In S6, the group analyzed tasks for the research lessons, considering the theme "sum of the amplitudes of the internal angles of a triangle", previously decided. Using their experience, the teachers quickly identified a task they usually proposed to their students and that they generally liked to do. It was to cut out the inner angles of a triangle and collate the pieces to represent a 180° angle:

Rosa: And the cutouts were from several different triangles.
Sara: Everyone makes their own.
Catarina: I always do this.
César: And they do it, they do it without problems?
Sara: In an instant, no problem at all and they like to do it. Everybody is happy. (S6)

The task is appealing and has great visual power, but, in mathematical terms, it is very elementary. Therefore, Marisa decided to challenge the teachers to try a task they did not know and that required the students to reach a conclusion about the sum of the amplitudes of the inner angles of a triangle from the exploration of the internal alternating angles, based on a triangle formed by two intersecting lines that cut two parallel lines. After the analysis of the task, the teachers raised several questions. Afonso referred to the fact that students no longer remember the concept of internal alternate angle "Yes, but this here assumes that they do very well what is behind and what is behind is so barren" (S6). To counter the low expectations in relation to students and to show the importance of proposing challenging tasks to students, Marisa insisted:

Marisa: I agree that they have difficulty, that there is a way to do, that there is a part for everyone, but they don't have to stay all just here probably. Therefore, if everyone can do this part, they can bend, they can take measurements... Is it also fair that those who can go a little further, also stay there doing folding?
Afonso: Not and of course not ... But you don't have to make such a big leap either.
César: Now there it is. We opened a too large gap ... (S6)

The teachers showed great resistance in challenging their students and tended to want to stick to what they knew students could already do. When they were challenged by Marisa to get out of their comfort zone, they argued with the difficulties of the students and the need for everyone to be able to do the task, but, for this, they tended to use fewer challenging tasks, thus reducing the learning opportunities of students. In this case, we have a conflict of participant teachers and the teacher educator based on didactic knowledge about the potential of challenging tasks for student learning. The teachers finally agreed to propose this kind of task with several changes to adapt to their students. In S7, where the group worked on the task and lesson plan for the research lesson, Carmen was very anxious about the possibility of not being able to lead the collective discussion and make room for students to discover what the task was asking. She said: “I am full of fear” (S7). In the post-lesson reflection, she described this experience:

Carmen: OK. And then, it was positive. First, that’s what I’ve been waiting for. So, I offered up right away because I thought it was going to be very interesting. Then I got scared here, didn’t I? That this wasn’t going to go well, we weren’t going to draw the conclusions we wanted, we were just going to see that the sum of the angles was 180° , and then what? But then, I was very pleased. I was satisfied with my students. (S9, post-lesson reflection)

Carmen, who was having her first contact with the exploratory approach, sometimes expressed her uneasiness to teach the research lesson, in the aspects that were innovative in her practice, the focus on the students’ mathematical reasoning and the dynamic of whole-class discussion. In this case, we identified the inner conflict of a participant teacher herself, which is based on the lack of confidence in her knowledge regarding the exploratory approach.

In this LS, the participants had to initiative to take part. In an unexpected way, most participants come it with another colleague from their school. Only Carmen and Afonso had no school colleague. Most teachers considered that there was collaboration in the LS and identified some factors that influenced it:

César: The factors that most contributed to the collaboration were the work in groups of “affinity for school”, the proposed practical activities are challenging and real, the professional experience of the teachers and the teacher educator that was apparent in promoting dialogue, negotiating, engaging, managing, and articulating individual differences, always leading to concerted agreements and the achievement of the common end. (RF)

César, who worked mostly with a colleague of his school, valued the fact that there are pairs of teachers from the same school. While Carmen, who was the only teacher in her school, pointed out that this situation made it difficult to get integrated into the LS group:

Carmen: From the first session, we could see (the distribution of teachers through the tables) that groups were being made, because they worked in the same school. (RF)

Although most of the work was all done in collective, Carmen seemed to feel some helpless because all the other teachers had a colleague in the LS and ended up communicating more with this person who knew the same school reality. Thus, there is a conflict of participating teachers among themselves, based on collaboration. However, from a different perspective, Maria valued the fact that there were teachers from different schools:

Maria: The fact that there are teachers from different schools, with different realities, allowed the sharing of experiences, ideas, and materials. (RF)

All teachers valued the work done in the LS, as we can see in Catarina's words, which highlight the potential for teachers to analyze and rethink their practice, knowing their students better:

Catarina: It is through a lesson study that the teacher best identifies the difficulties and abilities of students, their reasoning processes and with this knowledge improve teaching practice. (RF)

However, when asked about the possibility of developing LS in their schools, all teachers essentially indicated constraints, pointing to a certain unfeasibility:

Sara: [...] the immense bureaucratic work and diversity of tasks that teachers currently come up with absorbs much of the effort of teachers. The time left for the essential, which should be the selection and planning of tasks and activities, is scarce. (RF)

More specifically, the impediments pointed out are the lack of time and the bureaucratic overwork requested from teachers. This indicates a conflict of participant teachers with their school context, caused by lack of physical time and consequently, availability to engage in more projects. At the end of the LS, when asked about the impact that it could have on his practice, César said that he had been using some ideas of LS in his school for some time:

César: Since January we are operating a simple process of LS, called RIA-Recover-Include-Learning, to a grade 6 class that presents specificities (two teachers in a class, two times/week, rich tasks, collective discussion, reflection/ evaluation). (RF)

In this simplified LS process, two teachers planned lessons with challenging tasks, proposed them with a focus on collective discussion, and then they reflected on this lesson. However, they were disregarding the study phase and the exhaustive planning based on this study, which may compromise the results of the LS. The teachers value LS, but due to lack of physical time, they tended to simplify it, which will have strong consequences in its results. As a way of trying to solve the previous conflict with their school context, a conflict of participating teachers with the formative process arose, essentially, for lack of deep knowledge about the LS process.

Conclusion

This LS was exclusively composed of teachers who signed up voluntarily, willing to learn and reflect on their practice. However, following one of the most common types of teacher education in Portugal, the teachers come from different schools, in this case, mostly with another colleague of the same school. In contrast to what is presented by Quaresma and Ponte (2021), where teachers were invited to participate in LS by the direction of a school, thus were from the same educational context, this group accepted with great tranquility the research lesson and very easily a teacher volunteered to teach it. This may be related to the fact that all teachers voluntarily sought a professional development process that would allow them to reflect on their practice. However, there were specific conflicts from this organization, such as the one that stems from the interpretation of curriculum guidelines made in a specific school (conflict of participating teachers among themselves, affected by expertise), or even the integration of a teacher who did not have colleagues from her school in the LS (conflict of participating teachers among themselves, affected by collaboration).

In general, most conflicts were associated with expertise. Considering that teachers did not know LS, conflicts of participating teachers with the formative process arose, in a first phase, as teachers questioned the duration of the planning phase and its applicability to their daily practice. This conflict

was overcome as the LS progressed and teachers understood the model and variety of topics that were explored, such as tasks and the exploratory approach. These conflicts re-emerged when teachers were invited to use LS in their schools and suggested to do a simplified model of LS without the study phase. This suggestion from teachers is based on another conflict, of teachers with their school context, which does not give them the time necessary to make LS in its complete model. However, it also seems to be a lack of in-depth knowledge about the potential of the study phase in LS. Still associated with the expertise factor, conflicts arose associated with teachers' didactic knowledge. On the one hand, there was the inner conflict of the teacher who taught the research lesson, naturally, associated with the lack of confidence in using a new teaching approach. On the other hand, a conflict of participant teachers and the teacher educator emerged, when the teacher educator challenged teachers to experiment using challenging tasks that they did not use before. Without the facilitator's challenge, learning opportunities would be limited, as teachers tend to stay in their comfort zone (Mynott, 2019). There is a need to provoke conflict to increase the learning potential of this process (Hodgson & Wilkie, 2022).

We see that the conflicts that arise caused by expertise, on the one hand, are necessary for the development of new knowledge that is at the essence of the realization of LS. On the other hand, there are conflicts easily solved in the dynamics of LS. This can be done due to the voluntary participation and willingness to learn from these teachers, which, eventually, is also related to the fact that there were no conflicts caused by time in this LS towards the degree of commitment (Mynott, 2019). However, the conflicts generated by time, which are provoked by the demands of the school and that in a way transcend teachers, are more difficult to control, lead to more problematic consequences and compromise the integration of LS in schools in Portugal.

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