

Becoming a Lesson Study Facilitator: A Case Study

Paula Gomes

Polytechnic University of Setúbal

João Pedro da Ponte

Universidade de Lisboa

Marisa Quaresma

Universidade de Lisboa

Micaela Martins

Universidade de Lisboa

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This article reports on the initial experience of a knowledgeable mathematics teacher, Vanda, as she assumed the role of a novice lesson study facilitator. With two prior experiences of participating in lesson study, Vanda was challenged to facilitate a lesson study with the support of a more experienced facilitator, who worked with her to prepare the sessions. Drawing on a qualitative case study, data collection included participant observation (with audio recordings of preparation and lesson study sessions, logbook and document collection), and audio recorded semi-structured interviews before and after the lesson study. The results show how the dimensions of resources, orientations, goals and identity (ROGI framework) interact in framing Vanda's decisions, and the complex identity negotiation involved in this transition, as her prior teacher identity both supported and constrained her emerging facilitator identity. Believing that teachers learn from practice, she encouraged exploring simulated classroom scenarios and fostered peer collaboration. Over time, Vanda evolved from a hesitant guide into a confident facilitator, underscoring that facilitation competence is a situated process requiring strong knowledge of lesson study. Her journey also highlights the pivotal role of collaborative planning, and hands-on experience to her development as a lesson study facilitator and the dynamic nature of lesson study, where facilitators continually learn, adapt and grow.

Keywords • facilitator • lesson study • professional development • teacher identity

Introduction

Originating in Japan and disseminated more broadly by Stigler and Hiebert (1999), lesson study (LS) is a professional development process characterised by meticulous collaborative planning and real-time observation of student work. These two elements are central to LS and distinguish it from other formative teaching development processes (Hunter & Back, 2011). LS begins with teachers identifying a learning problem, designing tasks, and anticipating student strategies and difficulties, to design effective learning interventions. After one teacher teaches the research lesson, while others observe student work, the group reconvenes for a post-lesson reflection—a fundamental stage of LS—to analyse their observations and draw evidence-based conclusions regarding student learning. In the Japanese context, this stage often includes contributions from a “knowledgeable other” who provides extensive feedback to the group. In contrast, in Western LS, the process is commonly led by a facilitator, often a teacher or teacher educator, who leads the process (Hourigan & Leavy, 2021). Unlike other professional development processes, in which a teacher educator drives a well-defined structure and transmits predetermined content, many aspects of LS sessions cannot be scripted in advance by the facilitator, as the participants “drive the agenda and co-design the learning opportunities in real time” (Lewis, 2016, p. 538). Thus, the facilitator must balance expertise, teaching and guidance (Mynott & Michel, 2022), while allowing teachers to ask questions and build knowledge collaboratively (Tyskerud et al., 2023). Facilitators need to understand the many facets of school life and teaching and to have knowledge about LS, content and pedagogy, for collaborative and sustained teacher learning (Akiba et al., 2019; Hunter & Back, 2011; Hourigan & Leavy, 2021; Lewis, 2016; Ponte et al., 2025). Facilitators must also engage in continuous learning and reflection to improve their practice (Akiba et al., 2019, Clivaz et al.,



2023). Preparing and facilitating LS sessions is complex (Hunter & Back, 2011; Lewis, 2016; Mynott & Michel, 2022; Tyskerud et al., 2023), particularly for novice facilitators, who must model effective teaching practices while simultaneously learning from the process (Hourigan & Leavy, 2021). Thus, it is important to know how LS facilitators can be prepared effectively. Therefore, our research question is:

How does an experienced mathematics teacher, in her initial experience as LS facilitator, develop her facilitation knowledge, practice and professional identity?

Framework

Facilitators of professional development for mathematics teachers are pivotal in strengthening teachers' professional expertise and bringing educational innovations into schools (Karsenty et al., 2023). Their responsibilities involve managing professional development activities, setting norms, promoting teacher collaboration, and guiding discussions (Tyskerud et al., 2023). Particularly challenging is finding a balance between professional development learning goals and teachers learning pathways (Karsenty et al., 2023). Consequently, effective facilitation requires adequate preparation and ongoing support, as a facilitator's effectiveness improves with experience (Karsenty et al., 2023; Lewis, 2016).

To understand facilitator decision-making processes, Karsenty et al. (2023) developed the ROGI framework with four components: *Resources* (R) involving intellectual, material, contextual, and social tools available to facilitators, highlighting the significance of content knowledge and pedagogical content knowledge for effective facilitation; *Orientations* (O) referring to the facilitators' beliefs and values about teaching and learning; *Goals* (G) including both explicit and implicit purposes for professional development, such as content, process, and environment goals; and *Identities* (I) defined as how facilitators perceive their roles within a given context. This framework extends Schoenfeld's (2010) ROG framework for teachers' decision-making by adding identity. The authors draw on Gee's (2000) definition of identity as "being recognized as a certain 'kind of person', in a given context" (p. 99). Gee (2000) considers that individuals can have multiple, context-dependent identities, and distinguishes between *Institutional identities*, assigned by external structures (e.g., being a teacher or facilitator), and *Discursive identities*, constructed through interaction (e.g., recognising oneself as a teacher or facilitator). Karsenty et al. (2023) used this framework to analyse three cases of facilitators who participated in professional development processes, in Israel and Germany. They concluded that there are distinct orientations regarding how facilitators may assume their role, from more directive to more adaptive, with varying emphasis in creating a safe and respectful professional environment. They also pointed out that there are numerous goals to address, from professional development goals to process goals. Finally, they indicated that facilitators use a variety of resources, including different kinds of knowledge, experiences, and materials.

Schwartz et al. (2021) also used the ROGI framework to analyse how two novice facilitators—one from Israel and another from Germany—managed discussions within a professional development process they facilitated. The results show that over the course of a year, the novice facilitators progressed from merely initiating discussions to actively managing them. The changes in their facilitation practices emerged from resolving internal tensions and from shifts in their *Resources*, *Orientations*, *Goals*, and *Identities*, which were supported by the team guiding them through this new aspect of their professional activity. The facilitators developed their professional identity and their ability to understand the dynamics of group discussions. They adjusted their orientations and goals when necessary or found ways to steer the discussion toward their own goals and orientations, thereby meeting the aims of the professional development process and the capacity to adapt their resources accordingly.

In another study, Schwartz et al. (2023) analysed the transition of nine participants into their roles as facilitators, drawing on their prior experience as classroom teachers. Their findings indicated that teaching experience can be both an asset and a challenge. Challenges arise from familiar routines developed as teachers that do not necessarily fit teacher professional development processes. For



example, enforcing discipline rules or positioning themselves at the centre of the activity during sessions, as they would in their own classrooms. In addition, their teaching experience proved to be an advantage in managing group discussions to achieve the session's aims—as they would in their classrooms—or in bringing real-life classroom experiences to enrich discussions during the professional development sessions. This tension between established professional identities and emerging roles is also consistent with research on mathematics teacher identity, which conceptualises identity as developing through participation and experience rather than as a fixed attribute (Crisan & Rodd, 2017).

In LS, as a collaborative professional development process where teachers jointly plan, teach, observe, and reflect on research lessons (Hunter & Back, 2011), the facilitator's role is complex. Unlike other professional development processes, which are often guided by clear instructional goals and predefined agendas, LS unfolds around emerging questions grounded in teaching practice, as participants work collaboratively, share ideas and reflect throughout the process. In this context, both the goals and the resources are dynamic and co-constructed through real-time negotiation as interpretations of practice evolve. Instead of transferring expert knowledge, the LS facilitator is expected to lead the dynamic and often unpredictable sessions, to support and sustain the co-construction of professional knowledge in real time, and to foster a collaborative environment where teachers feel comfortable sharing ideas and reflecting on events (Akiba et al., 2019; Lewis, 2016; Tyskerud et al., 2023). In this context, the ROGI framework becomes particularly useful, as it makes visible how facilitators' goals and resources are continuously reshaped through interaction with teachers' contributions that captures real-time reasoning underpinning facilitation decisions.

Facilitators often draw on multiple identities and roles, positioning themselves as experienced teacher educators, as experts, or as members of the LS group. This positions them as learners among learners, providing guidance to teachers while allowing them to ask questions and build knowledge collaboratively (Clivaz & Clerc-Georgy, 2020; Lewis, 2016). These shifting roles reflect not only facilitators' identity and orientations toward teacher learning, but also the goals for the LS sessions, and the resources they choose (Tyskerud et al., 2023). This creates tension regarding when, how and whether facilitators should share their professional orientations to enhance the group learning. For novice facilitators, this dilemma is intensified by their dual identity as teachers and LS facilitators, requiring a complex renegotiation of familiar classroom practices (Mynott & Michael, 2022).

The “invisible” nature of LS facilitation demands much more than content and pedagogical knowledge. It requires subtly guiding the process to manage group dynamics, support reflective practice, and respond to the inherent unpredictability of LS sessions (Lewis, 2016; Mynott & Michel, 2022). From the ROGI perspective, these moments can be understood as instances in which facilitators dynamically mobilise and adapt resources, clarify or revise goals, or act on orientations toward teacher learning, while negotiating their professional identity in interaction with participants. For novice facilitators, such complexity is further shaped by the need to learn from the experience while simultaneously supporting teachers' collaborative work (Hourigan & Leavy, 2021).

Developing facilitation expertise in LS is therefore neither automatic nor isolated. As prior research suggests, developing facilitation expertise requires sustained opportunities for learning and reflection, supported through collaboration with experienced facilitators through formal professional development, or learning through on-the-job experience (Akiba et al., 2019; Clivaz et al., 2023; Hunter & Back, 2011; Lewis, 2016; Tyskerud et al., 2023). Understanding how facilitators—particularly novices—develop the resources, orientations, goals, and identities needed to lead LS effectively is therefore critical for advancing both facilitation practice and LS implementation. Therefore, considering our research question, we draw on the ROGI framework as an analytical lens to examine how a novice LS facilitator's decision-making and professional learning evolve.



Methodology

Design, Participants and Data Collection

The research conducted was qualitative and interpretive (Bogdan & Biklen, 1994), with a case study design Yin (2018) that involved an experienced teacher, Vanda (pseudonym) transitioning to the role of lesson study facilitator. Vanda and Paula (first author) had worked together previously as mathematics teachers, both with over 15 years of experience (in Years 7–12). Vanda had participated in two LS, facilitated by Paula, in which participants planned and taught lessons using an exploratory approach, drawing on the research-based notion that meaningful mathematical learning emerges when students work on tasks and whole-class discussions are orchestrated purposefully to connect and build on students' ideas (Stein et al., 2008). The exploratory approach contrasts with approaches in which the teacher tells students what to do and how to do it, with an emphasis on obtaining correct answers. Leading whole-class discussions is particularly demanding, as it requires in-the-moment decisions about selecting, sequencing, and connecting students' strategies, while maintaining the cognitive demand of tasks (Stein et al., 2008).

Paula challenged Vanda to facilitate a LS. To support the process, Paula acted the facilitator and planned the sessions collaboratively with Vanda, who played the role of lead facilitator for the first time. To manage the unpredictability of discussions, a key feature of Vanda's facilitation was her decision to use the exploratory approach as a facilitation strategy, particularly during the lesson planning sessions (Sessions 2–4 & 6–7, Figure 1), where anticipating student strategies and planning whole-class discussions were central. Eight mathematics teachers from the same school participated voluntarily in this LS, collaboratively selecting the topic “functions” (Year 10, aged 15 to 17). Six teachers had prior LS experience, some of which was with Vanda, and all but one had over 20 years of teaching experience.

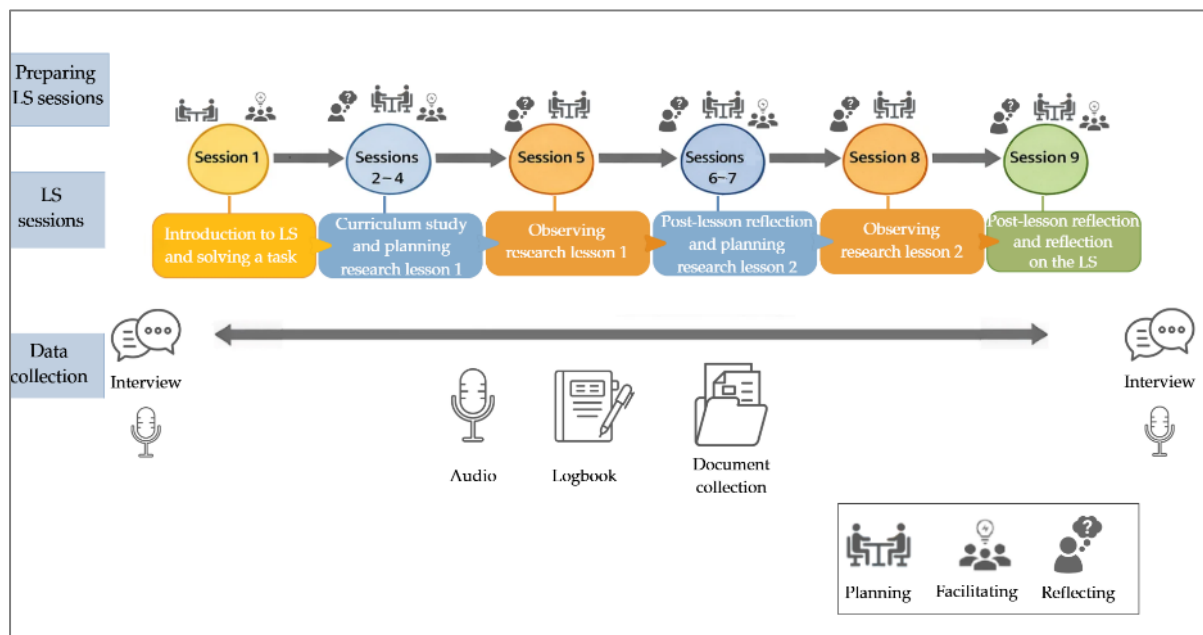


Figure 1. Preparing and leading lesson study sessions and data collection.

The LS facilitated by Vanda, implemented February to May 2024, had nine sessions. Session 1 began with a discussion on the timeframe and the LS stages. Then, the teachers worked on a task that connected geometry and functions and went on to frame the task within the curriculum guidelines. Sessions 2–4 focused on studying the curriculum and planning the research lesson. The teachers worked on tasks, acted as students to anticipate students' strategies and difficulties, and planned the

whole-class discussion. They also planned the first research lesson, which was aimed at students solving problems involving geometric properties of graphs of functions, establishing relationships and making conversions between different representations (graphical, algebraic, tabular, numerical), and using symbolic mathematical language and recognising its value for communicating. In Session 5, the teachers observed the research lesson taught by one of them and recorded notes on student work. In Session 6, based on their observations, the teachers reflected on the students' work. They then began planning a new research lesson, completing it in Session 7. In Session 8, a second research lesson was implemented, led by different teacher with the other teachers observing the students. In Session 9, the teachers reflected on the students' work based on their observations and on the LS process.

Figure 1 presents an overview of the LS process, highlighting the sequence of sessions facilitated by Vanda, along with the data collection opportunities. A semi-structured interview (Bogdan & Biklen, 1994), lasting 52 minutes, was conducted before Session 1 to know how Vanda positioned herself as a facilitator, and what she expected to do as a LS facilitator. A second interview, lasting 70 minutes, was conducted after implementation of the LS. The aim was to capture her evolving role as a facilitator, the challenges she faced, and the aspects she most valued from the experience. The interviews were audio recorded.

Vanda and Paula held planning meetings before each LS session. To guide these discussions, Paula prepared notes beforehand, outlining key discussion points as session goals, activity resources, and possible facilitation challenges. During those meetings, they discussed the work they would propose to the teachers and how Vanda could lead the session (e.g., managing time for the simulation of practice, reflection, and analysing curriculum guidelines). The preparation sessions (PS) were audio recorded, aspects of which were shared with the teachers. Afterwards, they reflected separately on the LS sessions, comparing it to their planning. After the first session, the preparation of LS sessions began with Vanda reflecting on previous sessions. Following these meetings, Vanda facilitated the LS sessions, with Paula always present.

Data collection instruments included participant observation (in preparing for and during LS sessions), with audio recordings of the PS and the LS sessions, a logbook, and the two semi-structured interviews conducted before (initial interview) and after the LS (final interview), as well as document collection (LS documentation and research lesson planning and materials).

Data Analysis

The data analysis focused on Vanda's facilitation practices and decision-making, paying particular attention to her concerns, as they shaped her actions, decisions and reflections during both interviews and LS preparation sessions—particularly regarding whole-class discussions as a teaching or facilitation strategy. We examined her development as a novice facilitator based on her experience as a teacher and former LS participant. Aiming to understand her journey from Vanda's own perspective, we report these findings mainly through her voice.

Taking Vanda's concerns as a starting point, we focused on her role as LS facilitator and the interplay between her past participation in LS as a teacher, and her emerging responsibilities as a facilitator. To ensure trustworthiness, coding was conducted independently by the authors and refined through peer discussion. The analysis was supported by triangulation across interviews, session recordings, and facilitator logbooks. We analysed Vanda's actions and decision-making processes, adjusting the components of the ROGI framework (Karsenty et al., 2023) by a deductive and inductive coding process (Coutinho, 2018). The deductive phase was anchored in theory, drawing on the ROGI conceptual structure proposed by Karsenty et al. (2023), while inductive coding was crucial to refine subcategories that captured the collaborative and dynamic nature of LS sessions, where knowledge was co-constructed in real-time. This coding allowed us to identify Vanda's evolving role and facilitator development by refining subcategories for resources, orientations, goals and identity based on group interactions and her emerging concerns during planning sessions and interviews. The adjustments made, indicated in parentheses, are in the following list:



- i) to *Resources* we added knowledge mobilised regarding LS (R1), such as drawing from prior LS experiences, and knowledge mobilised about the exploratory teaching approach (R2), including references to tasks, lesson structure, and whole-class discussion.
- ii) in *Orientations* we considered the facilitator's guidance for the participating teachers' learning (O1), which encompasses ideas and conceptions about how teachers learn (the interplay with practice, discussions and reflections with the construction of ideas; "teachers learn by engaging in practice"), along with the teacher's orientations for student learning (O2);
- iii) in *Goals*, we included consideration of the goals for the LS process (G2), namely the facilitator's decisions for teachers to learn about the LS process; and
- iv) in *Identities* we used data that referred to how Vanda positioned herself, both as an experienced teacher (initial interview) and as a novice LS facilitator (final interview).

Table 1 outlines the resulting categories, subcategories, and indicators used in the analysis. During the coding process, a data segment could be connected analytically to multiple ROGI dimensions. For example, moments in the post-lesson discussion where Vanda deliberately withheld her input to create space for the teacher's contribution were coded as an orientation (O1) and a goal (G1).

Table 1
Categories and Subcategories for Data Analysis

Category	Subcategory	Indicators
Resources	R1-Knowledge about and for the LS process	Refers to previous LS; uses a more experienced facilitator as a support to consolidate/validate a particular issue/idea
	R2-Knowledge about the teaching approach	Refers to the different kinds of tasks; the structure of the lesson; the whole-class discussion; the dynamics of the lesson
	R3-Material resources	Proposes teacher education tasks; shares tasks for the classroom
	R4-Social resources	Acknowledges the support and sharing among participants (collaboration) as fundamental to their learning
Orientations	O1-Facilitator orientation for teacher learning	Promotes situations that she considers as important for teachers' learning; identifies/remembers episodes of practice that contribute to teachers' professional development; makes decisions about the content from previous teachers' interventions
	O2-Teacher orientation for student learning	Proposes orientations/resources/dynamics/examples that contribute to students' learning; values a particular teaching approach
Goals	G1-Content goals	Identifies important aspects for teacher learning
	G2-LS process goals	Makes decisions to support teachers learning about the LS process
Identity	I1-How she sees herself as a teacher	Recognises/positions herself as a teacher
	I2- How she sees herself as a facilitator	Recognises/positions herself as a facilitator

Adjusting the ROGI framework to this specific LS context allowed for the scrutiny of the complex and situated nature of learning to facilitate LS. By expanding the framework to include specific types of knowledge mobilised for and during LS, as well as orientations toward both teacher and student learning, we captured the dynamic interplay between what the facilitator drew on, how she acted, and how she positioned herself throughout the LS process. These adaptations made it possible to trace how facilitation decisions were shaped by Vanda's previous experiences, and how they evolved from emerging group interactions, shaped by her dual identity as an experienced teacher and a novice LS facilitator.



Results

Vanda's development as a MTE with expertise in lesson study is presented through four sections: becoming a LS facilitator being an experienced teacher; becoming a LS facilitator being a LS participant; leading productive whole-class discussions as a core facilitator practice; and aspects to improve in future lesson studies. This structure outlines Vanda's journey from classroom expertise and hesitant guide into a confident lesson study facilitator.

Becoming a Lesson Study Facilitator Being an Experienced Teacher

Vanda's transition to facilitation was anchored in her identity as an experienced teacher (I1). Throughout the process, she frequently drew on her classroom expertise as a primary resource. She described her ability to anticipate students' strategies and difficulties as "intuitive"; a skill honed over two decades of practice. Reflecting on her initial interview, Vanda recalled how her previous participation in LS as a teacher had already transformed her teacher orientation for student learning (O2), particularly regarding task design:

Nowadays, when I create a task ... I don't just pick one that's already done and say, "This is cool"... No. I stop and think, "Wait, maybe this would be better if I ask it this way, or if I add some questions." [I1]

This personal transformation informed her orientation for teacher learning (I2, O1). Vanda strongly believed that the most effective way to "convince" her colleagues of the value of the exploratory approach was to model it through practice rather than theory. She viewed "showing" and "giving examples" as a vital facilitation strategy to foster teacher learning (G1):

Since I began doing this work, as a teacher ... I increasingly try to do tasks and lessons with this exploratory approach. How can we do this? It's by giving examples, isn't it? I don't see any other way to convince people than by showing them, "Look, I did it this way, I heard it this way, and it works." [I1]

In her view, teacher learning is a situated process of "seeing and experiencing" (I2, O1). She argued that while theory is important, "I'm a strong advocate of 'seeing is believing, experiencing is knowing'... I believe there's nothing like ... Seeing [and] experiencing. And then checking if it works, right?" (initial interview).

Transitioning from teacher to facilitator, however, was not without challenges. While confident in anticipating her students' thinking, Vanda experienced discomfort when facilitating group planning for unfamiliar students, preferring to rely on the teacher who would teach the research lesson (R4). As a teacher, Vanda felt in control; as a facilitator, she had to rely on the other teachers' knowledge of their own students as a social resource (R4). This discomfort was a central aspect of her emerging facilitator identity. She noted this in her final interview:

That work that we do: "Oh, what if students do this, how do we ...? What if students ...?"... I think this is a bit intuitive in my classes ... It's by knowing the students that we know how to help them. So, it's a bit difficult for me to predict [students' strategies and difficulties] right now.

Despite these challenges, Vanda's emerging identity as a LS facilitator was shaped by her teaching experience and her identity as teacher, particularly by her belief that professional learning is most effective through hands-on experience, observation and shared reflection. This informed her decision to prioritise a practice-based facilitation approach, aiming to support her colleagues in enacting exploratory teaching, which she considered pivotal to teachers' learning.

Becoming a Lesson Study Facilitator Being a Lesson Study Participant

Vanda's initial facilitator identity (I2) was shaped by the contrast between LS and her prior teacher education experience: "There was no focus on the student ... The focus was on the teacher having a new tool (software) to work with. [I2]. [The process] was exclusively prepared by me" (initial interview).

Drawing on her experience as a LS participant (R2), she noted that facilitating LS was quite different: "You lead the sessions depending on what comes up ... We have a goal, but we work together to achieve it." (initial interview). Vanda added that facilitating LS requires, "Being able to tailor what you are going to work on in each session to meet the participants' needs" (G1), which was both a challenge for the facilitator and a valuable aspect of LS. As a novice facilitator, however, she initially doubted that she could balance her agenda with giving the floor to the teachers (I2): "I don't think I have this ... getting people to think, getting people to go along with what you need, while also considering their needs ... I don't have this role of facilitator" (initial interview). To support this transition, she relied on collaborative planning the sessions with Paula and deepening her knowledge about LS through reading (R1): "I know I'll have to work closely with you, because I can't get there on my own. Will I need to read a lot? ... To share knowledge, one must have knowledge" (initial interview). Before Planning Session 2, Vanda read articles on LS, including one by Ponte et al. (2016) about LS carried out in Portugal.

Drawing on her experience as participant (R1), Vanda emphasised clarifying each LS stage, so all participants had a clear understanding of the process (G2): "I think we must present the concept of LS ... for everyone to reflect on what they think... Either those who have already been [in LS] or those who are new to it." [I1] When preparing Session 1, Vanda initially suggested using a form to elicit teachers' prior LS experiences (R3). However, following Paula's suggestion to include a policy brief about LS (Ponte et al., 2020), Vanda revised her plan (R1), adding it into the session plan: i) before the session, asking the participants to read the policy brief; ii) during the session, using slides as a resource to record teachers' contributions on the LS stages, particularly those who had previously participated; and iii) after the session, using the form as a resource for participants to record their ideas about the LS process (R3, R4).

Share this [policy brief] for them to read before the session ... During the session, present a step-by-step [LS] plan ... [We could] ask people who previously participated in LS ... That way we can understand if everyone, at least, correctly identifies the LS stages ... (PS1)

Although not all participants read the policy brief, Vanda facilitated the first session as planned. She gave the floor to all participants, whether to share their ideas based on their previous LS experience or to ask questions, particularly the first-time teachers. Reflecting on this session, she stressed the importance of material resources to support teachers' reflection (R3), drawing a parallel between student and teacher learning. She acknowledged that participants learn best by sharing ideas rather than merely listening to a facilitator (R4):

[As] there were people who had already been [to LS] who shared their ideas, those who had not, may have got a much better idea than the one shared by a facilitator ... As with our students ... It was in line with what I'd hope would happen. (PS2)

Despite her classroom expertise, when planning Session 3, Vanda referred to herself as a facilitator [I2], but also repeatedly expressed uncertainty in supporting colleagues' learning: "I know how to teach kids, I don't know how to teach colleagues ..." (PS3). She felt pushed out of her comfort zone by the sessions' unpredictability, as selecting or adapting tasks for discussion (R3) without a defined research lesson topic. This led to a discussion with Paula on the strengths and constraints of proposing tasks—for contextualising them in the curriculum and fostering student' learning, while anticipating their thinking (O2). Such discussion emerged when preparing Session 3, and Paula questioned whether, for the session's agenda, it would be very different whether the task was the one they were analysing or another (G1). Vanda acknowledged that the main goal remained the participants' collaborative work, regardless of the specific task: "No, probably not ... regardless of the task, the goal is to have the same result [work]" (PS3). Vanda and Paula then discussed the task for the next session and its potential for engaging teachers in solving and analysing tasks to foster productive whole-class discussions (G1). Drawing on her dual identity [I1, I2], Vanda suggested structuring the first part of the LS session into three stages as a facilitation strategy—task presentation, teachers' autonomous work, and whole-class



discussion—to mirror the research lesson (R2, O1). In the second part, they would reflect on this experience and define the research lesson mathematical topic and goal.

Vanda's confidence as a LS facilitator solidified through managing unforeseen events. During post-lesson reflections, she utilised slides spontaneously prepared by two teachers containing photos of student work (R4) and sent her a few hours before the sessions. Although unplanned, Vanda decided to integrate them, considering them valuable resources (R4) for fostering meaningful teacher learning (O1, G1), as it created opportunities for the group to reflect from practice, which she valued as a teacher (I1) and facilitator (I2):

Paula: We had teacher X preparing those slides with photos of the students' answers and quotes from their discussions, right? She recorded everything the students were saying ... And then, in the second [post-lesson reflection], teacher Y did the same ... We didn't prepare the session with those slides, but you facilitated the session based on them ... You could have chosen not to do so.

Vanda: Yes, I could have, of course. But it was fantastic, wasn't it? ... I just had to basically take it and go with what we thought. (final interview)

This episode illustrates Vanda's evolution into a facilitator capable of shaping reflections based on participants' resources, which was greatly valued by the teachers, as the session allowed them to revisit several moments of the lesson, using empirical data on students' work and classroom communication. Thus, from her knowledge of LS and participants, and collaboratively planning the LS sessions (R1, R4) Vanda increasingly positioned herself as a facilitator who values drawing on teachers' resources and interventions, without losing sight of the goal of the session.

Although Vanda continued to express uncertainty about independently preparing LS sessions (I2), she became more confident in designing session plans during later sessions, emphasising the value of collaborative planning with Paula (R1):

Our discussions before the sessions were essential ... I think that if they didn't exist, it would have been very different ... And it was thinking and finding strategies for getting around ... Challenges, that the benefit lies ... For me it was very rich ... It wasn't just one person thinking about the session, was it? We were sharing ideas. (final interview)

Vanda added that, even though she still had a lot to learn as a facilitator (I2), collaborative preparation and ongoing support from Paula enhanced her learning as a LS facilitator. By the end, Vanda recognised a clear shift in her contribution (I2): "Clearly, the preparation we did in the last sessions had much more input from me than the earlier ones." (final interview). She concluded that preparing facilitators is a situated process requiring deep knowledge of LS, prior participant experience (R1) and the ability to learn through the "plan-do-reflect" cycle:

Preparing [facilitators] would maybe involve doing it [facilitating LS], wouldn't it? ... Or having preparation, or someone working with the facilitator ... I like "doing it" ... You have the preparation, and you get a working group at school, and you, at school, play this role ... Planning, doing, planning, doing. I think it would be important, yes, for anyone who wants to become a LS facilitator. (final interview)

From Vanda's perspective, facilitators learn from collaborative practice, whether with teacher educators or by observing other LS facilitators, reinforcing that learning to facilitate is, above all, an act of learning in practice. Throughout the process, Vanda's reflections on session preparation and identity as facilitator highlighted the challenge of tailoring unpredictable sessions to the participants' needs. During the post-lesson reflections, she successfully managed an unforeseen situation and adjusted the planning to lead it from resources sent by participants just a short time before. Although Vanda initially considered herself unprepared for the role, by the final interview she expressed greater confidence in managing the complexity of LS facilitation, stressing the importance of collaborative planning each session for her growth as LS facilitator. Vanda's transition demonstrates that becoming a facilitator is a transformative journey rooted in extensive knowledge of LS, prior experience as LS participant and a personal commitment to the "plan-do-reflect" cycle.



Core Facilitator Practice: Leading Productive Whole-class Discussions

Leading whole-class discussions emerged as a central facilitation practice through which Vanda's orientations, resources, goals, and identity interacted. In this study, whole-group discussions were analysed at two levels: as a teaching practice for student learning, referred as whole-class discussions, and as a facilitation strategy for mediating teachers' learning, referred as whole-group discussions.

Vanda's MTE development was rooted in her teacher identity (I1). She emphasised her previous participation in LS shifted her orientations (O2) towards student thinking:

My teaching practice changed a lot ... I used to focus on a particular answer, and it would go on the board. Last year, I found myself wanting them [students] to do it, to show it in a different way ... It is only by doing it that the teacher realises whether it works. (initial interview)

This personal shift informed Vanda's content goals (G1) as a facilitator. Knowing, from past LS, that the task for the research lesson was too extensive and did not lead to much discussion, and that participants wanted to focus on classroom communication, Vanda prioritised the orchestration of whole-group discussions. She emphasised that, when planning the research lesson, the teachers needed to move beyond selecting tasks to purposefully planning, considering time for students' work and explaining their reasoning (O1): "We want them to expose themselves and ... discuss the results in the lesson." (initial interview). When preparing Session 1, Vanda pointed out that they should question teachers, "How we record and choose questions [solving strategies] for the discussion ... should also be in that part [lesson planning] 'How to select strategies for the whole-class discussion?'" (PS1) (G1).

In Session 1, teachers struggled to align the task they solved with the curriculum, limiting time for whole-group discussion. Reflecting in this session, Vanda reasserted her goal for students to "play an active role" (PS2) (G1). Drawing on her teacher identity (I1), and the belief that "seeing is believing, experiencing is knowing" (initial interview), Vanda suggested having teachers playing student role to better understand the goal for the research lesson (O1): "We collect the answers, show them ... and then we explain that this is what we are aiming for [in the research lesson]" (PS2).

Session 2 revealed significant tensions in leading discussions with teachers. Vanda monitored the teachers' work and encouraged them to share their ideas, aiming to help them to learn how to do so through a hands-on activity, but she explained participants' answers herself. She later highlighted the fragility of her emerging facilitator identity (I2) and reflected on the discomfort of "a teacher explaining to a teacher" (PS3) and the challenge of time management, "We had so much planned ... It's very difficult to simulate a teacher explaining to a teacher ... When I look at my colleague's solving strategy, I'm following it, right?" (PS3).

To address this, Vanda and Paula collaboratively planned session 3 using an exploratory facilitation strategy. Initially, Vanda suggested a short discussion, like in session 2, making more detailed planning for the research lesson. Paula questioned whether preparing such discussion could be part of the planning process: "Is it very different to do it with this task or another?" (Paula, PS3) and suggested adding students' answers for the teachers to analyse, select and sequence as a starting point for planning a whole-group discussion. Vanda agreed, as it was important for teachers to prepare that discussion more thoroughly, analysing students' answers, and anticipating possible strategies and difficulties (R2, O2):

Imagine that there are solutions with errors ... What do we do if there are no mistakes? Or someone has something that's completely out of the box ... Where do we fit it? I think having time to think about this and discuss it in preparation is important. (PS3)

As LS sessions progressed, Vanda shifted from explaining ideas herself to orchestrating discussion among participants, following her orientation toward learning from practice (O1). In Session 3, she deliberately structured the discussion as a facilitation strategy, around the selection and sequencing of teacher's work, as discussed during preparation meetings. Although she still faced challenges in not dominating the conversation, using her pedagogical knowledge and discussions with Paula, Vanda



shifted from "direct instruction" to create a safe environment for teachers to share ideas and reflect on their practice (R4, O1).

Thus, Vanda identified leading whole-class discussion as a key aspect for students' learning, something she values in her lessons. She suggested leading whole-group discussions as a LS facilitation strategy, based on the teacher's work, aligning with her belief in learning from practice. By the later sessions, she identified leading whole-group discussion as a key aspect for teacher learning, evolving from a classroom stage, as a teacher, to a professional strategy she facilitated as an emerging LS facilitator.

Aspects to Improve in Future Lesson Studies

In the first planning session, Vanda challenged the teachers to select tasks for the research lesson, believing that collaborative sharing would foster professional learning (R4, O1). However, only one teacher responded. When preparing the next session, Vanda and Paula noted that some of these tasks were problems and others were application tasks. Vanda then suggested using a GeoGebra applet to support students' work, as the use of technology was not thoroughly explored in previous LS (G1):

- | | |
|-------|--|
| Vanda | As we didn't cover [the contents], to have a GeoGebra file with variations of a , h and k , and they [the students] understand what each parameter influences in the parabola [$y = a(x - h)^2 + k$]. |
| Paula | You mean, let's take this graph, for example, built in GeoGebra and, at the same time, we have selectors to adjust it to the function graph ... |
| Vanda | Previously providing the [mathematical] content, this turns out to be an exercise ... Even though they [the students] have previously worked on the contents, they have the advantage of tinkering with the technology to try to understand the effects [of the variation] of the parameters ... [But] it doesn't lead to many solving strategies. |
| Paula | If you want... Especially because you feel comfortable with the use of technology... |
| Vanda | Only by having experience with [technology] can people understand the usefulness of that, right? ... Only when we see it happen, we actually see it to be useful. (PS2) |

Despite using GeoGebra, Vanda and Paula anticipated that students would not use multiple strategies for this task or the others proposed by a participating teacher. This dialogue highlighted Vanda's emerging facilitator identity (I2) as she weighed her own comfort with technology against the teachers' discomfort. Reflecting on this, Vanda—who valued hands-on activities—stressed that in future LS, teachers should design their own tasks and then "solve them as students" during the sessions. This facilitation strategy aimed to move teachers beyond theory and into the exploratory experience (O1):

There had to be a pre-selection, by the teachers, of a task... In a session, we grab a group of two [teachers], and they explore ... "Look, you do this, you do that, you do this. Try to explore ... Solve it as a student." (final interview)

After planning the research lesson, Vanda underlined that the observers should make detailed records of the students' work during the lesson, so that they could then reflect on their work and learning (G1). She drew on teachers' answers about the LS stages, after session 1:

At this stage, what you highlighted is that: i) the different solutions must be registered; ii) the focus must be on the student's work; iii) it is important that there are records; and iv) it is important to highlight the most interesting solutions. (Session 4)

Vanda returned to the lesson plan, which listed aspects that all teachers were expected to observe and record during the research lesson, such as the students' strategies and representations, difficulties that arose and the reasons for those (whether related to task design or to mathematical content), and surprising aspects. They could also make other notes they considered important (R3).

After observing the research lessons, teachers X and Y, voluntarily shared slides with episodes of the lesson and photographs of the students' work in the post-lesson discussions, as already mentioned.



However, Vanda identified a significant gap in the observation and reflection stages: despite structured guidelines for recording student strategies (G1), participant notetaking was often insufficient: "If you didn't get notes, you won't remember" (PS6).

To address this, she utilised Teacher X's slides in session 6 to model how detailed records enhance post-lesson reflection (O1, G2). Despite her efforts, once again, one participant still struggled to produce organised records. Consequently, in her final interview, Vanda emphasised that future LS require more rigorous planning for data collection(G1), stating that:

Each observer must make his/her [photographs] and record in his/her observations what he/she wants to record ... When preparing the post-lesson reflection, which in addition to recording, it is then appropriate to organise that record to then reflect with colleagues. (final interview)

Believing in the value of hands-on activities for teacher learning, Vanda also suggested that, in future LS, teachers propose their own tasks to increase opportunities for collaborative design and enactment, even if they were later deemed unsuitable. Vanda also stressed the need for greater attention to preparing the research lesson observation and the post-lesson discussion, highlighting the role of systematically collecting and sharing data from the student work as essential for teacher learning. Her reflections suggest that the "invisible work" of observation and purposeful facilitation strategies, such as simulations, are vital for developing teachers' professional knowledge.

Discussion

The aim of this study was to understand how an experienced teacher, yet a novice LS facilitator, developed facilitation knowledge and professional identity as a MTE during her initial experience leading LS. The Results section detailed Vanda's journey through three thematic lenses, her experience as a teacher, as a participant, and her practice leading discussions. We now re-examine those findings through the ROGI framework to understand how the interplay between specific resources, orientations, goals, and identity (Table 2) shaped her decision-making and professional growth.

Table 2

Summary of Categories and Subcategories, with Frequencies of Coded Text Segments (Units of Analysis)

Category and subcategory	Initial interview	Planning sessions	Final interview
Resources (R)			
R1-Knowledge about and for the LS process	2	1	3
R2-Knowledge about the teaching approach	1	2	0
R3-Material resources	0	5	0
R4-Social resources	0	6	3
Orientations (O)			
O1-Facilitator orientation for teacher learning	3	7	1
O2-Teacher orientation for student learning	2	2	0
Goals (G)			
G1-Content goals	2	9	1
G2-LS process goals	1	1	0
Identity (I)			
I1-How she sees herself as teacher	2	3	0
I2-How she sees herself as facilitator	4	5	3
Total	17	41	11

Mapping Vanda's Professional Trajectory

In the initial interview, Vanda's discourse was grounded in her teacher identity (I1 = 2) and her orientations toward student learning (O2 = 2), suggesting that she initially framed LS facilitation autobiographically (Brookfield, 2017). Even though her facilitator identity (I2 = 4) was present, it remained closely tied to her prior teaching experience. As she transitioned into the planning sessions, there was a substantial increase in the mobilisation of resources (R = 14) and the definition of content goals (G1 = 9), reflecting the practical and collaborative demands of preparing and facilitating the LS sessions. Social resources also became more prominent (R4 = 6), highlighting the importance of collaborative planning in shaping her LS facilitation practice. Notably, the coding of these planning sessions shows that references to her facilitator identity (I2 = 5) surpassed those of her teacher identity (I1 = 3), suggesting an active negotiation and expansion of her professional self-understanding. Vanda's reliance on social resources (R4) during this phase highlights the critical role of collaborative planning to support the management of the unpredictability of the LS sessions (Hunter & Back, 2011; Tyskerud et al., 2023). This aligns with. In the final interview, Vanda's discourse reflected a consolidation of her facilitator identity (I2 = 3) and a continued reliance on social resources (R4 = 3), such as collaboration with Paula.

Mobilising Resources

Vanda's previous participation in two LS served as a fundamental resource for facilitation (R1), supporting the planning sessions, providing her knowledge about and for the LS process, and enabling her to recognise that sessions are unpredictable and must be adjusted to teachers' comments. Such awareness created a significant tension; unlike her previous experience as a teacher educator where sessions were pre-planned, LS facilitation required her to manage emerging questions in real-time. This led Vanda to use her teaching experience (R2) as a resource, drawing on her knowledge of student learning processes to guide the teacher group. Participating in LS previously allowed Vanda to develop her knowledge about task design and leading whole-class discussions in her teaching practice (R2) and, in addition, to know in advance that leading these discussions needed more attention in future LS (R1). This prompted her decision to use simulations as a facilitation strategy to address the teachers' needs regarding whole-group discussions. Furthermore, her dual identity (I1, I2) was pivotal in her use of material resources (R3)—such as pre-designed tasks and articles about LS—to deepen her knowledge, trigger and deepen teachers' thinking, and address their concerns (Lewis, 2016). Finally, Vanda identified social resources (R4), such as collaboration and sharing among the participants, as essential for their learning, such as the presentations prepared by two teachers to support post-lesson reflections. By recognizing the value of peer-sharing and learning, she focused on co-construction rather than knowledge transfer, a key feature for facilitating LS.

Enacting Orientations

Regarding orientations, Vanda's facilitation was guided by her strong conviction that professional learning is most effective when rooted in practice and shared reflection. Her orientation toward students as active learners (O2)—valuing exploration over direct instruction—served as a foundation for her facilitator orientation (O1). As detailed in the results regarding her practice leading discussions, Vanda prioritised simulations over theoretical input. By creating environments where teachers engaged in tasks as learners, she promoted a "learning by doing" environment. This aligns with the observation by Schwarts et al. (2023) that novice facilitators often draw on familiar classroom strategies to scaffold teacher learning, bridging their dual identities as teachers and MTEs. This also aligns with research conceptualising professional learning as emerging through participation in collaborative, practice-based activity (Gee & Whaley, 2016; Tyskerud et al., 2023).



Establishing Goals

As for the goals, Vanda's practice was predominantly driven by content goals (G1), coupled with 12 coded segments (Table 2). As a direct response to her previous experiences as a LS participant, her primary goal was to support teachers in becoming skilled at teaching lessons using an exploratory approach, particularly in orchestrating productive whole-class discussions with their students. Additionally, Vanda established clear LS process goals (G2) during the initial sessions, to ensure that all teachers understood the stages of LS and the importance of collecting detailed evidence—records of the students' work and discussions—during lesson observations. By focusing on these goals, Vanda moved beyond presenting a "show and tell" format, steering the group toward a deeper analysis of student thinking and teaching practice.

Negotiating Identity

Central to this trajectory was the negotiation of Vanda's professional identity. Her identity as an experienced teacher (I1) served as a foundational resource throughout the process. With five coded segments (Table 2), her identity as a teacher was not only a background feature but also an advantage that enabled her to define meaningful goals and select mathematical tasks for the LS sessions. However, the transition to a facilitator identity (I2)—the most frequent subcategory in this dimension with 12 segments coded—involved a profound and often uncomfortable negotiation. As referred in the Results, Vanda initially experienced considerable insecurity, feeling compelled to substantially alter her approach to facilitation in contrast to her previous, more directive experiences. This growth towards a confident MTE was catalysed by her engagement with LS literature (R3), her reflective practice, and the collaborative planning with an experienced facilitator (R4). This engagement allowed Vanda to navigate what Schwartz et al. (2023) described as the negotiation between "two discourses" (teaching and facilitation). By the final sessions, Vanda was able to move flexibly between these identities (Karsenty et al., 2023), with facilitation identity developing alongside, rather than replacing her identity as a teacher.

Becoming a Mathematics Teacher Educator

Vanda's journey highlighted that becoming an MTE is a situated and evolving process (Lewis, 2016; Clivaz & Clerc-Georgy, 2020). Her reflections in the final interview highlighted the importance of facilitators having knowledge of the LS process (I2), drawing on prior experience as LS participants, and be prepared to deal with unforeseen events that may arise during the sessions. She further noted that facilitators learn from practice, particularly through the "plan-do-reflect" cycle situated within relevant school contexts. This aligns with Clivaz and Clerc-Georgy (2020) and Lewis (2016), who conceptualise facilitator learning as a situated and evolving process grounded in authentic contexts.

The analysis of Vanda's journey from a novice to a more confident facilitator illustrates the strong interrelations between the ROGI dimensions. Her dual teacher identity (I1, I2) and orientations, particularly her belief in teacher learning from practice and collaborative work (O2), informed her decision to simulate classroom scenarios and encourage collaborative learning among teachers, as described by Akiba et al. (2019) and Clivaz et al. (2023). These simulations were designed to meet specific content goals (G1)—modelling how teachers orchestrate whole-class discussions with their students—which was informed by her knowledge about task design (R2). Furthermore, Vanda's orientations (O1, O2) framed her actions in the LS sessions. Her previous participation in LS (R1) reinforced her conviction that professional learning must be practice-based (O2). Her goal was to show teachers how to plan and teach a lesson using the exploratory approach (G1), framing her decision to structure sessions that mirrored classroom lessons (task, autonomous work, and discussion). This complex interplay shows that her development as an MTE was not fragmented but was a systemic evolution: her resources (R), as her experience as LS participant, shaped her goals (G), as a teacher orchestrating whole-group discussions, which were enacted through her orientations (O), such as



classroom simulations, ultimately transforming her professional identity (I), evidenced by the dominance of identity codes in the data (Table 2, I2 segments). This holistic view, captured by the ROGI framework, makes visible the often-invisible work of facilitation and clarifies how novice facilitators negotiate their dual roles. It also highlights the support structures needed to enable the transition from teacher to facilitator. These structures can be conceptualised as critical support conditions and design features for effective LS (Akiba et al., 2019), thereby contributing to the field's understanding of how novice facilitators can be supported in developing their facilitation practice.

Conclusion

By analysing the initial activity of an experienced mathematics teacher acting as an LS facilitator, this study illustrates how facilitation knowledge and identity develop through practice. Using the ROGI framework, we provide evidence that Vanda's facilitation knowledge and identity evolved through planning, enacting, and reflecting on her facilitation, as well as through real-time decision-making during LS sessions. This development drew on her prior experiences as a teacher and LS participant and was initially shaped by her concerns and early experiences, before being strengthened by her growing confidence in the facilitator role. The results suggest that support structures—such as collaboration with an experienced facilitator—are key for novice facilitators.

By the end of the LS, Vanda had shifted from a hesitant to a more confident facilitator, demonstrating greater capacity to manage the unpredictability of LS sessions. She emphasised “doing” as central to her learning as LS facilitator, consistent with the views of Clivaz and Clerc-Georgy (2020), Lewis (2016), and Hourigan and Leavy (2021). Vanda also underscored the importance of strong knowledge of LS, prior experience as a LS participant, and continued opportunities for practice through “plan, do, reflect” cycles. Together these findings reinforce the view that facilitation expertise develops over time, through sustained participation in LS rather than being transferred automatically from prior teaching experience. This finding is consistent with research highlighting the gradual development of LS facilitation expertise (Akiba et al., 2019; Clivaz et al., 2023).

Vanda's reflection further reinforced her belief in learning through practice, highlighting the value of reflective practice and collaboration in professional learning. Her experience highlights the dynamic nature of the LS process, in which facilitators not only guide others but also engage in continuous learning, adapting their practice to the needs of participants and the demands of each session. By the end of the LS, Vanda acknowledged that she still had much to learn, but she felt more prepared to lead LS sessions. Her emerging identity as a facilitator developed alongside her teacher identity, drawing on her teaching experience as she developed new ways of thinking and acting.

This study contributes to research on MTE by making visible how professional knowledge and identity begin to take shape as teachers transition from teaching practice to LS facilitation. The findings suggest that becoming a facilitator is not merely an additive process of learning new knowledge and skills; rather, it is a transformative process in which existing teacher identities are renegotiated alongside the development of a facilitation identity. The ROGI framework (Karsenty et al., 2023) provides a means of capturing this by illustrating how a novice facilitator mobilised resources, adjusted goals to the needs of the group, and responded to the emerging demands of leading collaborative teacher learning. In doing so, the framework highlights the dynamic interplay between prior classroom expertise and the new ways of thinking and acting required for LS facilitation, offering a potential model for supporting the preparation of future MTEs.

The findings also raise questions about how facilitators negotiate the coexistence of teacher and facilitator identities and how professional learning and other support structures can facilitate this development. Further research could examine how facilitators negotiate dual identities as teachers and facilitators, and how support structures can foster their development. Future studies could also examine how these identities evolve over time and across different educational and cultural contexts, including how different forms of experience and support shape the development of facilitation expertise.



Corresponding author

Paula Gomes
School of Education
Polytechnic University of Setúbal,
paula.gomes@ese.ips.pt

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Ethical approval

Ethical approval for the research was granted by the Ethical Committee of Instituto de Educação da Universidade de Lisboa, and informed consent was given by all participants for their data to be published.

Competing interests

The authors declare there are no competing interests.

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