Lesson Study practices in the development of secondary teaching of students with moderate learning difficulties: a systematic qualitative analysis in relation to context and outcomes.

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Abstract

This paper examines data from the novel use of Lesson Study (LS), an internationally known strategy for professional development, to improve the teaching of students with Moderate Learning Difficulties (11-14 years old). The paper aims to use a systematic qualitative analytic approach to identify variations in LS practice in a Development and Research project with about 100 teachers across 30 schools in 2 LS phases. It also examines the extent to which the immediate context of undertaking the LSs relates to the LS practices and the outcomes for teachers and learners. Different data sources were used to examine the LS context, LS practices and outcomes. Analysis showed how teachers adapted the LS strategy to their particular subjects areas, the needs of students identified with MLD and their teaching contexts, while mainly keeping to the expected LS procedures. Co-variation analysis showed how the degree to which contexts were supportive of LS could be related to student learning gains and teacher outcomes, but no mediating factors were identified. The conclusions indicate the

importance of context for successful LS use. The findings are discussed in terms of possible mediating factors to better understand what is involved in quality and effective LS.

Key words: lesson study, moderate learning difficulties, inclusive teaching, systematic qualitative analysis

Introduction

Lesson Study (LS) is an internationally known professional development approach involving teacher collaboration and classroom enquiry that originated in Japan (Takahashi and Yashida, 2004) and has been used extensively in the Far East (Lim et al., 2011). Although LS has been used in the USA since the 1990s (Perry and Lewis, 2009), its UK use has been since the mid 2000s (Dudley, 2012). As a collaborative

strategy, LS usually consists of a cycle of three research lessons involving lesson review and development (see Figure 1). Teacher collaboration in Lesson Study takes the form of a LS team that jointly develops a series of lessons on a chosen topic with specific goals that lead to pedagogic questions which are addressed through planning and teaching the lessons (Puchner and Taylor 2006).

Figure 1 here

Though LS can be seen as one of various forms of collaborative professional enquiry and learning, it has several distinctive features. It is about studying lessons in which there is a pedagogic intention. The lesson is studied in terms of the observation of the students' learning that results from the planned teaching. However, the focus on learning is organized in different ways in different countries. In the UK version of LS, which is analysed in this paper, the focus is on the learning of what are called 'case students' (Dudley, 2012). These are the 1-2 students in the lesson who are selected to represent the chosen topic and LS research questions. The observation of the student learning by the LS team is also supplemented by consulting the case students about their learning at the end of the lesson. These aspects relate to another distinctive aspect of LS, its explicit research orientation; formulating research questions, which take the form of asking how to improve some aspect of teaching and learning as expressed in the language of research lessons. Another distinctive aspect of LS is the intensive observation by team members that is analysed in subsequent review and planning meetings to plan changes in the next research lesson (formative assessment). Another important feature of LS is that research lesson evaluation focuses mainly on student

learning rather than evaluating the teacher (Lee, 2008), which is fundamental to the collegial and research ethos of LS teams.

Lesson Study is a general and flexible strategy that can be used in different phases and areas of education with a focus on different student characteristics. However, it has tended to be used in mathematics and science education and not specifically with students identified as having special educational needs or disabilities. We have found no references to its previous use in developing inclusive teaching of students with special educational needs or disabilities in ordinary school and class settings (Howes et al., 2009).

Previous studies have indicated that teachers who have participated in LS have improved their teaching strategies, developed productive and successful collaboration with other teachers and gained a deeper insight into the teaching and learning process which is likely to be beneficial for future practice (Lee 2008; Sims and Walsh 2009; Puchner and Taylor 2006; Perry and Lewis 2009). Lewis et al. (2006) have suggested that these studies indicate that LS strengthens three pathways to teaching improvement: i. teachers' knowledge (e.g. subject and pedagogic knowledge, observation knowledge); ii. teachers' commitment and community (motivation to improve, greater connection to colleagues who can help), and iii. learning resources (lesson plans that reveal and promote student thinking, methods that support collegial learning). According to Dudley (2012: 91) the LS process 'encourages risk-taking and learning from what does not work as well as what does work'. The aim of the Lesson Study is not therefore to construct a perfect lesson, but to increase participants'

understanding of how pupils' learning can be improved – in other words, what works and why.

Lesson Study research has also shown that contextual factors are important for this method to be used effectively (e.g. Rock and Wilson, 2005; Lee, 2008; Perry and Lewis, 2009; Lim et. al., 2011). Therefore issues about timetabling in LS meetings, finding teaching cover and general support of senior teachers have been found to be factors that can support of hinder the smooth running of the LS process. Our research findings from the Lesson Study-MLD project have come to similar conclusions (see Norwich and Ylonen, 2013; Ylonen and Norwich, 2013), while also showing that some teachers had to put in extra time beyond their usual work time and that in some schools, despite the funding for their release from regular teaching, the funds were not used as expected. So, where contextual factors were supportive, teachers experienced Lesson Study as leading to positive outcomes. But, in other schools the timetable and management did not enable LS to operate optimally.

This paper analyses some of the data collected as part of the Lesson Study-MLD project, which aimed to improve the learning experiences and opportunities of students identified as having MLD. MLD was chosen, as it is a neglected and contentious area of SEN (Desforges, 2006). The project intended to enhance their educational achievements and to develop pedagogic strategies, programmes and materials for wider use in secondary schools. As a two phase project, it ran from the end of 2010 to July 2012, with two sets of schools and teachers mainly in south-west England. In both

phases the participating teachers, who taught students aged 12-14 (key stage 3), first received training in the use of Lesson Study and then were asked to design and undertake their own Lesson Study cycles in the broad areas of humanities, English and Art. With the focus on students with MLD these teachers identified students with MLD as the 1-2 LS case students and aimed to improve their class teaching with these students in mind. Teachers were advised to use the national definition of MLD as understood in their schools (DfES, 2005). In total about 30 secondary schools and over 60 teachers were prepared directly to undertake LS, but each team recruited 1-2 LS teachers, including the school's SEN coordinator, to join the LS teams, resulting in the involvement of about 100 teachers overall.

In this paper we focus on some of the key practices involved in LS and consider the immediate contexts that might shape these LS practices and how this may influence the outcomes for the teachers and learners. The general aims of this paper are, first, to examine how LSs were undertaken in this two phase LS project and, second, to examine how the immediate contexts relate to the LS practices and outcomes for teachers and pupils in a wide range of LS cycles. The LS was the unit of analysis in this study, which adopted a qualitative causal analysis in the style of Miles and Huberman (1994). Figure 1 shows several features of LS practice and its context that were assumed to be relevant to establishing quality LS processes and outcomes. Two key features highlighted in this figure are i. the use of relevant research and/or craft knowledge in the planning and review of the LS and ii. the support of senior teachers for

the LS practices and the organizational time and release required to undertake LS. In adopting this qualitative causal analysis we asked the following research questions:

i. What were the variations in LS practice used by teachers to improve the teaching of pupils with identified MLD (such as, the kinds of lesson goals, the knowledge used in planning research lessons, the pedagogic approach adopted and LS process completion)?

ii. To what extent did the immediate context of undertaking the LSs relate to the LS practices and the outcomes for teachers and learners?

The Lesson Study – MLD project

In the first phases of this development and research project 34 teachers from 17 schools received training and ongoing support from educational consultants in LS work. Due to unforeseen circumstances at three schools (e.g. staff illness, other work commitments), only 28 teachers from 14 secondary schools completed the programme phase and participated in its evaluation activities. Three of these were special schools that were included to act as comparator schools. Of the 28 teachers 82% were female and 18% were male, about 90% were aged under 40; and about 60% of the teachers had less than 10 years of teaching experience, while the remaining 40% had been teaching for over 10 years. These lead LS teachers then involved and briefed further teachers in their LS cycles. In the second phase there were 33 teachers from 15 secondary schools (three were special schools) who received training in LS, all of whom completed the programme phase. However, the second phase teachers received less guidance and support while undertaking the LS process in order to determine how LS

would operate under conditions more similar to those typical in schools. Of the 33 teachers, 80% were female and 20% were male; 90% were aged under 40; while 36% had less than 10 years of teaching experience and 64% had more than 10 years of teaching experience. All of the secondary school teachers in phases 1 and 2 of the programme had previously taught pupils identified as having MLD in their classes. As in phase 1, these lead LS teachers also involved further teachers in the LS teams. The secondary schools were mostly in south-west England (urban and rural settings) with some in the south-east.

All teachers in phase 1 of project came together on three full day conferences, at the start, after one term to review progress and after two terms to review developments and outcomes. The LS teams in phase 1 undertook three LS cycles. For phase 2 there were only two full day conferences, an initial briefing conference and a final conference after one term use of LS – the LS teams at phase 2 undertook two Lesson Study cycles and not three as in phase 1.

At the initial conferences teachers were introduced to LS principles and practical procedures, heard directly about LS from teachers experienced in LS, were introduced to theory and research about the nature of MLDs and current knowledge about teaching and motivational approaches relevant to these students. Details of all the recommended resources were posted on the project's website so that teachers could access these at any stage of the LS process. These included literature about higher order thinking skills resources (Fisher, 2006), pedagogic strategies for pupils identified as having Moderate

Learning Difficulties (Fletcher Campbell, 2004), motivational approaches (e.g. the ARCS motivation model (Keller & Suzuki, 1988) and research about working memory (Gathercole and Alloway, 2007).

Research methods and analysis

Methodological approach:

We addressed the two broad research questions by examining how the LS teams in the project schools designed their own LSs within the guidelines presented to them at the introductory conference and whether the context at the schools and the various LS processes were related to the outcomes at the end of the project. More specifically, we were interested in seeing what kinds of knowledge, if any, the teams used when planning and reviewing their research lessons as well as what were the main pedagogic approaches adopted and developed across the Lesson Studies. In addition, an examination of the broad aims of the Lesson Studies for both phases 1 and 2 of the project. The context supporting teachers' LS work was assessed by factors such as time to undertake the process and senior leader support for the process. Outcomes were assessed in terms of pupil learning outcomes, teacher pedagogic outcomes and wider outcomes for the schools (e.g. whether the LS process was continued after the project ended).

A qualitative data causal analysis approach was chosen to enable us to examine the various data sources systematically. This approach was based on the work of

Huberman and Miles (1989) and Miles and Huberman (1994) who emphasise the need to display data by using matrices, figures and/or networks as a fundamental part of the data analysis process. Data needs to be reduced to a manageable level by simplifying, abstracting and coding, which helps researchers to identify patterns and links in data displays in order to draw conclusions (Miles and Huberman, 1994). Social patterning in this approach is assumed to be organised and contextualised locally at a case level, rather than translated into general causal models. Alongside the causal streams or networks that are identified from the co-variation in factors is an associated causal narrative, which describes the meaning of the connections between the factors. IN addition, Huberman and Miles (1989) also show how it is possible to move from individual case analysis to multiple setting causal analysis by comparing individual causal links to some dependent variable across cases and matching outcome links across cases in different settings.

Our analysis across LS cycles used qualitative and quantitative sources of data in this matching pattern approach. Our aim was to examine the relationships between contexts, practices and outcomes of a selected number of Lesson Studies undertaken in the project schools. As a methodology it has similarities to a Realistic Evaluation (RE) methodological approach that also recognises context as critical to the operation of processes (mechanisms) that result in various outcomes (Pawson and Tilley, 1997). It was an RE approach that informed the design of a LS process questionnaire which was used as a data source in this study (see Ylonen and Norwich, 2013 for further details). Realistic Evaluation aims to link three distinct broad aspects of an intervention or

programme: its context, mechanisms and outcomes (C-M-Os) by constructing a process or programme theory that explains what processes (mechanisms) under what conditions (contexts) result in what outcomes. Realist evaluation, like Miles and Huberman's qualitative causal analysis, has an interest in local causal analysis and adopts realist philosophical assumptions as expressed in a critical realist stance associated with authors like Bhaskar (1982) and Manicas and Secord (1983).

Data collection and analysis methods:

The main data collection methods in the research reported in this paper consisted of case study reports written by the Lesson Study teachers at the end of the LS cycle, a Lesson Study process survey focusing on the contexts, mechanisms and outcomes, and a Goal Monitoring and Evaluation (GME) to examine the learning outcomes of pupils at the end of the process used in phase 2 of the project only. In addition, a follow-up survey to all the teachers was utilised to see whether the schools, departments and/or individual teachers had continued using LS after the project ended. These data were used to identify the variations in the key aspects of the analysed LSs, the context of conducting the LS and the LS outcomes.

The LS case reports used a template for participating teachers at the end of phases 1 and 2 of the project to summarise in their own words what they had done and achieved during each stage of the LS process. In particular, the teachers provided the context and overall aims of the Lesson Study, a summary of each Research Lesson undertaken, the impact of the Lesson Study on pupil learning, on current and future teaching, and the wider impact on the departments and school. In phase 1 the teachers

used one or two Lesson Studies out of the three as an example, while in phase 2 the teachers were requested to compile a separate case report from each of the two LS cycles undertaken. 18 case reports from 13 schools from phase 1 teachers and 13 case reports from 8 schools form phase 2 teachers are included in the analysis presented in this paper. The reports were content analysed (Robson, 2011) for the aims and goals of the LS undertaken, knowledge used in the planning for LS, pedagogic approaches used as well as outcomes of the LS process.

Because the case reports were the most important sources of data in the research reported in this paper, only schools that had completed at least one case report were included in the analysis. The total number of schools included in this paper (n=21) is therefore less than the total number of schools that took part and completed the LS-MLD project (n=29).

The LS process questionnaire provided data about the school context for conducting LS as well as teacher reports about outcomes for themselves form the LS cycles. Though these data relate to 2-3 LS cycles, they were judged to be applicable to the specific LSs analysed in this paper, as semi-structured interviews also undertaken as part of the evaluation research indicated that these factors were fairly constant across the period of the LS cycles in each school.

Figure 2 here

The following factors were identified in this analysis as shown in Figure 2:
Context of LSs:

Data from the LS process questionnaire was used for this factor. A mean score was computed from the ratings of six statements from the survey, which related specifically to the immediate context of conducting the LSs, using a four-point scale (definitely not; slightly; mostly; definitely; with a 'can't say' option). The following statements were covered:

- LS teachers meet regularly with enough time to undertake the LS process;

- LS teachers feel supported by senior teachers in the project;

- Senior teachers support LS teachers by finding out about assessment and teaching approaches used in LS;

- Senior teachers support the LS work by enquiring about progress;

- The school actively supports its commitment to participate in the LS project; and,

- Timetable flexibilities enable the LS teachers to meet regularly.

Where two teachers from the same school had filled in this survey, the mean score from their responses was calculated and used. These scores were then coded as low, medium and high based (i.e. low =<2; medium =2.1-3.0; high =>3.0) on the set of scores across the LS schools and inserted in the co-variation analysis table. Additional information about the context of undertaking LSs was also summarised from details in the LS reports to supplement the level coding.

LS factors:

All of these factors were identified through content analysis of the relevant sections of the case reports:

i.   <u>LS aims</u>: The aims of the LS were identified from the case reports and were summarised qualitatively for further analysis. These summaries were then coded in terms of whether they were curriculum 'subject-related' e.g. **'**information retrieval from text**'** and/or about 'learning processes' e.g. **'**having more confidence in group activities**'**.

ii.   <u>Case pupil details</u>: This was about the pupils identified as having MLD and their level of special educational needs derived from the case reports (whether this was at school action, school action plus or Statement level).

iii.   <u>Pedagogy adopted</u>: The kinds of pedagogy adopted in the research lessons were identified from analysis of the planning of the research lessons in terms of a scheme (see Table 1 for details) which was arose from a fuller analysis of pedagogic approaches used in phase 1 LSs (see Ylonen and Norwich, 2012).

iv.   <u>Knowledge used</u>: Three kinds of knowledge were identified from analysis of the case reports in terms of: a. based on own professional / craft knowledge, with no outside sources, b. based on own professional knowledge and some outside knowledge source, but not specifically related to MLD, e.g. about group work and c. based on own professional knowledge, uses outside literature source, but with specific relevance to MLD e.g. working memory and thinking skills.

v.   <u>All phases of LS process completed</u>: This was coded as yes or no based on whether all stages of the LS model shown in Figure 1 were undertaken or not (i.e. the 3 research lessons with prior and subsequent review/planning meetings).

Outcomes of LS:

i.   <u>Teacher pedagogy outcomes</u>: The case report data were also used to analyse thematically the main pedagogic outcomes for the teachers at the end of the process. These qualitative comments were grouped into different themes, which consisted of: pedagogic strategies and approaches that were found to be useful and continued to be used by the teachers, e.g. increased awareness of the teaching and learning process, improved lesson planning, and improved discipline in class. These were coded into a specific pedagogy outcome code (S) for when two or more specific approaches were reported and a general code (G) when only one or no pedagogic approach was reported.

ii.   <u>Teacher outcomes</u>: Teacher outcome statements were also part of the LS Process questionnaire. There were 15 statements which covered areas such as more knowledge and understanding about learning needs of pupils who have been identified as having MLD; more confidence to try novel teaching approaches; being more open to learning from others; and, improved planning of teaching. These were coded as low, medium and high relative to the range of scores and displayed in the analytic tables.

iii.   <u>Learner outcomes</u>: In phase 1 learner outcome accounts from the case reports were analysed thematically in terms of generality-specificity and focus of reported outcomes (academic-cognitive, e.g. improved learning outcomes, attainment and development of thinking skills OR behavioural-motivational, e.g. increased confidence, attitudes, engagement in class and self-esteem).

This produced 4 kinds of outcomes: general academic-cognitive, specific academic-cognitive, general behavioural-motivational and specific behavioural-motivational. The kinds of outcomes were also then coded as very positive, positive, neutral outcomes and cannot say/don't know (these were coded as '++', '+', '=' and 'N/A' respectively in the analytic table). No negative outcomes were reported.

In phase 2 more emphasis was placed on evaluating the pupil learning outcomes following LS. A more systematic goal setting and monitoring system based on the method, Goal Monitoring and Evaluation (GME) was introduced into the LS procedures (Dunsmuir et al., 2009). The GME method has been used to evaluate the outcomes of many kinds of programmes in various service contexts, initially under the name Goal Attainment Scaling (GAS) (Jones et al., 2006). In the adopted version of GME the LS teams were asked to set 2-3 learning goals per case pupil before the LS cycle commenced. In addition, the teams were asked to specify three pupil performance levels on an 11-point progression line for each of the case pupil's goals (ordinal scale). The two levels were set before the programme started (a baseline level and an expected level), and one after the programme (an achieved level). In this way, the teachers assessed pupils' achieved levels by comparison with baseline and expected levels. They also gave descriptions for all 3 levels and evidence for those descriptions (Norwich and Ylonen, 2013 for more details). The LS teams were also expected to set

levels jointly so the achieved levels were moderated to reduce bias that may arise from only one teacher's assessment. The attained levels at the end of the LS cycle were then used to evaluate pupil outcomes in terms of any progress relative to baseline and the expected level (the descriptor codes, 'progress as expected'; 'more than expected', 'less than expected' or 'no progress' were used in the analytic table).

The GME scheme also resulted in a set of specific learning goals, which could be analysed in terms of the kinds of goal; whether they were about curriculum subject-related e.g. **'developing written ideas independently'** and/or about learning processes e.g. **'having more confidence in group activities'**. The degree of goal attainment could also be analysed in terms of the kinds of goals set.

iv.   Continued use of LS: A follow-up survey was sent to all participating schools in phases 1 and 2 of the project about eight months after project phases 1 and 2. The findings of this survey was used to inform whether the participating teachers had continued using LS individually, more widely in the departments or within their schools as a part of their continuing professional development (CPD) approaches. The responses were coded into 'yes', 'no', or 'N/A' (don't know/no response)

v.   Wider department / school outcomes: The case report data were used to analyse what the main outcomes of the LS process were for the participating

teachers' own departments and/or schools. Those teachers' who answered this question mainly commented about their aims to share project findings with other colleagues and senior leaders in the school and their aims to continue using LS in the future.

The above data were analysed in two ways in relation to the two broad research questions. For the first question about the variations of different LS practices are reported descriptively. For the second question about the relationships between the context of the LSs, the LS practices and their outcomes, these factors were entered in a coded and summary qualitative form into qualitative data co-variation tables, as shown in Table 5. Co-variations between these multiple factors were examined qualitatively following the procedures associated with Miles and Huberman (1994).

Ethical clearance was provided by the University Ethics Committee which established that ethical practices accorded with recognised ethical principles of educational research. Participants were assured of anonymity of themselves and their schools. All collected data was maintained as confidential to the research team and data stored kept in a secure manner. Informed consent applied to the schools and LS participants. As the case pupils were not involved in the project outside usual lessons, no informed consent was required from their parents.

Findings

The findings are presented in two sections. The first relates to the first broad research question about the variations in LS practice used in the LS-MLD project overall. The second relates to relationships between the LS context, practices and outcomes.

i. Variations in LS practice

This analysis drew on the full range of LS case reports across both phases of the project.

The Lesson Study aims

The broad aims of all the Lesson Studies undertaken in both phases 1 and 2 of the project were identified from the LS reports. For phase 2 as well the goals for the two case pupils in the LSs was also identified from the Goal Monitoring and Evaluation data. Teachers in the project schools were given the opportunity to formulate their own specific aims for their Lesson Studies given the common focus on MLD. As Table 1 shows, the LS aims focused on challenges in teaching and learning as perceived by the teachers themselves for the case students selected as having a MLD. The range of aims was similar across the two project phases, mainly covering: improving pupils' engagement, motivation, confidence, independent learning skills, group interaction and speaking and listening.

Table 1 here

That there was a smaller proportion that were mainly about improving pupils' academic and cognitive skills is also evident in the analysis of the goals for the case pupils in phase 2, using the GME analysis of pupil goals data (see Table 2).

Table 2 here

Table 2 shows a breakdown of the pupil aims – in 18 LSs with each having 2 case pupils and each pupil having more than one learning goal, the total number of goals was 69. As described above, the goals were analysed into whether they were curriculum subject-related and/or about the learning process. Some LS goals were a mix of subject-related and learning process. Table 2 shows that about 70% of LS goals were learning process only, with about 29% involving some explicit subject related goals.

Knowledge used in planning of Lesson Study

When introduced to the model of LS used in this project, the schools were also encouraged to use some external knowledge sources in their LS planning as discussed above. Table 3 outlines three modes of knowledge use by the LS teachers in their planning and shows how many project schools in phases 1 and 2 of the project utilised these different knowledge modes.

Table 3 here

In mode 1 the teachers rely on analysing their professional knowledge and do not refer to any outside sources in their LS planning. In mode 2 the teachers in their planning draw on professional knowledge and some outside knowledge sources such as models of group work in teaching. Finally, in mode 3 the teachers make explicit use of literature sources that are related to teaching and learning of students with identified MLD, such as research informed ideas and practices about working memory and thinking skills that

have relevance to teaching issues in the area of special educational needs as well as draw on their professional knowledge.

Table 3 shows that between 31% and 39% of schools in both phases 1 and 2 of the project used their professional knowledge only, while 22% of phase 1 schools and 15% of phase 2 schools used their professional knowledge together with some outside knowledge sources. Just under 40 % of phase 1 schools and just over 50% of phase 2 schools used explicit sources such as thinking skills research and/or working memory research. Some LS teams made reference to sources that had not been recommended by the university team, but had been discovered through other means. So, between 60 and 70% of the LS teams in phases 1 and 2 used some knowledge whether relating to teaching in general (mode 2) or relating more specifically to teaching pupils who have been identified as having MLD (mode 3).

As an illustration of the different approaches to designing Lesson Study and so demonstrating the three modes described above, data from the case reports written by LS teams in three of the project schools are briefly outlined below.

A LS team from a special school in phase 1 relied on the professional knowledge of the participating teachers when planning their LS cycle in English (mode 1). The aim of this LS cycle was to 'use speaking and listening, role play and source analysis to demonstrate pupils' knowledge and understanding of different types of text'. More specifically, the aims for the two case students included improved engagement of student A in group activities and development of her language and communication skills, and fostering of cooperative behaviour and adult modelling appropriate social

behaviours of student B. The topic in these three research lessons was focused on the students analysing and demonstrating their understanding of two pieces of literature: Shakespeare's Hamlet and Anne Fine's the Diary of a Killer Cat. The main teaching approaches chosen were audio-visual and kinaesthetic approaches. At the end of the LS the teachers reported clear gains in the case students' learning, behaviour and confidence. It was noted by one teacher that:

'this progress is not confined to the lesson study classes, but has been noted by other teachers and parents. Parents...were delighted with A's progress in that she was able to contribute to family discussion without being prompted. B is much happier, focused pupil and more motivated'.

In terms of impact on practice and future teaching, the following aspects were highlighted:

- how by targeting key pupils with certain information at key times, can improve their confidence, develop and/or improve pupil relationships,
- by strengthening the weakest member and quietening the more dominant member in the student pairs, creates a fair platform for both,
- the value of thinking carefully about how and when to ask questions,
- how to less bothered about being in control of all aspects of teaching and learning in the classroom; sometimes just letting things happen.

The second example is from a phase 2 LS team, which in planning a Geography LS, used their own professional knowledge with some general outside knowledge sources (mode 2) about assessment for learning (AfL). The aim of this LS was to 'improve

retention of knowledge and understanding through the use of AfL techniques and by using speaking and listening, role play and source analysis'. Both case pupils had been previously identified as struggling in all aspects of the curriculum. The specific aims for case student A included improving her confidence and focus in class as well as retention of information. The aims for student B included becoming more focused and less distracted in lessons and developing his ability to work independently. The teaching approaches which were used in the three lessons included differentiated teaching materials, kinaesthetic approaches and practical tasks, group work tasks (e.g. group roles and a use of drama activities) and peer assessment.

It is notable in this example that case student A was described as having problems with retaining information from lesson to lesson, which could be related to the student having problems with her working memory. The teachers describe how in the final research lesson A had independently adopted a method of taking notes in lessons to help her better remember and retain information. She did this without any prompts or suggestions from the teachers. This suggests that case A would be likely to benefit from various working memory strategies as suggested by Gathercole and Alloway (2007). This suggests that the LS teachers could have adopted strategies associated with supporting working memory in their research lessons. Nevertheless, these teachers identified various teaching ideas about practices arising from their LS: the use of practical activities in lessons for students with identified MLD, using team-building and collaboration as an integral part of learning, give pupils new opportunities to explore their skills and abilities to raise pupil confidence, use movement in lesson to support levels of concentration and learning.

Finally, the third example of another phase 2 LS team illustrates knowledge use with clear links to the teaching and learning of students with identified MLD (mode 3). The LS team at this school used a variety of different research materials in their planning of the three lessons in geography. The main focus of this LS cycle was on improving the engagement of students in the study of geographical phenomena, which had been identified as being challenging because it involved abstract ideas. Another area of focus was to increase the students' self-motivation in order for them to take more pride in their work and increase their progress in the topic. The LS team decided to focus on trialling various approaches which, if successful, could then be implemented in a range of other subjects across the school. These approaches included the use of outside literature sources such as research literature about the use of thinking maps, aspects of collaborative learning, enquiry-based learning linked to motivation, engagement and achievement and reward systems and strategies to encourage motivation. Some of the outcomes of this LS were described as including: more inclusive teaching due to the focus on certain students; visible progression of the case students' confidence and achievement in the subject; and, identification of literacy problems of one of the case pupils, which is being investigated and further support is being provided.

Pedagogy used

The case report data were also used to examine the different pedagogic approaches adopted and used by the teachers when undertaking the Lesson Study process (see Table 4). It is notable that the pattern of pedagogic approaches in phases 1 and 2 were similar; involving i. a broad pedagogic approach, e.g. activity based method, ii. varied input approaches e.g. multimodal approaches, iii. adapting cognitive demand e.g.

memory support and consolidation and iv. learning relationships e.g. using different groupings).

Table 4 here

ii. Relationships between the LS context, practices and outcomes

What follows are analyses that address the second research question about how the context of undertaking the LSs co-varied with the LS practices and the outcomes for teachers and learners.

The main analysis of these possible relationships was undertaken as explained above in terms of a qualitative table with columns representing the set of contexts, LS practices and outcomes for the specific LS summarised in the rows. There was relevant data across the 16 schools for the 23 LSs that were analysed in this way. These LS were represented in a table covering 4 pages; Table 5 shows only an example of this longer table. (see appendix)

Context – LS factors:

There were no co-variations between the LS context levels and:

i.   whether the LS process had been completed (3 research lesson and 4 LS team meetings) or not,

ii.   the focus of the LS aims (as subject-related and/or about learning processes);

iii.   the level of identified need of the case pupils with MLD, who were the focus of the LSs (their levels of special educational needs - school action, school action plus and Statement – varied across the different context levels).

iv.   the pedagogy used in the research lessons (e.g. the patterns of pedagogic approaches were similar whether the LS context was coded as low or medium to high).

v.   the kinds of knowledge used in the LS (the LSs that were conducted in high, medium and low supportive contexts all used MLD related knowledge).

Context – outcomes and LS factors - outcomes:

The association between the LS context levels and the pedagogic outcomes derived from the LS cycles was analysed in terms of a specific pedagogy outcome code (S), when two or more specific approaches were reported and a general code (G), when only one or no pedagogic approach was reported. Analysis showed no co-variations; the seven general pedagogic strategy outcomes were in medium and high contexts, while specific outcomes were found across all three context levels.

However, analysis did show some co-variations between LS context and teacher outcomes levels. All five low teacher outcomes were associated with low or medium contexts, while none were in high LS contexts. All seven high teacher outcomes were associated with medium or high context levels, none with low contexts. Analysis of the co-variation of LS context with continuing to use LS outcome also showed that in all 5 schools where LS teams reported that their school would continue to use LS these were ones where the LS context was at a high level. In the 12 cases where LS was not going to be used or there was no data, 8 were in medium or low LS contexts. In 4 cases the LS context was high but LS would not be used.

Though there was not enough variation in learner outcomes in phase 1 outcomes to analyse co-variations with context and LS factors, there was enough variation for phase 2 analysis. This showed that there was a tendency for 'less than expected' learner outcomes to be associated with low to medium LS contexts (6/7) rather than high contexts (1/7). Likewise, there was a tendency for 'more than expected' outcomes to be associated with medium to high contexts (7/8) than low contexts (1/8).

As explained above, the evaluation strategy in phase 2 involved setting case pupil learning goals. This made it possible to analyse the relationship between the goals set at the start of the LS cycles and the monitored outcomes at the end of the cycles. Table 2 (see above) shows the breakdown of the kinds of learning goals by learning progress using the GMS scheme. This shows that no particular kind of learning goals (subject-related and/or learning process) was associated with a very much higher percentage of 'more than expected' student progress.

There was not enough variation in LS factors to undertake any more co-variation analysis for LS factors with pupil outcomes in phase 2 LSs. However, co-variation of LS factors (LS aims, pedagogy and knowledge used) with teacher outcomes and continued use of LS was undertaken. No relationships were identified.

Discussion and conclusions

We have used data from a development and research project to examine two research questions using systematic qualitative analysis. We were interested in the variations of LS practices used by teachers in the project schools (research question 1) and the

extent to which the context of undertaking the Lesson Studies was related to the LS practices and the outcomes for teachers and learners (research question 2).

The variations in the way the LS teams conducted their LSs, in terms of their LS aims, the kind of knowledge used and pedagogy adopted, reflects how teachers adapted the LS strategy to their particular subjects areas, the needs of students identified with MLD and their teaching contexts. These findings illustrate the flexibility of the LS strategy when used for the same purpose across schools and while keeping to the LS procedures. However, though the LS teachers had been encouraged to use research informed knowledge relevant to teaching and learning of pupils with identified MLD, this happened in between 40-50% of LSs. The remainder used their professional/craft knowledge only and/or some more general research knowledge. Interviews with teachers who only used professional / craft knowledge in their LSs, suggests that they found this knowledge adequate for their LS use (Ylonen and Norwich, 2013).

The general aims of the LSs were varied, most commonly about enhancing the students' engagement with learning, their independent learning, enhanced group interaction and enhanced confidence of those learners who had low self-esteem. Curriculum subject aims were mostly implicit in these learning process aims, though sometimes explicit with these learning process aims. The typical teaching approaches used by the teachers reflected these Lesson Study aims as it emerged that, by and large, the teachers adopted and used some well known pedagogic approaches such as multi-modal and sensory approaches, differentiation of teaching, motivational approaches, grouping and peer support strategies.

The co-variation analysis based on the data display tables showed how variations in the degree to which contexts were supportive of LS (timing, release and management support) could be related to student learning gains and teacher outcomes (e.g. knowledge about MLD learning needs, trying out new teaching approaches, more open to learning from others) as well as continued use of LS in their schools. These conclusions provide support for the LS model (Figure 1). They also add to the current international research, as referenced above, about the crucial importance of context for the successful use of LS in schools through the use of novel evaluation research methods in a UK context. However, it was not possible to show any co-variations that linked the LS context to the examined LS practice factors and then onto the various outcomes. This indicates that the variations in the practices that we did examine (LS aims, knowledge used and pedagogy adopted), important as they are to LS procedures, did not mediate the link between the LS context and the LS outcomes. The research literature (Lewis et al., 2009) suggests that some other processes that we did not examine might be relevant through analysis of direct recordings of LS deliberations, e.g. how the knowledge is used in the LS review and planning, the quality of working relationships in the LS team, personal characteristics of the LS teachers and/or the quality and depth of review of the case pupils' learning.

Though the conclusions to be drawn from these analyses are tentative, the consistencies in the findings drawn from different sources increases their dependability. Given the range of data sources there was also some missing data that reduced the scale of the analysis. The paper is also based on a qualitative data causal analysis methodology that identified co-variations between factors. Whether such co-variations

even with the causal narratives in the Case Reports justify secure causal attributions depends on philosophical positions that cannot be addressed further in this paper. Nevertheless, not only does this paper provide an empirical perspective on the details of a set of secondary school LSs and illustrate the significance of specific aspects of the LS context, it also indicates that future research needs to focus more carefully on a range of other factors not covered in this study using more varied data sources, such as, the pedagogic analysis in LS, the LS team relationships and the LS teachers' characteristics to understand what is involved in quality and effective LS.

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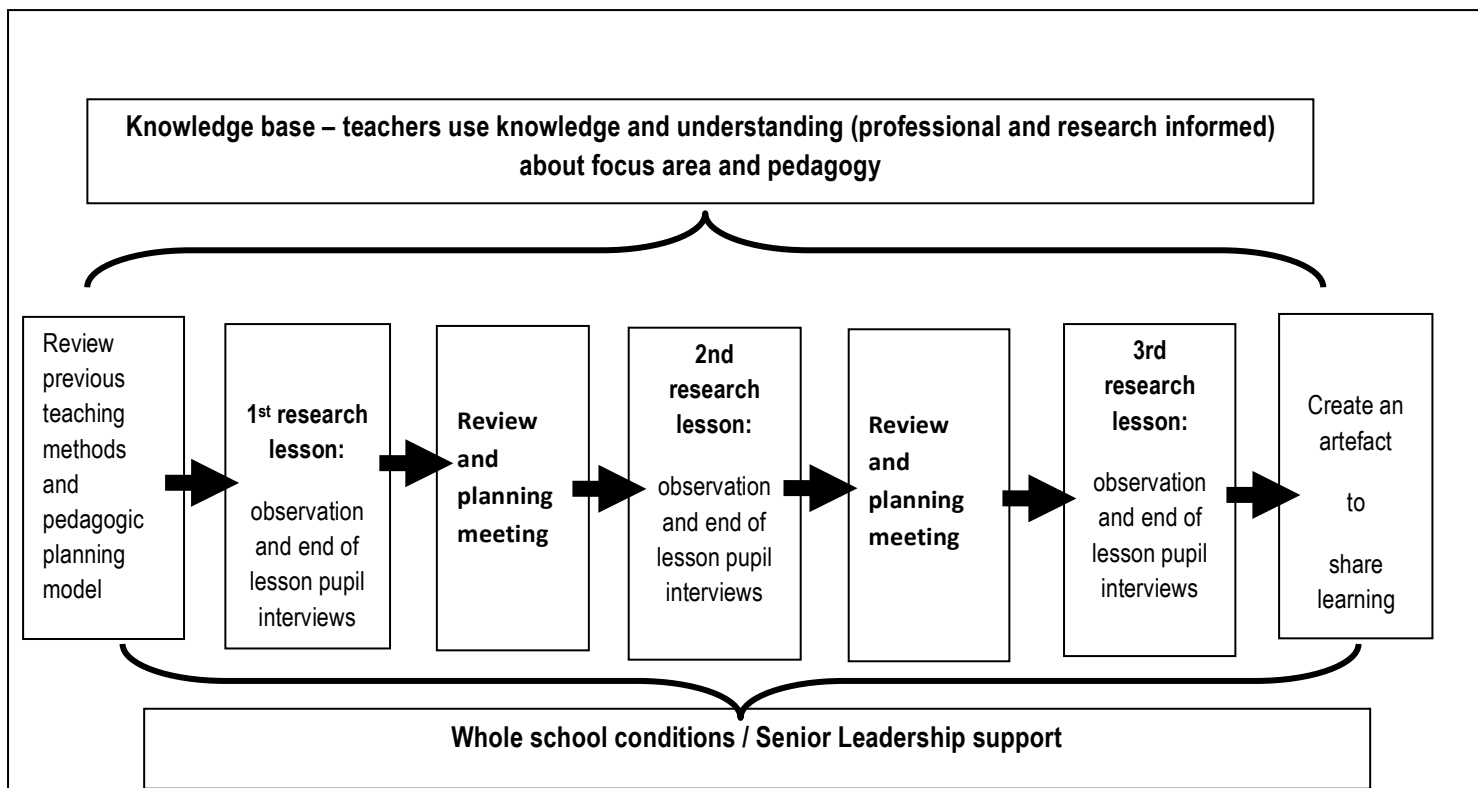
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Appendix

Table 5 here

Figure 1: Model of Lesson Study

Knowledge base – teachers use knowledge and understanding (professional and research informed) about focus area and pedagogy

Review previous teaching methods and pedagogic planning model

1st research lesson: observation and end of lesson pupil interviews

Review and planning meeting

2nd research lesson: observation and end of lesson pupil interviews

Review and planning meeting

3rd research lesson: observation and end of lesson pupil interviews

Create an artefact to share learning

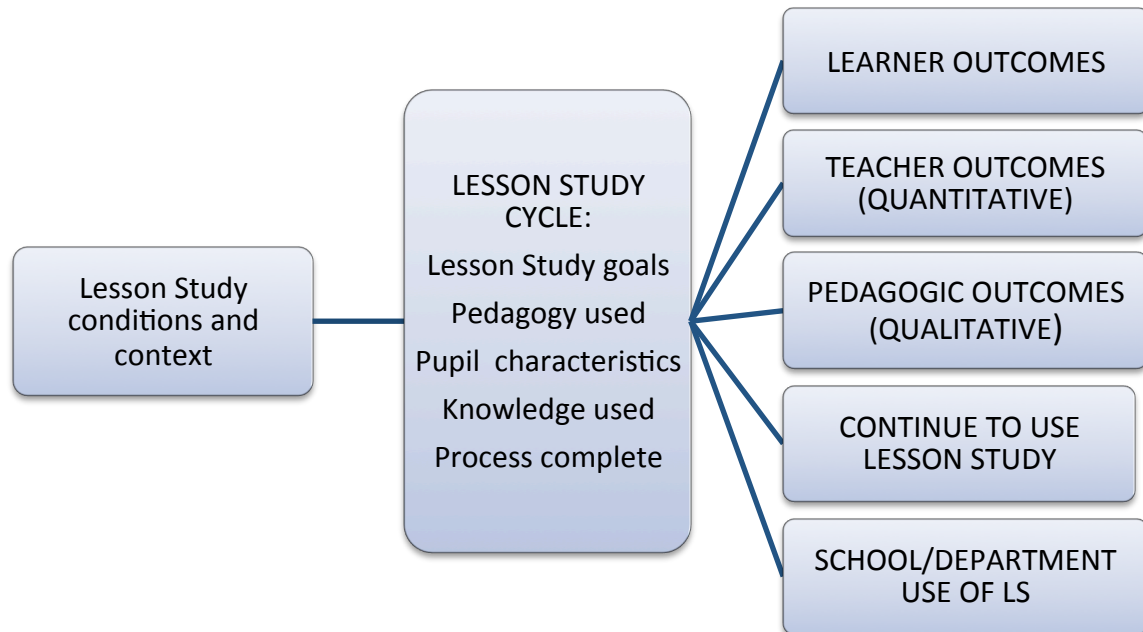Whole school conditions / Senior Leadership support

Figure 2: The qualitative analysis framework

Table 1: The main aims of the Lesson Study cycles in phase 1 (LSs) and phase 2 (LSs)

	Total phase 1	Total phase 2
Engagement with learning	7	6
Independent learning	6	4
Speaking and listening	4	4
Development of higher order thinking skills	5	4
Enhanced group interaction	9	7
Supporting confidence (for those with low self esteem)	4	7
Information retrieval	1	0
Literacy / text	4	1
Other	1	0
Total number of aims	**41**	**33**

Table 2: Kinds of LS goals by learning outcomes in terms of level of progress using Goal Monitoring and Evaluation (phase 2)

Frequencies/ row %s	No progress	Progress less than expected	Progress as expected	Progress more than expected	Total
Subject-related only	0	6/43	5/ 36	3/21	14
Learning process and subject related	0	2/ 33	2/33	2/33	6
Learning process only	0	24/49	10/20	15/31	49
	0	32 (46%)	17 (25%)	20 (29%)	69 (100%)

Table 3: Knowledge sources used in Lesson Study planning, phases 1 and 2

Knowledge used in planning of LS	Phase 1 Lesson Studies (of the total of 18)	Phase 2 Lesson Studies (of the total of 13)
Draws on own professional knowledge, with no outside sources referred to (Mode 1)	7 (39%)	4 (31%)
Draws on own professional knowledge and some outside knowledge source – not specifically relevant to MLD (Mode 2)	4 (22%)	2 (15%)
Draws on own professional knowledge, uses outside literature source – with specific relevance to MLD e.g. working memory, thinking skills (Mode 3)	7 (39%)	7 (54%)

Table 4: the main pedagogic approaches used in the Lesson Studies, phase 1 and phase 2

Pedagogic approach	Phase 1 Lesson Studies	Phase 2 Lesson Studies
1. Broad pedagogic approach	(15)	(10)
1a. Learner centredness	8	7
1b. Activity based learning	4	3
1c. Assessment for learning	3	0
2. Varied input (multi-modal/sensory approaches)	17	10
3. Adapt cognitive demand	(19)	(15)
3a. Level/style (differentiation)	8	5
3b. Memory/consolidation	6	7
3c. Use of cognitive strategies	5	3
4. Motivational approaches	5	6
5. Learning relationships	(16)	(12)
5a. Grouping and peer support	15	11
5b. Adult-pupil communication	1	1
6. Working with additional adults	1	0

Table 5: Example of qualitative analysis undertaken

LS CONTEXT		LESSON STUDY					OUTCOMES	
Sites	*Context: conditions*	*LS aims*	*Case pupil details*	*Pedagogy adopted (see Table 4 for codes)*	*Knowledge used*	*Complete phases of LSs?*	*Teacher pedagogic outcomes*	*Teacher survey outcomes*
Special school 1: LS1	T score 3.67 (H)	Engagement with learning; independent learning; enhanced group interaction	Statement	1a, 2, 5a	P1	*Yes*	Sacrificial conversation; awareness of teaching and learning personalities; short timed tasks; cutting down on teacher-led activities: S	High
Special school 1: LS2		Independent learning; enhanced group interaction	Statement	1a, 2, 5a	P1	Yes	Sacrificial conversation; awareness of teaching and learning personalities: S	
Secondary school 1 : LS1	T score 3.67 (H)	Enhanced group interaction; literacy/text; higher order thinking skills	Both 2 were SA+	1c, 2, 3, 5a	P3	Yes	Thinking and rehearsal time; higher level prompt questioning; visually interesting resources; active challenges; pupil-centred approach: S	Medium
Secondary school 1: LS2		Enhanced group interaction; Literacy/text; higher order thinking skills	N/A	2, 3, 4, 5a	P3	Yes	Use collaborative consequences style approach when teaching reading responses; prompt cards; rehearsal time; tactile resources: S	
Secondary school 2	T score 3.5 (H)	Independent learning; information retrieval; literacy/text	N/A	2, 3a, 5a,	P1	Yes	Step by step scaffolding until learning is secure; independent learning focus; building on previous lesson and learning: S	High
Secondary school 3	T score 1.83 (L)	Speaking and listening; Enhanced group interaction	Year 7 SEN English	1a, 1b, 2, 3a, 4, 5a	P3	n/a	Take more risks with teaching; step back as teacher and allow the pupils to do more; peer assessment: S	low