

Enhancing teachers' reflection through lesson study: is it feasible?

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ENHANCING TEACHERS' REFLECTION THROUGH LESSON STUDY: IS IT FEASIBLE?

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This study aimed to explore the content and levels of teachers' reflection as they engaged in Lesson Study (LS). However, this article only focuses on changes in teachers' reflection from a LS group. This LS group was made up of six primary mathematics teachers and four knowledgeable others. They carried out five LS cycles. Qualitative data were collected through reflection sessions, participatory observation, collection of artefacts and interviews. Analysis of data revealed that there were changes in the teachers' reflection. These changes included improvement in the depth of reflection about pupils' learning, shift from teacher's perspectives to pupil's perspectives, anticipation of pupils' responses and reflection from several perspectives. Thus, enhancing teachers' reflection through LS is feasible.

INTRODUCTION

Reflection practices have increasingly been used to support teachers' professional development (Suratno & Iskandar, 2010) because teachers would be able to recognize their own weaknesses and strengths through reflection (Boon, 2002). Furthermore, through reflection, teachers would be able to understand better the complex nature of their own teaching and their pupils' learning (Zeichner & Liston, 1996).

In Malaysia, the practice of reflection was first introduced to in-service teachers in 1999 (Ministry of Education, 1999). Teachers were required to reflect on to what extent they have achieved their teaching and learning outcomes. However, this requirement did not really encourage the teachers to reflect critically and deeply. Therefore, it was not surprise that a review of local studies (e.g. Siti Mistima Maat & Zakaria, 2010; Tee, 2007) reported that Malaysian teachers' reflection was still descriptive and not in-depth. Reflection that is descriptive will not help teachers to fully understand, and thus improve their teaching. Hence, there is a need to enhance reflection practices among Malaysian teachers.

To date, only a few studies have done on teachers' reflection in LS. Review of literature (Tosa, 2014; Myers, 2013; Posthuma, 2012) showed that the teachers generally reflected about LS process, teaching, learning and physical set up of lesson. Tosa (2014) discovered that most of the teachers' reflection which were at higher level focused on teaching strategy and pupils' thinking. Posthuma (2012) reported that the teachers became more aware of the pupils' needs after involving in LS.

Other studies (e.g. Chiew, 2009; Fernandez & Chokshi, 2002) found that LS could enhance teachers' reflection. However, they did not study in detail how LS could

impact teachers' reflection. Likewise, studies from Tosa (2014), Myers (2013) and Posthuma (2012) did not show substantial evidences that LS improve the teachers' reflection. Thus, this study aimed to explore changes (if any) in the teachers' reflection as they engaged in LS process.

THEORETICAL FRAMEWORK

Two theories that underpin this study were Situated Learning Theory by Lave & Wenger (1991) and the framework of teacher reflection practices of LS (Suratno & Iskandar, 2010). According to Situated Learning Theory (Lave & Wenger, 1991), learning occurs through the learners' legitimate peripheral participation in the activity of the community of practice. There are experts and novices in the community of practice. As the novices participate in the practice of community, they interact and collaborate with experts and other novices in the community. After an extended period of time, the novices internalise the culture of the community, change their beliefs and behaviour, and ultimately change to become experts of the community.

Reflection was defined as "active, persistent, and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and the further conclusion to which it tends" by John Dewey (1933, p. 9). According to Suratno and Iskandar (2010), reflection is the heart of LS. Teachers reflect when they are preparing the lesson plan (prospective analysis), teaching or observing the research lesson (situational analysis) and reflecting on the research lesson (retrospective analysis). However, in this study, only teachers' reflection during reflection sessions were studied. During the reflection sessions, the teachers analysed the relationship between their teacher teaching and their pupils' learning. They also compare the learning trajectory design (LTD) with the actual learning trajectory (ALT). They framed and reframed the problem analysed and developed alternative LTD for future lessons.

Therefore, in this study, "reflection" was defined as the activity carried out by a group of teachers, who looked back into their pupils' learning during the research lesson, analysed their pupils' learning, identified the reasons of the incidents happened and explored alternatives to improve their pupils' learning. The community of practice was the LS group. The teachers were not familiar with reflection when they first conducted the LS. As they engaged in LS, they interacted with the knowledgeable others and other teachers in the group. After several LS cycles, they internalised the way of reflecting and they became able to reflect like expert. The teachers were expected to attain a fruitful understanding and the ability to frame and reframe problem after several LS cycles (Suratno & Iskandar, 2010).

METHODOLOGY

This paper discussed the teachers' reflection in a LS group, which was set up by six primary mathematics teachers. Besides, four knowledgeable others, who were comprised of two university lecturers, a postgraduate student and a School

Improvement Specialist Coach, also involved in the LS cycles. The LS group carried out five LS cycles. Each cycle consisted of four steps, namely, (1) identify and formulate goals; (2) plan research lesson collaboratively; (3) teach/ observe research lesson; and (4) reflect and refine lesson plan.

Qualitative data were collected through participatory observation, reflection sessions, interviews and collection of artefacts. The artefacts collected were observation sheets written by the observing teachers and knowledgeable others during research lessons, research lesson plans, as well as pupils' worksheets. All the research lessons observed and reflection sessions were video-recorded, and transcribed verbatim for data analysis. Then, the transcripts were divided into segments. A segment refers to part of the transcript which was related to a topic or theme of reflection. The segment ended when the topic changed. The length of the segment ranged from a phrase from a person to several utterances from different persons. Next, the segments were coded to the themes of reflection, like pupils' learning, teaching strategy and instructional content. Triangulation of reflection transcripts, observation sheets and field notes were also carried out. Lastly, the coding was compared across the five LS cycles to explore any changes in the teachers' reflection.

FINDINGS AND DISCUSSION

The findings revealed that there were four changes in the teachers' reflection as they progressed from the first to the fifth LS cycles. These changes included:

Improvement in the depth of reflection about pupils' learning

The teachers' reflection about the pupils' learning became more in-depth as they progressed to the fifth LS cycle. At the beginning stages, the teachers' reflection about the pupils' learning were superficial and general. They merely described whether the pupils "understand" or "able to calculate". They did not elaborate further with evidences to show the pupils' understanding or learning. For instance, during the first reflection session, a male teacher, John articulated,

I think they did not understand the 'Golden Hour'. Then, when talking about 72 hours, golden 72 hours is equivalent to how many days, they were able to calculate it. Next, one week is equal to how many hours, they need to know there are seven days in one week, so they faced problem in solving that question. After that I asked two weeks is equivalent to how many hours, they were able to calculate, but they need some guidance. (Reflection Session LS1)

Comparatively, at the later stages, the teachers' reflection about the pupils' learning became more in-depth, as they were able to point out exactly the related pupils' misconceptions. Figure 1 displays a question which most of the pupils answered wrongly during the fifth research lesson. The pupils were expected to write the improper fraction of the picture, which was $\frac{10}{6}$. Teacher, Sophy found that the pupils were not able to answer this question correctly because:

The pupils did not know the way of identifying the denominator, they counted [the total number of portions], for example, there were three circles... the denominator should be six, but [the pupils] added up all the portions, [so their denominator became 18]. The pupils have not mastered the concept of denominator yet. (Reflection Session LS5)

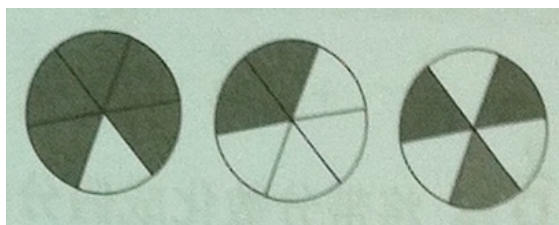


Figure 1. The question posed during the fifth research lesson

This finding supported the findings reported by Hart and Carriere (2011) that the teachers' reflection about the pupils became deeper after the LS process.

Shifting of teachers' reflection from teachers' perspectives to pupils' perspectives

During the first two reflection sessions, the teachers tended to reflect and comment from the teachers' perspectives. Their comments focused on the observed teacher's teaching strategy, his/her personality and behaviour based on their own perceptions. For instance,

I want to praise him for admitting his mistakes... because we, as teachers, after we design an idea, sometimes we change the idea on the spot, so got mistakes, he changed immediately, this is correct [attitude]. (Betty, Reflection Session LS1)

The [induction set] was interesting, because teacher used a big dice. (John, Reflection Session LS2)

Only the teacher was talking, the pupils did not talk, this is my weakness, I always forgot to give my pupils chances to talk. (Betty, Reflection Session LS1)

These teachers gave comments based on their own perceptions of effective teaching. Betty perceived that the teacher should change immediately if there are any mistakes done during the research lesson and also get the pupils to involve actively. Whereas, John deemed that using the big dice made the lesson interesting.

At the later stages of LS, the teachers started to reflected from their pupils' perspectives. They reflected based on the pupils' misconceptions, behaviours and problems faced during the research lessons. For example, during the fifth reflection session, the teachers discovered that the pupils have misconception in getting equivalent fraction. The pupils identified fractions with same denominator as equivalent fractions. Based on the pupils' misconception, the teachers refined the lesson plan by giving example and non-example. As suggested by Sophy, "making comparison, $1\frac{1}{2}$ and $\frac{3}{2}$ are equivalent, then show $\frac{4}{2}$, [ask the pupils], are they equivalent? Although their denominators are the same, they are not equivalent" (Reflection Session LS5).

In addition, Betty also commented on the teaching strategy based on the pupils' behaviour during the fourth reflection session, she articulated that "actually we don't have to discuss the answers one by one, the pupils already felt bored" (Reflection Session LS4). Then, Fanny made suggestion based on the pupils' behaviour, she said, "get the [four groups of pupils] to exchange their answers, and ask them to mark the answers written by other groups" (Reflection Session LS4).

Furthermore, the teachers also reflected based on the pupils' problems. The problem was raised up by John, "some pupils did not understand Mandarin" (Reflection Session LS4). But, the lesson was carried out in Mandarin. Thus, some of the pupils did not understand the lesson. Based on the pupils' problem in understanding Mandarin, Betty suggested, "sometimes, teacher should speak some English in order to help the pupils to understand" (Reflection Session LS4).

In sum, the teachers reflected purely from teachers' perspectives at the beginning stages of LS. As they progressed to the later stages, they became more aware of their pupils' learning problems and needs. So, they moved to reflect from the pupils' perspectives.

Anticipation of pupils' responses

The teachers became more aware of the pupils' possible responses at the later stages of LS. They could anticipate their pupils' responses when they were refining the lesson plan and the mathematical tasks. During the fifth reflection session, the teachers tried to change the mathematical task of matching mixed number with improper fraction which they found it was not suitable. John started by suggesting to give all the pupils a fraction. Then, ask them to draw the picture of the fraction and find another friend who holds a fraction equivalent to their fraction (Line 1 in the transcript). Sophy anticipated the pupils' answer, where they might be drawing different shapes (2). Betty also predicted that the pupils would draw different shapes and sizes. But, she perceived that the differences in shapes and sizes might cause confusion among the pupils (3).

So, Sophy suggested to change the task to colour the boxes based on the fractions given and find another fraction equivalent to theirs. She proposed to provide more boxes than needed to make the task more challenging (7). But, Ashley predicted that the extra boxes would confuse the pupils (8). As the result, Betty suggested to refine the task by giving only the number of boxes as needed based on the fraction (9).

In sum, the teachers became more aware of the pupils' responses. They anticipated the pupils' possible answers and confusions, and tried to eliminate the pupils' possible confusions when they were refining the lesson. Previous literature (Fernandez & Chokshi, 2002) reported that anticipation of pupils' responses occurred during the preparing lesson plan stage, but in this study, it was found that anticipation of pupils' responses could also happen when the teachers were refining the lesson plan. It is important for the teachers to anticipate the pupils' responses as this activity encourage

the teachers to think in term of the pupils, which supports the teachers to develop knowledge of mathematics and pupils (Meyer & Wilkerson, 2011).

- 1 John: What about the teacher poses a fraction of $\frac{3}{2}$ and asks the pupils to draw?
- 2 Sophy: They draw whatever shapes they like, then their friend [holding equivalent fraction] might be drawing different shape. But the main point is, both of them, have one full piece, and one half piece.
- 3 Betty: I think we should not ask them to draw by themselves. They might be confused if their shapes are different. I think, the pupils have not mastered the concept yet, they don't know... because this is bigger, that is smaller, they are not equivalent, they will think like this?
- 4 Ashley: It's possible.
- 5 Sophy: Or we ask them to colour.
- 6 John: Colouring also can.
- 7 Sophy: For mixed number, let's say like this; give them three boxes without dividing lines and two boxes with dividing lines. Then $1\frac{1}{2}$, they would colour, one whole box and half of the box. This is the colouring of mixed number. For improper fraction, give them all the boxes with dividing lines, give them more boxes than needed, like this, at least they can colour like this. Then, they would see one whole box and one half of the box, so they are equivalent.
- 8 Ashley: I worried that the remaining boxes will make them confused.
- 9 Betty: More confused. You give them two, all with dividing lines. Then they colour by themselves.

Reflecting from several perspectives

The teachers reflected from several perspectives at the later stages of LS. During the fifth reflection session, the teachers pointed that the pupils faced problem in determining the denominators for mixed number and improper fraction. Sophy elaborated that it was because

[the pupils] counted [the total number of portions], for example, there were three circles... the denominator should be six, but [the pupils] added up all the portions, [so their denominator became 18]. (Reflection Session LS5)

When they were analysing the causes of the pupils not being able to determine the denominator correctly, they viewed the problem from three perspectives, namely the pupils' prior knowledge, the pupils' learning during previous lesson and the instructional content delivered during the research lesson. Betty perceived that the problem was caused by the pupils' prior knowledge. She suspected that "the pupils have not mastered the basic concept of the fraction" (Reflection Session LS5).

However, her comment was rejected by Ashley and Sophy. Ashley argued that, "no, [the pupils] have mastered the basic concept of fraction" (Reflection Session LS5). Then, Sophy linked the problem with the pupils' learning in the previous lesson which taught about the basic concept of proper fraction. She expressed, "could it be because the pupils confused with the concept taught in the previous lesson? Because in that

lesson, we taught them to count all the portions” (Reflection Session LS5). But, again, this statement was rejected by Ashley, the teacher who taught the previous lesson. She clarified that “I only used one paper at that time, I drew all the portions on the paper” (Reflection Session LS5).

At the end of the discussion, the teachers believed that the misconception was caused by the instructional content delivered during that particular research lesson. Ashley explained that “[the teacher] did not emphasize that there are many pieces, but you should not count all the portions, you only count the number of portions in one piece” (Reflection Session LS5). The discussion among the teachers during the fifth reflection session showed that the teachers reflected the lesson from several perspectives.

This result showed that the teachers have attained the ability of framing and reframing the problem discussed after engaging in LS (Suratno & Iskandar, 2010). Reflection from several perspectives is categorized as high level reflection (Lee, 2005; Ward & McCotter, 2004; Jay & Johnson, 2002), because by reflecting from several perspectives, the teachers would be able to understand the complex nature of teaching and learning in a holistic manner.

CONCLUSION

We acknowledge that analysing data from only a case of LS group which involved five LS cycle may not be sufficient to render the claim that LS process can enhance teachers’ reflection. However, in this case study, at least four observable changes in teachers’ reflection were noticed as they progressed from the first to the fifth reflection sessions. These changes include improvement in the depth of reflection about pupils’ learning, shifting the reflection from teacher’s perspectives to pupil’s perspectives, anticipation of pupils’ responses, and reflecting from multiple perspectives.

Although the impact was not very obvious within the five cycles of LS, but there is definitely some gradual improvement in the teachers’ reflection observed as they conducted multiple LS cycles. Hence, enhancing teachers’ reflection through LS is feasible. Nevertheless, future studies are needed to explore the factors that could make teachers’ reflection in LS more effective, for instance, the role of knowledgeable others and the anticipation of pupils’ responses during the planning stage.

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