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Improving English Language teaching through lesson study: case study of teacher learning in a Singapore primary school grade level team

Abstract

Purpose – This paper reports on how a grade level team in a Singapore primary school used lesson study to mediate the implementation of the English Language (EL) national curriculum. It aims to explore how this process had mobilized different teacher knowledge, challenged their beliefs of teaching and student learning, and created impact on their learning and knowledge.

Design/methodology/approach – An interpretive qualitative study using a case study methodology was employed. Data collected included participant observations and individual interviews. Transcripts of lesson study discussions were open coded for the content of teacher discourse and the sources of influences on the teachers' reasoning and action.

Findings – The findings indicate that each stage of the lesson process engaged teachers' deliberative discourse differently and constituted their (1) building a common inquiry stance into the problem of student learning in reading and writing, (2) moving away from lesson-based view to embracing a curriculum-based deliberation, and (3) challenging their shared assumptions and enabling their learning to adopt the students' lens in improving the research lesson.

Originality/value – This study provides an illustrative case on how teachers' talk about work practices in lesson study mediated teacher learning in a group context. The study established the importance of an interconnected view of teacher interaction in lesson study that factored in the consideration of the influences at the teachers' level and at the school's level that enabled and/ or impeded a broader consideration of practice and richer conditions for the mentoring of novice teachers in the team.

Keywords - lesson study, English language teaching and learning, teacher professional learning, Shared Book Approach, primary or elementary school, Singapore

Paper type - Research paper

1. Introduction

This paper reports on how a grade level team in a Singapore primary school used lesson study to mediate the implementation of the English Language (EL) national curriculum. Through participant observations of two lesson study cycles, teacher interviews, and document analysis, it examined how teachers engaged in a deliberative discourse that enabled them to problematize the current curriculum and pedagogical practices and devise new strategies and resources to enhance students' EL literacy skills. It explored how this process had mobilized different teacher knowledge, challenged their beliefs of teaching and student learning, and created impact on their learning and knowledge. The use of multi-level analysis enabled the consideration of the content of teachers' deliberative discourse and the sources of knowledge that teachers drew upon in their reasoning and action. The strengths of the multi-level analysis and the focus on the engagement and impact of each lesson study stage are visible contributions of this study to the terrain of research in lesson study.

2. Background

English language education in primary schools in Singapore

English is both a medium of instruction and studied as the first language in Singapore schools. English language teaching (ELT) in Singapore is made complex by its multi-ethnic student profile. Only 52% of students of Chinese ethnicity, 26% of students of Malay ethnicity, and 50% of students of Indian ethnicity aged 5 to 14 spoke English frequently at home (Singapore Department of Statistics, 2011) while the rest had relatively less contact with English until they began formal schooling. In primary schools, ELT is made more complex as students of different ethnic groups and social-economic status in Primary 1 (first grade) classes are mixed regardless of their EL proficiency or dominant home language for the purpose of social integration.

To cater to a diverse range of EL learners in the school system, the Strategies for English Language Learning and Reading (STELLAR) national EL primary curriculum was developed. The STELLAR programme sought to increase the opportunities for students to speak extensively and share their views with the teacher and their classmates to build their confidence in writing and speech (Ministry of Education, 2012). It aimed to support 'the teaching of English through a balanced combination of explicit instruction in language skills, including grammar and phonics, and the use of age-appropriate children's stories' (Ministry of Education, 2015). With STELLAR, primary schools in Singapore no longer used commercially produced textbooks. Instead, a common set of Big Books for the lower primary grade levels and STELLAR Readers for the upper primary grade levels were developed by curriculum specialists at the Ministry. An example of a Big Book selected for use at the Primary 1 level was 'Smarty Pants' written by Joy Cowley, a well-regarded author of children's literature. The story of Smarty Pants, the clown, was also the text chosen by the lesson study team in our study. Detailed curriculum guides, known as the STELLAR Specific Guidelines (SSG), outlining the scope and sequence of the units of work were also developed. The STELLAR reform could be seen as a response to the challenges brought about by the lack of teacher expertise, and the paucity of resources reported by EL teachers in a national study on EL teaching (see Goh et al., 2005).

In a typical Primary 1 classroom, the teacher begins the unit of work with the Shared Book Approach (SBA), one of STELLAR's signature pedagogies. In the first part of SBA (SBA1), the teacher reads the Big Book to the class, one page at a time, and asks a series of scaffolding questions listed in the STELLAR guidelines, to provide opportunities for students to predict content and offer their personal responses (30 to 60 minutes). In SBA2, the teacher teaches the language items and structures based on the Big Book, guided by the lesson plan and supported by the learning sheets in the STELLAR guidelines (two to three hours). The

STELLAR signature pedagogies depicted in Figure 1 were seen to provide students with ‘opportunities to express themselves in an environment where language learning can be enjoyable yet purposeful’ (Ministry of Education, 2012).

Figure 1. Lower primary STELLAR teaching cycle.

In the Modified Language Experience Approach (MLEA), another STELLAR signature pedagogy, the teacher works with students in writing the Class Dictated Story, and at the Group Writing and Individual Writing stages (two to three hours). The unit of work concludes with Learning Centres (one hour) through which students consolidate their learning with word study activities.

Research found substantial uniformity in how Primary 1 and Primary 2 teachers from different primary schools all conducted EL lessons based on the STELLAR guidelines (Curdt-Christiansen and Silver, 2013). While the teachers adhered closely to the recommended STELLAR pedagogies and materials, the observations of their classroom practice suggested that deeper changes in teaching to enable students ‘to interact and engage in productive exchanges with teachers’ were less evident (Curdt-Christiansen and Silver, 2013). The present study was, therefore, keen to look at how teachers working together in a grade level lesson study team would engage in a deliberative discourse to enable them to problematize the current curriculum and pedagogical practices and devise new strategies and resources to enhance student learning. The study set out to address the following research questions: (1) How does each stage of the lesson study process engage teachers in deliberative discourse? (2) What teacher learning is enabled through lesson study?

3. Literature Review

The review of the literature aims to deepen the understanding of curriculum and pedagogical deliberation in teachers’ lesson study discourse of collective reasoning and action, in particular what constitute deliberating acts, teachers’ knowledge and beliefs that bring about changes and improvement in their teaching of the research lesson as well as the contextual influencing factors on the lesson study endeavour. Dewey's (1908/1932) notion of deliberation as dramatic or ‘imaginative rehearsal of various courses of conduct’ (p. 303) formed the basis of Schwab’s method for the practical problem of curriculum making (Schwab, 1969). Our review of literature revealed how lesson study resembles such deliberation unfolding through each of the stages in which teachers collaboratively study curriculum and student learning to identify problems, formulate goals to bridge learning gaps, and engage in Schwab's (1969) curriculum deliberation. Curriculum deliberation here is characterized by the weighing of alternatives and justifying actions of teaching improvement by studying student thinking and drawing on the evidences of student learning or the lack of it to inform curriculum and pedagogical decisions and problem solving.

Following Lewis et al. (2006), a lesson study cycle starts with teachers working with an established common goal, along a series of lesson planning sessions and culminating in the enactment and observation of a research lesson, followed by a post-lesson colloquium to consolidate learning. In Dudley's (2013) study, a process involving more than one lesson study cycle and the teaching of an improved lesson was employed. In the goal setting stage at the start of the lesson study cycle, teachers across different studies identified current problems in student learning and growth, which in many cases had been defined in terms of an overall student learning goal (e.g., Fernández et al., 2003; Fernández, 2010; Lewis, 2009), allowing teachers to analyze the causes to student problems, formulate hypothesis, and envision how to bring student learning and development to a higher level by aligning with school development goals (e.g., Lewis et al., 2013; Liberman, 2009; Parks, 2008; Rock and Wilson, 2005). Goal setting also focused on teachers’ studying the curriculum materials to

determine what was known about the teaching of the specific topics and aligning student learning with content-specific goals (Lewis et al., 2012) and their examining an 'existing textbook lesson' (Lewis et al., 2009). The use of a lesson study protocol has been said to be helpful in focusing teacher conversations in problem identification and formulation, orienting them towards more specific planning for problem solving (Chong and Kong, 2012).

In the lesson planning stage, as Fernández (2010) noted, teachers engaged in knowledge co-construction involving deliberative reasoning, development of useful instructional tasks, and opportunities to discuss in detail how students think and how best to further the understanding of student thinking (Fernández, 2005). Several studies suggested that as teachers worked out the students' tasks themselves, their discussions helped them understand student thinking through anticipating students' responses (Inoue, 2011) and pre-empting different kinds of errors that students might make (Lewis et al., 2011). In Singapore, Chong and Kong (2012) found that the lesson study planning protocol requiring the team to develop overarching and content-specific goals 'guide[d] the generation of teaching strategies' (p. 272), strategies for supporting student thinking, and measures to evaluate implementation of such strategies. Yet how teachers as a team moved from their initial ideas to a more enriched understanding of teaching through collaborative deliberation in the lesson planning and post-lesson reflection stages was, however, not well-understood.

During the observation of research lessons (RL), teachers collected data on student learning when they studied particular case students to see how student thinking changes (e.g., Dudley, 2013) and examined aspects of the lesson design that fostered or hindered student learning (e.g., Lewis et al., 2012). Pella (2012) found a clear connection between the discussions around how teachers had analysed their students' work during the post-lesson reflection and the transformations in their pedagogical approaches to teaching writing including the design of more structured scaffolding and open-ended tasks in the subsequent lessons. Teachers' understanding of students deepened during the post-lesson colloquium when they explored the data collected to identify implications for student learning and develop new questions for the next lesson study cycle (Lewis et al., 2011).

An American case also found that during the post-lesson discussions, teachers' understanding of student learning deepened through their deliberation on 'the reasons behind student understanding and/ or the impact of instruction on student learning' (Santagata and Guarino, 2012). Fernández (2010) confirmed that the post-lessons discussions offered teachers 'opportunities to learn from considering alternate points of view to see differently and reframe events or problems within their lessons' (p. 360). These findings were reinforced in the case of lesson study used in a university methods course for eight in-service American teachers which had reported that the reflection of multiple observers 'provided additional insights that individual observers simply cannot provide' (Kotelawala, 2012). This process of framing and reframing problems of practice was, according to Schön (1983), integral to the development of a reflective practitioner.

Despite the power of lesson study in enabling teacher learning through curriculum deliberation and evidence-based instructional improvement, caution needs to be taken when interpreting its impact. Fernández (2005) remarked that the focus on student thinking and what teachers can learn in lesson study 'very much depended on what teachers bring to the table' (p. 283). She further asserted that teacher learning was not inherently attributable to lesson study design per se. This warning was reinforced by Siu (2008), a researcher-facilitator who reported that she could only 'start with where teachers were' despite the visible gaps between the perceptions of good language teaching that was grounded in theoretical knowledge and the perceptions of good teaching that was grounded in teachers' practical knowing (p. 107). These findings offer two valuable insights into the affordances of lesson study for teacher learning. First, the knowledge co-construction in the teacher teams is

brought about by the extended and recursive nature of the lesson study inquiry as deliberative practice rather than as an attempt in a one-off endeavour. Second, teachers not only bring to the table their individual teacher learning orientation, but also the influence of school-level factors and the social-cultural contexts which shape their teacher discourse and what is made possible for expansive learning (Engeström, 2001), where ‘learners learn something that is not yet there’ and are involved in constructing and implementing ‘a new object and concept for their collective activity’ (Engeström and Sannino, 2010).

4. Methodology

With a view to understand in-depth contextualised teacher learning, a case study research design was undertaken to investigate teacher interaction situated in the lesson study team. A case study research approach was adopted to understand the multiple interacting factors that were likely to be at work (Yin, 2014) in bringing about teacher learning which was of interest in this present study. A combination of observations, interviews, and a qualitative survey was employed.

Teacher participants

The ability to gain access to the research site was a major consideration in the choice of the school. The school’s familiarity with lesson study was another consideration in the purposive sampling. New Vision Primary School (pseudonym), a government, co-educational school, was established less than a decade ago in a relatively new housing estate in Singapore. The lesson study team selected by New Vision for the study comprised the teachers teaching English and Mathematics at the Primary 1 level to students aged six to seven years. Comprising 11 teachers, including three beginning teachers (BTs), the team composition was representative of a typical grade level team in Singapore schools as it reflected the profile of Singapore’s teaching force with a growing number of novice teachers. At the time of the study in March 2014, the BTs, Amalia (BT1), a Malay Singaporean, Wei Jie (BT2), a Chinese Singaporean, and Usha (BT3), an Indian Singaporean, had nine months, 15 months, and 21 months of teaching experience respectively. All of them were below 30 years of age. The Research Teachers (RTs), Ahmad (RT1) and Siti (RT2), two experienced teachers with at least eight years of teaching experience who taught the planned lessons, were selected by the drawing of lots about a week before the scheduled RL1 to ensure fairness and equity.

The team was diverse across gender and race, a profile reflective of Singapore’s multi-racial society. The team comprised three male teachers and eight female teachers. All the experienced teachers had at least eight years of teaching experience. All the teachers had prior experience in observing at least one research lesson, but only three teachers, Mary, the School Staff Developer who played the role of the Knowledgeable Other (KO), Ahmad (RT1), and Susan (Team Member 3), had previous lesson study experience. Prior experience in lesson study was defined as having participated in at least one lesson study planning team. The group composition was reflective of a team that was largely inexperienced with lesson study. Mary (KO) and Sally (EL Senior Teacher) played important roles in facilitating the lesson study. The participant profile is presented in Table 1 below.

Table 1 Teacher Participant Profile

Data collection

The observations of the teacher team were scheduled during their weekly timetabled time for teacher professional development over 10 weeks in March to May 2014. The five planning

meetings and three post-lesson reflection meetings provided a total of 8 hours and 7 minutes of data. For the purpose of analysis, the lesson study inquiry was divided into four key phases as depicted in Figure 2: planning in Cycle 1, reflection in Cycle 1, planning in Cycle 2, and reflection in Cycle 2. Cycle 1 Planning comprised three planning sessions. Cycle 1 Reflection was conducted after teaching the first research lesson. Cycle 2 Planning consisted of two planning meetings. Finally, after teaching the improved lesson, Cycle 2 Reflection involved the post-lesson colloquium and the final evaluation meeting.

Figure 2. Four phases of the lesson study inquiry.

The two pre-lesson study interviews with two BTs and the five post-lesson study interviews with the two BTs and three experienced teachers accounted for a total of 5 hours and 16 minutes of data collected. Artefacts used and produced in the course of the lesson study were also collected, including the lesson plans and student handouts.

Data analysis

The discussion transcripts were carefully read and meaningful utterances were annotated and open coded in Nvivo. A meaningful utterance was defined as a unit of discourse indicating the teacher's reasoning or assertion about a topic issue. Process codes in the form of gerund phrase descriptions ('ing' words) were used to label the meaningful utterances. Examples of the assertion-based process codes included 'seeing character traits and feeling words from teachers' and students' perspectives', and 'not reinventing the wheel by using whatever resources are available'. Transcripts from the teacher interviews, responses from the teacher survey and evidence from artefacts were drawn upon to supplement the data analysis.

To ensure the reliability of the open coding, the first author invited her doctoral classmate to code the transcripts from a New Vision planning meeting (93 minutes long) and a post-lesson colloquium (34 minutes long) which accounted for 26.08% of the observation data. The calculation of interrater reliability for the New Vision coding yielded a percentage agreement of 92.09% and kappa statistic of 0.37, indicating a fair level of agreement between coders.

The process codes were grouped into core categories based on patterns of similarity (Saldaña, 2013) with regard to teachers' reasoning and action. Assertions of teacher learning were made based on the prevalent core categories indicated by the frequency of meaningful utterances open coded across the eight lesson study meetings. The reduced data obtained was pulled together to develop what Strauss and Corbin (1998) described as a rich analytical 'storyline' (p. 148) of the processes and outcomes of teacher learning enabled.

5. Findings

The key findings are presented to portray how each stage of lesson study was a mediator of teachers' deliberative discourse on lesson planning and reflection that drew upon and consequently mediated their knowledge, beliefs, and practices. The findings suggest that teachers' curriculum deliberation through lesson study enabled them to problematize the STELLAR curriculum and pedagogical practices, and devise new strategies and resources for the school's reading programme to enhance students' literacy skills.

The analytical narrative that follows pulls together the three most prevalent core categories of teachers' reasoning and action which enabled their (1) building a common inquiry stance into the problem of student learning in reading and writing (12.23%), (2) moving away from lesson-based view to embracing a curriculum-based deliberation

(32.28%), and (3) challenging their shared assumptions and enabling their learning to adopt the students' lens in improving the research lesson (41.67%).

(1) Building a common inquiry stance into the problem of student learning in reading and writing

The team started the first lesson study meeting by doing a round-robin brainstorming centred on the question 'What topic or skill do students have difficulty learning?' Beginning with problem identification provided an entry point for collective deliberation. The pooling of the teachers' experiences from different classrooms helped piece together a composite picture of the students' learning difficulty, their reading comprehension, and their ability to 'connect' their writing with the reading. Sally, the EL Senior Teacher (ST), pointed the team to the problem with the lack of 'explicit teaching'. Referring to Figure 3, she introduced the 'new reading programme', Readers' Workshop, that the EL department had developed to enhance the STELLAR programme by weaving in comprehension instruction after the first reading of the Big Book at SBA1. She related to them examples of 'comprehension strategies' in the Readers' Workshop at the primary one level including 'making connections text to self, [...] making predictions, and character study'.

Figure 3. Readers' Workshop teaching cycle.

Sally also shared about the implementation issues of the Readers' Workshop at the Primary 2 level where teachers had jumped quickly to the worksheets designed, and skipped the teacher modelling and group work stages. It seemed that with her framing, the team's concern with the lack of 'explicit teaching' became a procedural issue that did not need further unpacking. Sally's mediation as a more knowledgeable other (KO) contributed to the quick foreclosure of the brainstorming session and the teachers' moving quickly to design the research lesson centred on one of the character study worksheets that they were familiar with.

Responding to the converging discussion to focus on the 'explicit teaching' of the 'new reading programme', Mary who was the Staff Developer and another KO cautioned the team against 'jumping into the lesson, even to the book'. She raised the importance of first spelling out 'What is the overarching thing we want to do?' and understanding 'the essence of lesson study ... is for us to study together to design a lesson to help our students' (Planning Meeting 1, 28 March 2014).

Mary's interjection brought about more turns of teacher talk in framing the overarching goal of the lesson study inquiry. When Ahmad (RT1), the teacher who was to teach the first research lesson, declared, 'The kids can't write, that's the root of the problem', Amalia, a beginning teacher (BT1) commented that she was 'just overwhelmed by this' complex problem. The cognitive dissonance articulated by Amalia (BT1) provided an opportunity for Mary to align the group deliberation purposefully with 'the essence of lesson study', which was studying 'children's thinking and at the same time, [...] to develop ourselves [...] to develop that (sic) eyes, [...] a window to children's mind and thinking'.

In at least two important ways, the reframing of the central purpose of lesson study inquiry helped align novice teachers' thinking with the team's stance. Firstly, it helped the newcomers consider and articulate desired long-term student development goals. Secondly, it helped them view teacher learning in lesson study as the development of teacher disposition and teacher knowledge for enhancing student-centred pedagogy. In this way, understanding the 'essence of lesson study' made it possible to further align the teacher professional development effort with the EL department's vision of developing children's literacy. It also helped the team put student learning as the central focus of the lesson study inquiry. The

inquiry stance established at the beginning stage framed the team's planning and enactment of instruction that was to follow and enhanced the collective pedagogical reasoning and action.

(2) *Moving away from lesson-based view to embrace a curriculum-based deliberation*

In designing the learning activities and working out the flow of the lesson procedures, the teachers anticipated the students' responses to the student task on a character study shown in Figure 4 and envisioned possible teacher support and evaluation of teaching and learning for each task.

Figure 4. Character study task

The character study task required the students to describe Smarty Pants, the character from the Big Book, by completing the sentence 'I think Smart Pants is a _____ person because _____'. The team had used a similar task on another Big Book character as a 'pre-test' with their classes to determine the students' prior knowledge and gauge the team's planning. Culling and interpreting evidence of the students' work gave the team insights on the possible areas for intervention, particularly focusing on vocabulary instruction.

The focused planning team comprising Ahmad (RT1), Siti (RT2), and Fatimah (TM1) presented a draft lesson plan for discussion with the larger team. They approached research lesson 1 (RL1) as part of a 'lesson package' to enhance SBA1 rather than as a stand-alone lesson. This was an important finding as it showed the teachers moving from their usual one-lesson framing to a 'larger curriculum' perspective, and how their deliberative discourse in the investigation and planning stage of lesson study had helped them make this shift in their thinking. Embedding the RL within the existing STELLAR programme opened up opportunities for the articulation of the rationale underlying STELLAR pedagogies. This was exemplified in the following excerpt in which Siti (RT2) articulated the thinking behind scheduling RL1 at SBA2 rather than at SBA1. She explained:

In our discussion, the last session, we talked about the possibility of one STELLAR strategy that is SBA1. To put this in SBA1. After much discussion, you know, we did debate about it. We do not want to lose the essence of SBA1, predicting and then you know generating ideas and all that. We have shifted this explicit teaching of the structure to move on after all during SBA2. (Planning Meeting 3, 11 April 2014)

The curriculum deliberation allowed the teachers to anticipate the issues that could arise in the classroom enactment, in terms of what the students might find difficult in arriving at the adjectives to describe the character traits of Smarty Pants. The teachers anticipated that using the concept map in Figure 5 to elicit the students' responses after they had viewed a video clip about a clown would provide them with the necessary vocabulary to complete the character study task.

Figure 5. Concept map used in RL1

The teachers pre-empted potential problems resulting from the students' lack of prior knowledge of the activities undertaken by Smarty Pants, particularly about car racing. To this end, Ahmad (RT1) suggested using the Formula 1 (F1) car racing event that was held

recently in Singapore to activate the students' prior knowledge about race car drivers and their being adventurous or possibly, brave. In the end, more precise teacher questions were spelt out, for example, Who have (sic) seen a racing event before? Where? Do you know the names of any car racers? What do you think of people who enjoy racing? (Lesson Plan for RL1). The teachers, through reasoning from their adult's perspective, anticipated that by asking more of such scaffolding questions, including the names of famous F1 drivers, would activate the students' prior knowledge about car racing. They expected that the use of these questions would help the students 'move away from the feelings (e.g., scared) and focus on the qualities' of the character in the book (e.g., adventurous, brave, etc.) (Planning Meeting 3, Amalia (BT1), 25 April 2014).

(3) Challenging shared assumptions and learning to adopt the students' lens in improving teaching and learning

When putting the designed research lesson into action, two critical incidents challenged the teachers' shared assumptions and triggered the shift in the teachers' consideration of practice from the teacher lens to the 'student lens' (Fernández et al., 2003). First, Ahmad (RT1) was unable to elicit the anticipated responses for the character traits of Smarty Pants. Contrary to what the teachers had anticipated, the students did not know any names of the F1 drivers and one student even offered 'Red Bull' as the answer. It was only when another student mentioned Lightning McQueen, a Disney animation character, could the class make the connection with professional car racing. When asked about what they thought of Lightning McQueen, one of the students offered the adjective 'awesome', but was unable to say why he had thought the character was so.

Second, the teachers observed that the students had first considered Smarty Pants' actions before describing his personal quality. This was in contrast to how the character study worksheet had been designed which required the students to first name the adjective and then support it with a reason. Usha (BT3) offered this valuable insight on the way the students had concluded about the character traits of Smarty Pants, saying:

they took a long time to come out with why they say that. So I felt it would be easier to go the other way, that means focus on the action first for example, he likes to swing on trees that are very high. So he is not afraid of heights so what does that tell you about him? [...] But for children, maybe they look at the actions first. Why? Because they are able to see. And then, they can use the actions to come out with the adjective. (Post-lesson reflection 1)

The reflection on students' difficulty during the post-lesson colloquium opened up the space of curriculum deliberation, enabling the teachers to rethink a number of related issues in the design of learning resources. These issues included (1) how the 'completing the sentence' task required multiple dimensions of student understanding of EL; not only the understanding of appropriate vocabulary, but also the knowledge of word spelling and sentence structures, and (2) the thinking processes that the students had to undergo in evaluating the actions of the character before coming to a conclusion about an appropriate character trait that could be inferred from his actions.

The team's attempts to address the students' difficulty observed led to a number of improvements in RL2. Firstly, differentiated group activities were developed, particularly a 'matching sentence' activity sheet for low-progress students was designed that required them to match the actions of Smarty Pants with the character trait that was indicated as opposed to the more open writing task for the high-progress students. Secondly, the teachers also clarified their understanding of what constituted character traits as opposed to the feeling words elicited from

the students in the concept map shown earlier. The curriculum deliberation led to the teachers' designing of more explicit vocabulary instruction by using an anchor chart to build students' vocabulary through labelling the words elicited from them. Specifically, a star symbol was used to annotate positive character traits, a dustbin symbol for negative character traits, and a heart symbol for emotions. The labelling of the words in the anchor chart provided a means to help the students understand the distinction between the different adjectives that could describe the character in the book.

6. DISCUSSION

Our study uncovered a grade-level team's collaborative curriculum deliberation process as they endeavored to improve Primary one children's reading and writing. The findings on how the teachers built on one another's contributions and how different sources of teacher knowledge were drawn on by the teachers at the different phases in the lesson study cycle were much larger and more complex. Unfolding along a problem-solving process, what and how teacher talk were depicted resonate with Schwab's (1973) notion of curriculum deliberation and further the understanding of the pathways of teacher learning.

Collective pedagogical reasoning and action as curriculum deliberation through lesson study

The findings on how the team had built a common inquiry stance and moved towards a curriculum-based deliberation indicate the different pathways of teacher learning enabled by curriculum deliberation through lesson study. While Shulman's (1987) idea of pedagogical reasoning helped us in naming the general features of the teacher discourse we studied, it stopped there and was unable to inform us on how to describe the group deliberative dynamics in problem solving. The collective reasoning and action in the spirit of Schwab's notion of curriculum deliberation allowed us to view the deliberative practice engendered in the community of teachers. Such reasoning and action enables teacher teams to make visible, utilize, and share their tacit PCK collectively to transform their initial teacher understanding to a comprehensible form to students along each stage of lesson study. The findings echo the view of curriculum deliberation as being primarily concerned with improving school practices, beginning with addressing an existing curriculum concern, and involving 'deliberate and reflective decision-making processes' (Deng, 2013). The interpretation of findings suggests that the teachers' deliberation on the design of learning activities and the design of lesson procedures include: (1) raising different concerns with student learning, (2) justifying possible alternatives, (3) asking questions to establish a common understanding, and (4) reporting observations using specific examples from the research lessons.

During the post-lesson reflection phase, teacher talk shifted from being primarily informed by their pre-existing understanding of PCK and the influence of school-level factors to their reasoning and action being more informed by their understanding of PCK and KOS drawn from the observation of the research lesson. The teachers' deliberation during this stage focused on: (1) interpreting what they had observed of students' behaviour, (2) addressing areas of concern with the observed student learning outcomes, (3) evaluating how well the lesson was enacted, and (4) considering improvements in the lesson design. Such reasoning and action would enable teacher teams to make visible, employ, and share their KOS to feed forward to the next design cycle. From a discourse perspective, the study went deeper to understand what the teachers were doing in transforming their knowledge and developing an enriched understanding KOS and PCK.

Dudley's (2013) observation of lesson study teams in the UK found, through coding the interaction functions of the teams' discourse, that there was a high incidence of teacher learning occurring at points when the teachers rehearsed aloud. By viewing lesson study, in its fuller range, as a problem-solving process comprising different, unique, but interconnected

stages, we found that teacher learning not only occurred in the heightened moments of rehearsing and teaching, but was informed throughout the process as a line of reasoning and action of curriculum deliberation, shaping and reshaping their knowledge and understanding. An important implication for policy-makers and school leaders in supporting grade-level teams more effectively would be to adopt a process-oriented view to teacher learning in community and to honour the time and space necessary for learning through problem-finding and problem-solving to happen.

What was surprising was how teacher talk had drawn less on the teachers' understanding of subject matter knowledge (SMK). One possible reason for the little emphasis on teachers' understanding of SMK in shaping and consequently being shaped by teacher talk may be attributed to the teachers assuming that 'the knowledge, understanding, skill, and disposition that are to be learned' by students (Shulman, 1987) had been duly considered in utilising the existing STELLAR programmatic resources. The findings agree with the extant literature on how lesson planning in teacher teams drew largely on teachers' collective understanding of classroom data and practical knowledge (e.g., Roblin et al., 2014). The study reinforced our current understanding that teachers' reliance on only past classroom experiences in interpreting and justifying pedagogical actions could possibly lead to the reproduction of more of the same 'old practices' in school (Roblin et al., 2014).

Lesson study as a site of learning for all members, particularly for mentoring the novice teachers

Nevertheless, how teachers' shared assumptions were challenged and how they learnt to adopt students' lens in their deliberation shed light on the shared literacy practices developed and the teachers' conceptualisation of EL education that furthers the understanding of enactment of literacy policy in Singapore. The findings echoed what Wenger (1998) had theorised of the workings of a community of practice (CoP) characterised by a joint enterprise, shared repertoire, and mutual engagement. Firstly, what the teachers did in the team demonstrated how they negotiated the joint work of designing EL lessons using specific programmatic resources and working within the constraints of the school conditions to produce invented literacy practices unique to their situation with student learning. Secondly, the findings illustrated how through the course of teacher interaction, the ideas, language, and teaching resources created for representing teacher practice enabled the teachers to negotiate meaning and which also became part of the honed repertoire of the team.

Consequently, the BTs valued the opportunities to observe the more experienced teachers plan and enact the research lessons. They moved towards more central participation as they contributed to more turns of talk and as the lesson study inquiry progressed. As mentioned, the insights into materials design and development described earlier were raised by the BTs in the team on which the more experienced teachers discussed extensively. The more experienced teachers also indicated that they learnt from the fresh insights from the BTs. Finally, the tensions arising from the mutual engagement amongst teachers presented ways for the teachers, particularly the novices, to participate more in teacher talk. As discussed earlier, for example, when the BTs felt overwhelmed by the multiple perspectives in the initial meeting, the more experienced KO stepped in to talk the team through the diverging discussion to converge on a common understanding of the essence of lesson study inquiry.

By and large, at each stage of lesson study, the team's collective pedagogical reasoning and action was characterized by a deliberative discourse about curriculum and teaching around students' problem in learning reading and writing. Planning, teaching, and observing aimed at improving student learning created opportunities for the team to identify and solve problems, a process that raised their acute awareness of the limitations of their

knowledge, the habit of mind of teachers as adults, and their shared assumptions of student learning. Deliberative actions, thus, followed, as they grew more determined to change and improve themselves as teachers. Following a lesson study model in tapping the available resources, such as the STELLAR curriculum and resources, the teachers reasoned with tools, designed and redesigned their lessons, and came up with new strategies and resources informed by the evidence of their use in the research lessons. The lesson study processes engendered a learning community in which all teachers could have probably learned: old and new, experienced and novice alike. Lesson study became a site for mentoring the novice and young teachers as they seemed to have learned and contributed most despite their visible cognitive dissonances. Last, but not least, their prominent school-level influence showed that such teacher learning might not necessarily happen in all schools, and principals and teachers need to cultivate the inquiry stance to allow this to happen.

7. Conclusion

From the perspective of learning pathways, opening up teacher talk through various activities including (1) coming to a common problem, (2) justifying pedagogical actions and designing lessons, (3) observing and reflecting on what works and does not work in the lesson enactment, and (4) redesigning the lesson from new understanding spell out in concrete terms the interconnected pathways to develop teachers' understanding of the knowledge of practice. The insights on the entry points and pathways of teacher learning in lesson study can inform the implementation effort of schools embarking on lesson study and the work of teacher educators and teacher leaders tasked to develop principled approaches in supporting teacher teams in school.

The general implication for future studies is that examining one dimension of learning from the teachers' perspectives of what the interpersonal activities would mean to them (Rogoff, 1990) is important, but not enough in capturing the complexity of teachers learning together. Research has, therefore, to look at multiple dimensions to build an interconnected view of teacher learning in community, including examining the conceptual resources in teacher talk, the understanding of teacher knowledge and epistemic stance brought in, the enriched teacher knowledge developed, the shifts in teacher beliefs, the honing of shared practices, and the school-level factors that enable learning as well as provide challenges.

Although advances were made to research on teachers' learning outcomes in lesson study as the literature review has indicated, there is still a call for further attention, particularly in the area of elucidating the processes and conditions under which lesson study teams learn. The present study was an attempt to address this gap in the literature and offer insights into how teachers' talk about work practices in lesson study mediated teacher learning in a group context. Overall, the study established the importance of an interconnected view of teacher interaction in lesson study that factored in the consideration of the influences at the teachers' level and at the school's level that enabled and/ or impeded a broader consideration of practice and richer conditions for the mentoring of novice teachers in the team.

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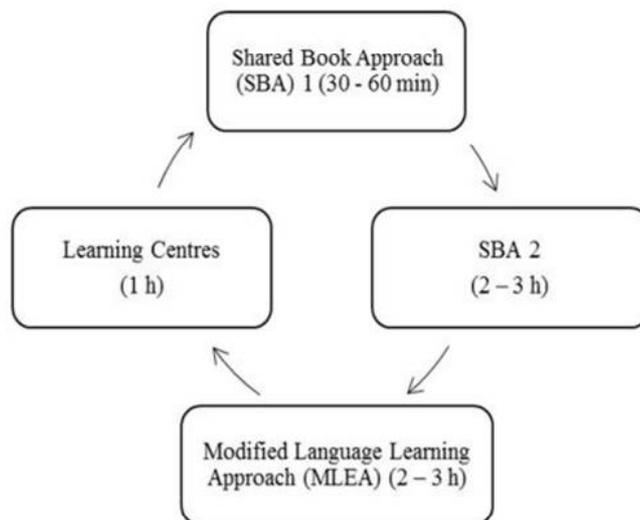


Figure 1. Lower primary STELLAR teaching cycle.

Figure 1. Lower primary STELLAR teaching cycle.
Figure 1. Lower primary STELLA
184x120mm (96 x 96 DPI)

*Table 1**Teacher Participant Profile*

Teacher	Role	Gender	Race	Teaching experience (years)	Prior LS experience
Amalia	Beginning Teacher 1	Female	Malay	0 – 2	No
Wei Jie	Beginning Teacher 2	Male	Chinese	0 – 2	No
Usha	Beginning Teacher 3	Female	Indian	0 – 2	No
Ahmad	Research Teacher 1	Male	Malay	8 – 15	Yes
Siti	Research Teacher 2	Female	Malay	More than 15	No
John	Lesson Study Facilitator (LSF)	Male	Chinese	More than 15	No
Mary	Knowledgeable Other (KO)	Female	Chinese	More than 15	Yes
Sally	Senior Teacher	Female	Chinese	More than 15	No
Fatimah	Team Member 1	Female	Malay	8 – 15	No
Cathy	Team Member 2	Female	Chinese	8 – 15	No
Susan	Team Member 3	Female	Chinese	8 – 15	Yes

Table 1
Teacher Participant Profile

Table 1 Teacher Participant Pr
191x139mm (96 x 96 DPI)

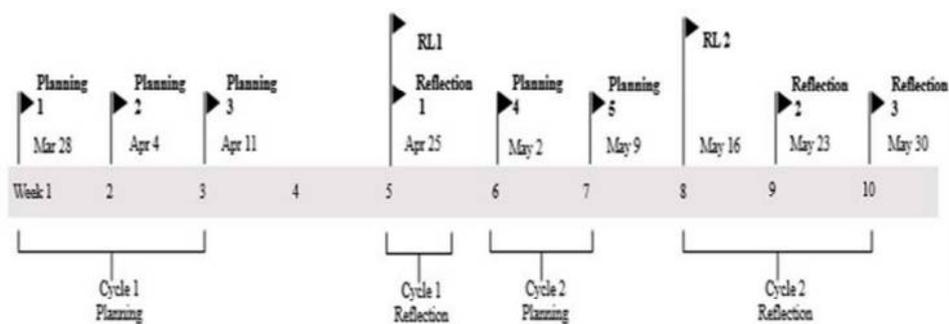


Figure 2. Four phases of the lesson study inquiry.

Figure 2. Four phases of the lesson study inquiry.
Figure 2. Four phases of the I
192x80mm (96 x 96 DPI)

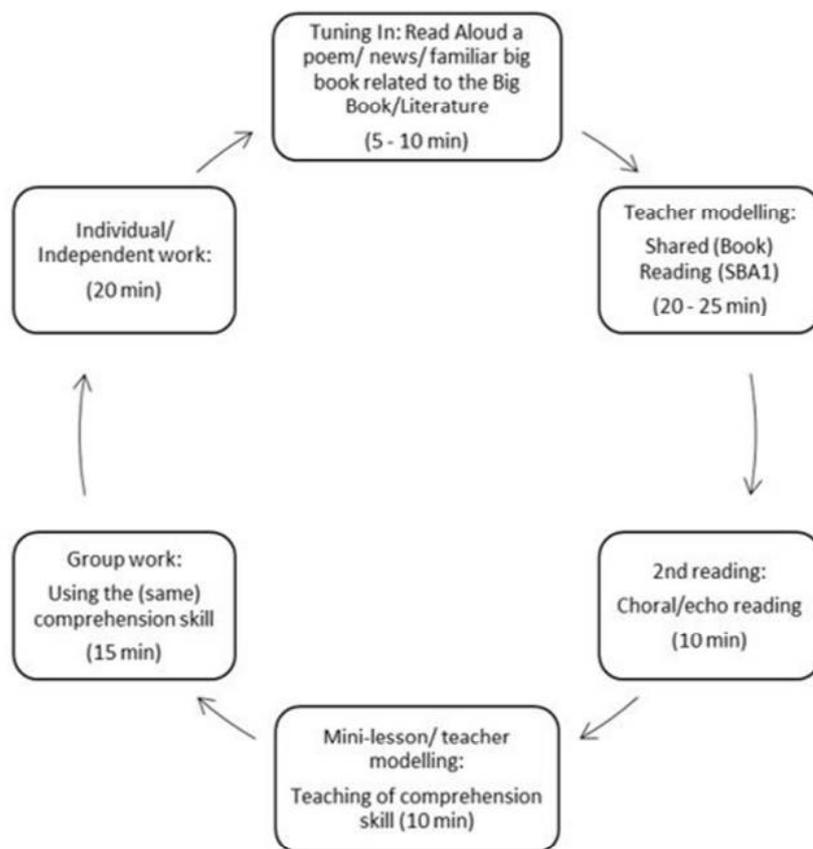


Figure 3. Readers' Workshop teaching cycle.

Figure 3. Readers' Workshop teaching cycle.
Figure 3. Readers' Workshop
159x151mm (96 x 96 DPI)

Name: _____ () Class: Primary 1/ _____
Date: _____

Readers' Workshop (Character Study)

SMARTY PANTS

I think Smarty Pants is a _____ person because _____

Illustrate by drawing what he did in the book.



Figure 4. Character study task

Figure 4. Character study task
Figure 4. Character study task
170x135mm (96 x 96 DPI)

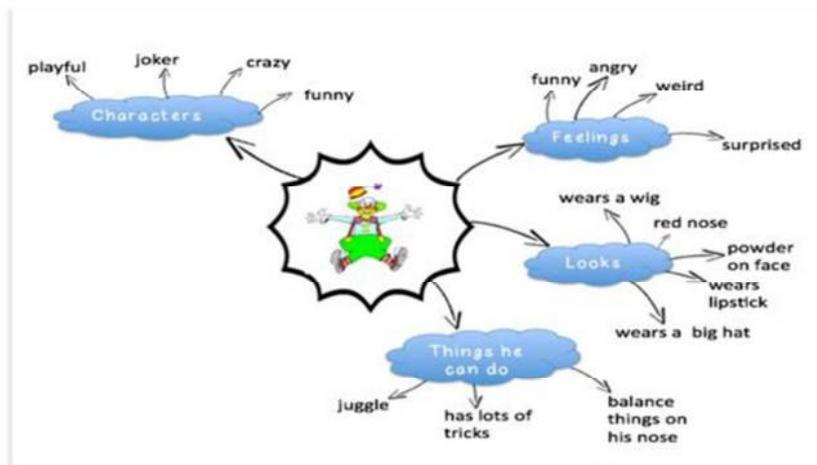


Figure 5. Concept map used in RL1.

Figure 5. Concept map used in RL1.

Figure 5. Concept map used in
175x100mm (96 x 96 DPI)