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STRIKING A BALANCE: THE CONTRIBUTION OF LESSON STUDY TO ORGANIZATIONAL LEARNING THROUGH ADAPTATION AND ROUTINE

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A B S T R A C T

While maintaining professional development approaches is difficult, it is a key priority for supporting the progress of teachers. We look at the degree to which teachers continued lesson study in their own schools following a four-year participation in a cross-school Lesson Study Professional Learning Network, as well as how they went about doing so. Diverse perspectives emerged about the general notion of lesson study. If the underlying idea was changed, teachers rarely continued with lesson study; when they did, they usually made adjustments that involved removing crucial elements. Instructors who upheld the fundamentals of lesson study were more likely to continue using the program in their own classrooms and to think highly of it.

I INTRODUCTION

Professional development (PD) practices remain at the forefront of ways to support teacher learning. Although much is known about which characteristics PD practices need to have to be effective, maintaining and sustaining effective PD practices in schools remains a considerable challenge (Desimone & Stuckey, 2014; Hargreaves & Goodson, 2006). One such PD practice which potentially contains all characteristics of effective PD but proves difficulty to sustain in schools is lesson study. Lesson study has gained increasing global attention in the past 30 years. Lesson study is translated from the Japanese *jugyou kenkyuu*, with the first word meaning "live instruction" or "lessons" and the second "research" or "study" (Lewis, 2016). Lesson study involves a research cycle with phases during which teachers collaboratively investigate their own teaching practice (Lewis, Perry, & Murata, 2006). It can support teacher and student learning in new contexts (Cajkler, Wood, Norton, & Pedder, 2014; Schipper, Goei, de Vries, & van Veen, 2018; Xu & Pedder, 2014) but is difficult to sustain. Often, lesson study initiatives are short-lived and simplified (Akiba, 2016; Lee, 2015; Takahashi & McDougal, 2016).

Specifically, when lesson study is adopted in international contexts, several researchers (e.g. Akiba, 2016; Takahashi & McDougal, 2016) have argued that it does not always "stay true" to the Japanese model. The question of how lesson study can become an embedded practice in schools outside Japan relates to the implementation fidelity and local adaptations debate (Anderson, 2017). Depending on the approach taken, different views have emerged on what is considered acceptable when lesson study is adopted internationally. In a fidelity approach, lesson study should be understood and performed as in Japan. The local adaptations approach,

by contrast, allows for adjustments to the practice as long as teachers adhere to its core elements (Quinn & Kim, 2017). Generally, the implementation debate applies not just to

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PD practices that are adopted from another culture but to any PD practice taken up in schools. PD practices always need to be interpreted and performed by teachers, making discussions about adaptations and faithful implementations apply to other forms of PD as well. For example, research on data use, another PD practice, also engages in questions of how the practice needs to be taken up by teachers and the extent to which teachers may adjust or stay faithful to the core elements of data use (Coburn & Turner, 2011; Hubers, Schildkamp, Poortman, & Pieters, 2017). As such, while our discussion focuses spe- cifically on lesson study, the questions and problems surrounding embedding lesson study apply to PD in general.

Given the above, investigating how lesson study can become embedded involves two separate questions: (1) Which core elements of lesson study should be embedded? and (2) How is lesson study actually embedded in practice? In this paper, we take a local adaptations approach, arguing that lesson study can be modified as long as core elements are preserved. We apply the concept of organizational routines to examine whether and how teachers embed lesson study in their own school settings after learning to use it. We aim to contribute to the small but growing body of empirical studies examining lesson study in practice in new international contexts. In this study, we investigate teachers who took part in a cross-school Lesson Study Professional Learning Network (LSPLN) for four years, during which they performed six cycles. The LSPLN was set up to develop teacher learning and was designed to enable teachers to introduce lesson study into their own schools and to continue with the practice as a lesson study facilitator with their own colleagues after training had ended. By examining whether and how teachers maintained or modified lesson study as an organiza- tional routine and how doing so connected with their continued performance of the cycle, we aim to provide more insight into how lesson study can become embedded in school settings new to the practice.

1. THEORETICAL BACKGROUND

1.1. Organizational routines

One useful way to investigate how PD practices, such as lesson study, can become embedded in practice is by framing them as organizational routines (Hubers et al., 2017; Spillane, 2012). Organizational routines broadly refer to "repetitive, recognizable patterns of interdependent action, carried out by multiple actors" (Feldman & Pentland, 2003, p. 95). Schools, as with any other organization, have various organizational routines, such as parent–teacher meetings, grade-level or department meetings, and tea- cher evaluations (Sherer & Spillane, 2011). Organizational routines contain an internal structure, which consists of the general idea
and specific performances of a routine. Feldman and Pentland (2003) refer to the

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general idea as the *ostensive* aspect and to specific performances as the *performative* aspects of a routine. The ostensive part is the routine in principle. It represents "the ideal or schematic form of a routine. It is the abstract, generalized idea of the routine" (Feldman & Pentland, 2003, p. 101). By contrast, the performative aspect "consists of specific actions, by specific people, in specific places and times" (p. 101). The ostensive and per- formative aspects are recursively related: within performance of the routine, the ostensive aspect is created and re-created; in turn,
the ostensive aspect constrains and enables performance of the routine. Organizational routines, in this sense, are capable of en- dogenous change, as people – either deliberately or unconsciously – "produce variations on a routine, to select these variations, and to retain them as what it means to do this particular routine" (Feldman & Pentland, 2003, p. 113). The variations that can occur
during performances can, in turn, lead to changes in the ostensive aspect of the routine (Sherer & Spillane, 2011; Spillane, 2012). In this sense, the concept of organizational routines allows for an investigation of how ways of working are modified or maintained, which makes it a useful concept to examine whether and how teachers adapt lesson study as presented during the LSPLN and whether and how they embed it in their own practice.

1.1.1. Usefulness

Understanding why some organizational routines become embedded in organizations while others do not also depends on whether they are considered useful (Witt, 2011). A routine's usefulness involves the appropriateness of the design (Witt, 2011). Examining a lesson study's usefulness and feasibility for practicing teachers is especially important to consider in our context, because
though lesson study potentially contains all effective design principles, teachers do not always evaluate it positively (Brosnan, 2014). To date, no studies have explored in depth why teachers do or do not consider the practice useful.

1.1.2. Organizational routines in education

Educational scholars interested in exploring work processes within schools have recently turned their attention to organizational routines (Coburn, Mata, & Choi, 2013; Spillane, 2012). For example, Roegman and Riehl (2015) investigate the potential of rounds as a new organizational routine to transform the practice of preservice teachers. They show that teachers made use of this possibility to a limited degree, due to the newness of the practice. Other authors investigate the implementation of data use, revealing that schools struggle to develop organizational routines and that the development of the ostensive aspect was especially scarce or lacking (Hubers et al., 2017). Sherer and Spillane (2011) show that the introduction of a five-week assessment routine enabled both constancy and change in practice over time. On the one hand, the ostensive script helps structure school practice and interactions; on the other, it

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never completely specifies action people need to take during performances of the routine. During performance of a routine, teachers and school leaders "changed the routine as they repaired and expanded it and as they strived to make it better", leading to changes in the ostensive aspect of the routine (Sherer & Spillane, 2011, p. 642).

Table 1

Definition and operationalization of lesson study as an organizational routine.

Aspect	Operationalizations
Ostensive	The general script of lesson study
Performative	Continued performance of lesson study
Usefulness	Evaluation of the appropriateness of the design of lesson study

1.2. Lesson study as an organizational routine

We investigate lesson study as an organizational routine that contains the ostensive and performative aspects and examine how teachers perceive its usefulness. (see Table 1 for an overview). In the following sub-sections, we discuss what is known from the lesson study literature on these aspects and how lesson study was introduced and performed during the LSPLN.

1.2.1. Ostensive

The general script of lesson study involves the core elements of the research cycle. During the LSPLN, teachers worked with a version closely aligned with the Japanese cycle; it was based on both the American adaptation by Stepanek, Appel, Leong, Turner Mangan, and Mitchell (2007) and the British adaptation by Dudley, 2011, which contains case pupils. This cycle contains six phases. During phase 1, the group formulates a lesson goal and long-term goals for students and develops a research question. In phase 2, the research lesson is planned, which includes developing SMART (specific, measurable, acceptable, realistic, and time-bound) lesson goals, choosing case pupils, and describing expected student responses. Teachers are advised to undertake a literature study, make an
inventory of good practices, and/or explore team members' (practical) knowledge in the course of designing the research lesson (de
Vries, Verhoef, & Goei, 2016). In phase 3, the lesson is taught and then case pupils are interviewed. Phase 4 consists of the post-lesson discussion, which focuses on the

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research goal and student learning. In phase 5, the team revises the lesson and teaches it again. In phase 6, the group reflects on the entire lesson study process and shares their gained insights with the wider school staff. Fig. 1 presents a graphical representation of this cycle.

Studies have shown that how teachers interpret lesson study varies and can develop as they gain more experience with the practice. Research reports that teachers often misunderstand lesson study as lesson planning instead of teacher research (Fujii, 2014; Lewis et al., 2006; Yoshida, 2012). Bocala (2015) finds that teachers without lesson study experience focus most on the observing phase whereas teachers with more lesson study experience focus more on student learning. By contrast, Durden (2018) demonstrates that what teachers consider elements of learning study (a variant of lesson study) fall on a continuum of increasing complexity, from improving lessons by following a process to transforming student understanding through conceptual change; the more complex

teachers' understanding of lesson study, the more elements they ascribed to the practice.

1.2.2. Performative

Table 2 presents an overview of the possible elements in lesson study according to Takahashi and McDougal (2016). Following Stepanek et al. (2007), we consider the phases of the research cycle core elements of lesson study captured by elements 0–VIIII. Teachers in new contexts often leave out elements that distinguish lesson study as a research process. For example, Seleznyov (2018) shows that international lesson study practices did not always include identification of a research theme (33 %), studying curriculum material (63 %), or live observation of lessons (8 %).

Optional elements of the cycle are phases 0, IX, and X. In Japan, element III entails studying curriculum material. In our context, we consider this element open to local adaptation. In Japan, learning "goals are widely shared and specified with lesson-level precision" (Hiebert & Stigler, 2017, p. 2), whereas the Netherlands has no national curriculum (Nieveen & Kuiper, 2012). Teachers need to teach toward Core Curriculum Standards, but these general objectives still provide teachers with substantial freedom to

decide what and how to teach. In addition, research has shown that Japanese curricula are well designed to study student learning, which is often absent in curricula outside Japan (Lewis, Perry, & Friedkin, 2011). As such, in the absence of well-suited curriculum material, the Dutch lesson study advises undertaking literature review and sharing personal teaching expertise as ways to design the research lesson (de Vries, Roorda, & van Veen, 2017). In this sense, the Dutch model does not hold as tightly to the traditional

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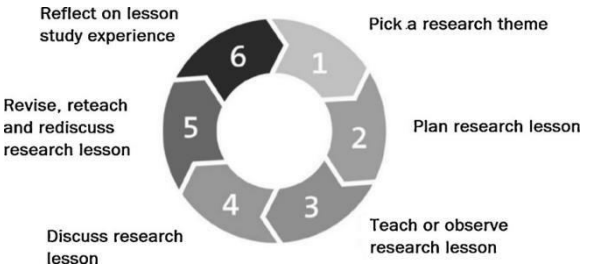

Fig. 1. Six stages of the
Dutch lesson study cycle.

Table 2
Overview of core and optional elements of lesson study.

Element	Activity	Core/ optional
0.	Share thoughts and ideas on education	Optional
I.	Start with a question or issue from teaching practice	Core
II.	Define clear research goal	Core
III.	Study data/publications/lesson material and share expertise	Core
IV.	Design research lesson (including observation forms) and write out research lesson plan	Core
V.	Teach research lesson, live observation, and collection of data	Core
VI.	Engage in in-depth conversation	Core
VII.	Repeat elements V and VI followed by a final reflection	Core
VIII.	Share results with others outside the lesson study team	Core
IX.	Seek guidance of facilitator familiar with the lesson study process	Optional
X	Implement input from knowledgeable other	Optional

studying of curriculum material (*kyouzai kenkyuu*) phase of Japanese lesson study as prescribed by the implementation fidelity perspective (Takahashi & McDougal, 2016).

A knowledgeable other "is someone from outside of the planning team with deep

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expertise in the content, often deep expertise in teaching, and much experience with lesson study" (Takahashi & McDougal, 2016, p. 515). In Japan, the knowledgeable other is present during the research lesson and gives the final remarks during the post-lesson discussion. During the LSPLN, teachers were
assisted by two subject pedagogical experts. Although these experts were available for consultation on request after the LSPLN ended, they were no longer formally involved.

In addition, a lesson study cycle can include a facilitator, whose role is to guide and monitor the lesson study process. This person can be someone from the lesson study group or an outside member (Stepanek et al., 2007). Facilitators contribute to both the organization and quality of lesson study: they take care of negotiating agendas and priorities, enabling the group to focus on teaching and learning, and deepen group discussions by directing the group to the lesson goal (Ermeling & Graff-Ermeling, 2016). Though not considered a core element, in the current study, all teachers were prepared to become facilitators during the LSPLN. If they continued with lesson study in their own setting, they always took on the role of lesson study facilitator within the lesson study group.

1.2.3. Usefulness

In Japan, lesson study is considered fundamental for the practice of teaching (Watanabe, 2018), but outside Japan, teachers' evaluation of lesson study varies. Some studies report that teachers appreciate the opportunity lesson study provides to collaborate
and share experiences with and knowledge about education (Mon, Dali, & Sam, 2016), though others show that teachers also question the use of the practice and doubt whether it is worth the time investment (Brosnan, 2014; Lee, 2008; Norwich & Ylonen, 2013). Although studies show that teachers interpret, perform, and evaluate lesson study differently, no research at present explores how these elements are connected. The current study explores this connection to gain insight into how lesson study can become embedded in new contexts. Herein, we address the following research questions:

1 What do teachers consider the general script of lesson study (ostensive)?
2 Do teachers continue to perform the lesson study (performative), and if so, how?
3 How do teachers evaluate the usefulness and feasibility of lesson study (usefulness)?

III. METHOD

1.3. Research context

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This study draws on an LSPLN project undertaken at a university teacher education program in partnership with other teacher training schools and secondary schools in the Netherlands. We use data from 21 teachers from 14 secondary schools in the northern Netherlands who participated in two LSPLNs, one for math and one for Dutch, for four years (2014–2017). These networks were part of a project for (cross-school) LSPLNs launched by the Dutch Ministry of Education (de Vries & Prenger, 2017). During the project, teachers learned extensively about lesson study and the core principles of the practice. They participated in the previously mentioned
six cycles of lesson study (Dudley, 2011; Stepanek et al., 2007) After four years, the LSPLN ended and university support and funding ceased. Teachers could decide for themselves whether and how to continue with lesson study, which 12 teachers from nine schools did.

1.4. Data collection

We conducted semi-structured, open-ended interviews with the 21 LSPLN former participants (see Table 3 for teacher char- acteristics), three of whom did not respond to the request for an interview or were not able to participate. Examples of interview
questions include the following: “What phases do you consider part of lesson study?” (ostensive), “Is every phase of the cycle equally important?” (ostensive), “Which phases of the research cycle do you perform?” (performative), and “To what extent do you think

Table 3

Sample descriptions.

Descriptive	Data
Gender	4 male (19 %)/17 female (81 %)
Age (in years) (range: 26–59)	$M = 41{,}86$, $SD = 1133$
Teaching experience (in years) (range: 5–37)	$M = 14{,}24$, $SD = 908$
Teacher qualification	M.Ed.: $n = 11$ (52.4%)
	B.Ed.: $n = 10$ (47.6%)
Main teaching subject	Dutch $n = 11$ (52.4%)
	Math $n = 10$ (47.6%)

lesson study is worth the time investment and why?” (usefulness). Interviews had an

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average duration of 60 min and were audio recorded and transcribed verbatim.

2. Findings

Regarding the ostensive aspect (the general script), we found four perceptions of the general idea of lesson study. We observed no correlation between which perception participants had and subject matter taught, level of experience, or gender.

Next, we describe the results for each research question for each perception of the general idea separately. We use the overview of core and optional elements of lesson study to structure our results by beginning with the perceptions which focuses on elements of phase 0 and continuing with perceptions that focus on later and/or more phases. For each perception, we describe if and how the lesson study routine was performed and how teachers conceived of lesson study's usefulness (see Table 4 for a summary of the results).

2.1. Lesson study as developing a shared vision on education

2.1.1. Ostensive

One teacher, Ann, focused specifically on the initial phase of lesson study, in which the team is encouraged to share and discuss views on education. She explained that for her, the ultimate goal of lesson study was to collaborate to develop a shared vision. At her K – 9 school, she had used lesson study to allow a specific team to collaborate as a means to create more stability within the group. She viewed lesson study as a way to create a collaborative learning environment and work toward a shared vision among the members. In this sense, Ann modified the general script of lesson study by focusing specifically on phase 1.

2.1.2. Performative

Ann had begun performing the cycle at her school with a team that needed more stability, a group of homeroom teachers[1] who taught various subjects. She had divided the teachers into three lesson study groups and had planned to go through all the phases of the cycle. However, because she started late in the school year, when teachers had many obligations, they had to stop before any of the groups had completed the cycle. She explained that it was quite difficult to keep her colleagues present and engaged. For example,

during the post-lesson discussion she struggled to keep colleagues focused and interested. Ann's performance of the cycle was in- complete, and she had no concrete plans to perform the cycle in the future.

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Table 4
Summary of results.

Perception	Ostensive	Performative	Usefulness	Number of teachers with this perception[a]
1 Shared vision	Script focuses mostly on phase of sharing views on education	Not finished and no concrete plans to continue	Design not useful to create a shared vision	1
2 Lesson planning	Script focuses mostly on the lesson planning phase	Either not implemented or shortened and simplified	Design not useful for lesson planning	7
3 Student observation	Script focuses mostly on the observation phase	Either not implemented or intention to shorten and simplify	Design not useful for gaining insight into student responses	4
4 Researching student learning and enhancing PCK	Ostensive script includes almost all core elements	Mostly implemented as intended during the LSPLN	Design useful to enhance PCK and investigate student learning	10

[a] Jack has both perception 1 and 4.

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2.1.3. Usefulness

Ann considered her time investment in learning lesson study worth it because of the opportunities it presented to exchange and discuss ideas with colleagues. However, her experience with the half-implemented cycle made her doubt whether lesson study was a good way to develop a shared vision. Instead, she thought it might be a prerequisite for lesson study rather than an outcome. In general, she noticed that her colleagues were less invested in the process than she was and were more willing to rush through the various phases. She believed a reason for this might be that the focus was not on the teachers' own subject. Overall, she did not consider lesson study appropriate for creating a shared vision.

IVCONCLUSION AND DISCUSSION

2.2. Lesson study

We aimed to investigate how teachers create lesson study as an organizational routine and gain insights into how lesson study can become embedded in contexts outside Japan. One of our main findings is that teachers varied in whether they maintained or modified the ostensive aspect of lesson study as presented during the LSPLN. Moreover, the results showed that teachers' ostensive understanding connected with the performative aspect and their evaluation of its usefulness. When teachers perceived lesson study as researching student learning and enhancing PCK, teachers mostly maintained the ostensive aspect of lesson study. In this perception of lesson study almost all the phases of the cycle were part of teachers' general script of lesson study. Teachers with this perception were both most willing to perform all phases of the research cycle and most likely to consider the design of lesson study useful. In the other perceptions of the ostensive (shared vision, lesson planning, and student observation) teachers' general script of lesson study focused on only one of the phases as presented during the LSPLN. In these perceptions of the ostensive, teachers often indicated that they did not want to continue with lesson study in their own schools and believed the cycle was not appropriately designed and, therefore, not useful. They considered the cycle too lengthy for what they thought it yielded: one lesson plan or a one-time insight into student responses. If teachers did continue to perform lesson study, they modified the cycle, considering many elements in- essential and too time consuming.

A possible explanation for the differences in the ostensive script of lesson study among teachers can be found in the literature. People can adjust the ostensive aspect of a routine by going through successive performances of it (Feldman & Pentland, 2003; Spillane, 2012). Organizational routines are not stable; rather, they are subject to change as teachers go through a "processes of

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variation, selection, and retention that takes place between the ostensive and performative aspects of the routine" (Feldman &
Pentland, 2003). Applied to our results, this could mean that as teachers went through the LSPLN's siX research cycles, some might have changed the ostensive aspect of the practice, transforming it from teacher research to lesson planning or student observation.

Our finding that maintaining the ostensive aspect of lesson study leads to richer implementations of the practice also aligns with what we know from implementation literature. Studies show that teachers must maintain the core elements of an innovation to avoid lethally adjusting the practice (Quinn & Kim, 2017). The results indicate that perceiving lesson study as researching student learning and enhancing PCK, teachers were both most able and most willing to embed lesson study as an organizational routine in their own settings. If teachers with other perceptions of lesson study continued to perform the cycle it was modified to such a degree that the
teachers' practices aligned more with other PD practices such as collaborative lesson planning or collegial observation. These teachers
continued with a practice that no longer captured the core elements of lesson study, though they did seem to continue a change process that may have been initiated by the LSPLN. Although lesson study itself was not embedded, the teachers implemented an adapted practice, which they reported offered them valuable learning opportunities.

However, if the goal is to embed long-term, school-based PD in schools, our results show that teachers' ostensive understanding of
the PD is crucial. Only when teachers maintained the ostensive script of the PD was the practice most likely to be (almost completely) embedded in the school. In all other cases, teachers either were unwilling to continue or, if they did, lethally adapted the practice into something that no longer contained all characteristics of the PD practice.

2.3. The research cycle

Our results are in line with previous findings that teachers leave out elements that distinguish lesson study as an inquiry process (Seleznyov, 2018). Our results show that including research elements is crucial for embedding the ostensive script of lesson study. Teachers who did not perform the research elements did not consider these aspects necessary parts of the general script of lesson study. Lesson study was no longer viewed as a form of teacher research but as mostly about either lesson planning or observing students However, if lesson study was seen as researching student learning and enhancing PCK, teachers explained that they needed
the research elements to assess student learning – in other words, to perform their ostensive script of the practice.

A pattern running though almost all performative aspects of lesson study was the

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focus on sharing personal teaching experience and good practices as a way to design the research lesson rather than undertaking a literature review or reading books or articles. This finding suggests that in our contexts, researching a topic by sharing teaching experience is preferable for teachers to investigate their research theme. It could also be an initial step in setting up a collaborative practice, as in the Dutch system it is relatively uncommon for teachers to discuss in depth one another's views on education (Snoek, 2017). Teachers also eliminated research elements during the continued performance of the cycle to make the practice more suitable to colleagues from whom resistance to research elements was expected. In Japan, teaching is considered research, and teachers are viewed as researchers of their own practice, which makes lesson study an integral part of the profession; however, outside Japan, this is not often the case (Akiba, 2016; Fujii, 2014; Hiebert & Stigler, 2017; Watanabe, 2018). As such, "perhaps the key factor for lesson study to be productive anywhere is for teachers to view teaching as research and to develop their own identities as researchers" (Watanabe, 2018, p. 10).

Teachers also reported specific factors (e.g., department dynamics, organizational factors) that influenced their ability to perform the cycle. In some cases, teachers expressed a willingness to perform the cycle but were unable to find motivated and enthusiastic colleagues who were willing to engage in collaborate learning. In this case, the predominantly individualistic nature of PD in the Netherlands may have been an obstacle to the development of collaborative professional cultures such as lesson study in schools (Snoek, 2017). How lesson study was organized also influenced the extent to which it was implemented. For example, teachers mentioned that both facilitation and scheduling influenced whether and how the cycle was performed.

V LIMITATIONS

We recognize multiple constraints in our analysis. Initially, our main focus was on determining if teachers included lesson study as a regular and established practice throughout the organization. Nevertheless, we did not ascertain the extent of support provided by school administrators to these instructors, which is a crucial aspect of incorporating new methods (de Vries et al., 2017; Xu & Pedder, 2014). Subsequent investigations should explore the collaborative efforts of teachers and school administrators in implementing lesson study inside educational institutions.

Furthermore, our attention was directed towards the educators who were involved in the Personal Learning Network (PLN), rather than their fellow teachers inside the school who were not affiliated with this network. Additionally, our findings suggest that the involvement of the former PLN instructors' colleagues played a constraining effect in the implementation of lesson study. For instance, Jill perceived the fundamental concept of lesson study as the process of investigating student learning and improving pedagogical

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content knowledge (PCK). However, Jill's colleagues did not appear to have the same explicit goal for lesson study that focuses on researching student learning and improving pedagogical content knowledge (PCK). Instead, they seemed to view it primarily as lesson planning, which restricted Jill's ability to fully engage in lesson study as a research cycle. Therefore, it is imperative for future study to also consider the significance of coworkers.
Furthermore, our research specifically targeted the Dutch setting. Conducting studies in different settings is essential to have a more thorough understanding of how the ostensive aspect relates to the performative aspect and how teachers assess the usefulness of lesson study. Our findings provide insight into certain scenarios within Dutch secondary education. Gathering evidence from additional settings will enhance our understanding of the necessary conditions for successful implementation of lesson study in different contexts.
Ultimately, our attention was directed towards examining how teachers' utilization of the ostensive component of lesson study influenced the practical execution and assessment of lesson study's efficacy. Nevertheless, our findings indicate that additional variables had a role in the implementation of lesson study within a school setting. For instance, the organizational setting influenced the decision of groups to expand the number of research courses due to scheduling difficulties. Additional modifications were implemented based on interpersonal factors. Some teachers were unable to form a group due to their department's lack of support or because the schedule was changed as a result of differing educational beliefs. Therefore, our findings also demonstrate the challenging and stubborn nature of educational practice. Additional characteristics such as school culture, leadership, concepts of teaching, teacher motivation, and self-efficacy might also have an impact on the perceived ostensive script and performance of lesson study (Saito, Khong, & Tsukui, 2012; Xu & Pedder, 2014).

VI FUTURE RESEARCH

Further research should be conducted to explore the process of integrating PD methods like lesson study into educational environments. While several educational researchers have started studying the development of organizational routines in professional development (PD), further research is needed in this area (Hubers et al., 2017; Roegman & Riehl, 2015; Spillane, 2012). Our study demonstrates that the ostensive element can significantly differ, and that the preservation or alteration of the ostensive feature is related to whether teachers desire to incorporate lesson study in their respective schools. Nevertheless, the reasons behind why teachers uphold or alter the ostensive script remain ambiguous. Through an examination of the ways in which teachers interpret and understand lesson study, a deeper understanding may be obtained regarding the difficulties and procedures associated with the preservation or alteration of essential components in the ostensive script. Research has indicated that instructors vary in their understanding, adjustment, and implementation of new educational initiatives (Coburn, 2001; Luttenberg, van Veen, & Imants, 2013). Researchers could employ the concept of sense-making, which refers to the process by which individuals comprehend and make sense of new information and concepts (Weick, Sutcliffe, & Obstfeld, 2005), to examine the reasons for the varying findings reached by teachers on the ostensive feature. Future research can

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investigate the relationship between teachers' ideas of teaching and their understanding of lesson study, which may help explain the variations in teachers' perceptions of the overall notion of lesson study. Sensemaking is typically shaped by preexisting frames of reference, convictions, and ideas (Coburn, 2001; Weick et al., 2005). The way teachers interpret new educational efforts is heavily influenced by their understanding of teaching, as demonstrated by Luttenberg, van Veen, and Imants (2013).

Takahashi's (2017) analysis of the degrees of teaching provides additional evidence for the relationship between the understanding of lesson study and the notion of teaching. He provides instruction at three different levels: 1) Teaching involves imparting crucial fundamentals, facts, concepts, and practices to students. 2) Teaching entails elucidating the meanings and rationales behind fundamental concepts and activities. 3) Teaching involves offering students opportunity to comprehend content and practices, and facilitating their learning process. In Japan, teachers, particularly at the primary level, make a concerted effort to implement level 3 teaching methods, as described by Takahashi (2017). If the primary purpose of teaching is understood as facilitating student learning, lesson study, which centers on examining student learning, appears to be applicable. However, if teaching is considered at a basic level where only topic knowledge is conveyed without considering how students acquire the information, it becomes unclear to what degree examining student learning through lesson study is necessary. This indicates that the main difficulty in maintaining LS (learner-centered education) on a worldwide scale is the need to recognize teaching as a means of facilitating student learning, in order to ensure that LS is meaningful and beneficial for instructors. Future research should explore the extent to which instructors' interpretation of LS is linked to their understanding of teaching. Specifically, it should take into account how teachers might use the concept of LS as a means of collaboratively addressing PCK issues within their perspective.

While there are still gaps in our knowledge about how organizational routines in professional development (PD) are created, maintained, and developed, our study emphasizes the possibility of using this notion to investigate how new working methods might be integrated into school life. Acquiring these understandings can assist in maximizing the effectiveness of lesson study in facilitating teacher learning and provide clarity on how lesson study can be transformed into a valuable localized adaptation rather than a detrimental mutation.

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