The content of teachers' reflection in lessson study: a case study

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THE CONTENT OF TEACHERS' REFLECTION IN LESSON STUDY: A CASE STUDY

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Abstract

This study aimed to explore the content and the level of teachers' reflection as they engage in lesson study (LS). Two LS groups participated in this study. However, this paper only discussed the content of the teachers' reflection from one LS group. This LS group comprised of six primary mathematics teachers. They carried out five LS cycles. Each cycle comprised of four steps, namely: (1) identify and formulate goals; (2) plan lesson plan collaboratively; (3) teach/ observe the research lesson; and (4) reflect/ refine lesson plan. The researchers participated in all the cycles to guide and to observe the participants. Qualitative data were collected through participatory observation, reflection sessions, collection of artefacts and interviews. Videos of reflection sessions were imported into NVivo and transcribed in verbatim. The utterances of the participants and their observation sheets were coded according to themes. Analysis of qualitative data revealed that the main topics reflected by the teachers were pupils' learning, instructional content, teaching strategy and mathematical task. These four topics were interrelated. The teachers reflected on the instructional content and mathematical task based on the pupils' learning during the research lesson. The teachers emphasised teaching strategy which enhanced the pupils' participation in the lesson because they believe that the pupils learn well if they

participate actively. The content of the teachers' reflection could be a guideline for future educators who intend to start lesson study as their professional development.

Keywords: lesson study, reflection, primary school teacher, mathematics

Introduction

Reflective practice was claimed to be one criterion of effective teachers (Scales, 2008; Hassett, 2000). Through reflection, teachers understand the complex nature of their classroom (Zeichner & Liston, 1996). Besides, reflection is also self-evaluation which helps teachers recognise their own strengths and weaknesses (Boon, 2002). Therefore, reflection is increasingly used to support teachers' professional development (e.g. Posthuma, 2012; Chi, 2010; York-Barr, Sommers, Ghere, & Montie, 2006)

In Malaysia, the concept of reflection was introduced into the teacher education curriculum at college level (Bahagian Pendidikan Guru, 1993, 1995, 1996, 1998), in 1989, when the clinical supervision was implemented in the student teaching component. Since this implementation, reflection has become an important concept learnt in the teacher education programme. In 1999, in-service teachers were expected to include their reflection in their lesson plan (Surat Pekeliling Ikhtisas Bil. 3, 1999). They were required to reflect on the extent of what they have achieved in terms of the teaching and learning objectives. This requirement may not encourage the teachers to reflect critically and deeply.

A review of literature showed that not many studies were carried out on Malaysian teachers' reflection (e.g. Siti Mistima Maat & Effandi Zakaria, 2010; Suraya Sulyman, 2005). Siti Mistima Maat and Effandi Zakaria (2010) found that the participating in-service teachers reflected on what they had done in the classroom. These teachers did not identify the right action

to be taken. Similarly, Suraya Sulyman (2005) also explored in-service teachers' reflection. She discovered that the scope of the participating teachers' reflection was relatively narrow and their reflective practices were unsystematic and infrequent. Although there were only limited studies done on in-service teachers' reflection, both studies disclosed that the participating teachers' reflection were descriptive and not in-depth. Descriptions of the lessons do not promote productive reflection which would help the teachers develop a more complex view of teaching (Hatton & Smith, 1995; Davis, 2006). Thus, there is a need to cultivate reflective skills among the teachers.

Some researchers (Suratno & Iskandar, 2010; Burghes & Robinson, 2009; Chiew, 2009; Fernandez & Chokshi, 2002) found that lesson study enhances a teachers' reflective thinking. However, they did not explore in detailed how reflective thinking was enhanced through lesson study. Therefore, this study explored the content and level of teachers' reflection in the lesson study. However, in this paper, we only focus our discussion on the content of reflection of a lesson study group.

Lesson Study

Lesson study originated from Japan. It is a long term teacher-led professional learning. A group of teachers collaboratively and systematically plan, conduct and reflect on research lesson (Wang-Iverson & Yoshida, 2005). Lesson study has spread to many countries. Researchers and educators implemented lesson study as professional development activities in their countries (e.g. Yoshida, 2012; Chiew, 2009). As a result, many studies were conducted on lesson study. In the early stages, most of the studies focused on the feasibility of lesson study as professional development in their respective cultures (e.g. Cajkler, Wood, Norton, & Pedder, 2014; Chiew,

2009). After believing in the potential of lesson study, researchers implemented lesson study to achieve specific pedagogical goals. For instance, Ong (2010) used lesson study to promote questioning skills among the teachers. Some researchers focused on the teachers' learning skills (Suh & Seshaiyer, 2014; Meyer & Wilkerson, 2011), teachers' observation skills (e.g. Myers, 2012), and teachers' reflective thinking.

Reflection

The notion of reflection was started by John Dewey (1993). According to him, reflection is "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" (p. 9). Some studies (e.g. Posthuma, 2012; Chi, 2010) have been done to explore the content of teachers' reflection. Chi (2010) as well as Williams and Grudnoff (2011) explored the teachers' reflection when the teachers reflected individually. Meanwhile, Posthuma (2012) and Postholm (2008) studied the teachers' reflection when the participating teachers reflected in groups. A review of these studies (Posthuma, 2012; Williams & Grudnoff, 2011; Chi, 2010; Postholm, 2008) revealed that there were four major themes to the content of teachers' reflection, namely (i) teacher and teaching; (ii) students and learning; (iii) classroom context; and (iv) others. The theme of 'teacher and teaching' refers to teacher's personality, teacher's strengths or weaknesses, teacher's teaching practices or styles, teacher's questioning techniques, and achievement of learning objectives. 'Students and learning' includes the students' personality and learning. 'Classroom context' refers to classroom management and classroom setting. The theme 'others' included the language used, the examination and the textbook.

Methodology

Research design and participants

This study is part of a bigger project which aims to introduce lesson study to improve the teaching of teachers and ultimately enhance the pupils' academic achievement. The researchers employed a multiply case study research design. Seven primary schools were involved in this study, which included three national type Chinese schools (SJKC), national type Tamil schools (SJKT), and one national schools (SK). A total of 13 lesson study groups were set up in these seven primary schools.

This paper only focuses on the content of teachers' reflection in one of the cases. This lesson study group was set up by six primary mathematics teachers of a national type Chinese school (SJKC). This school was a small school located in the rural area. There were only a headmaster, ten teachers and a total of 138 pupils in this school. Among the six participating teachers, there were two male teachers and four female teachers. Table 1 displays the background information of the participating teachers.

Table 1
Background Information of the Participating Teachers

Participating Teacher	Gender	Teaching Experience (years)	Level of Mathematics Teaching (Year)
T1	Male	1	4
T2	Female	5	5
T3	Male	4	1-6 (Tutoring Class)
T4	Female	7	1 & 6
T5	Female	10	2
T6	Female	6	3

Methods of data collection

In this study, qualitative data were collected through participatory observation, reflection sessions, collection of artefacts, and interview.

(i) Participatory observation

The researchers acted as participants and observers in this study. The researchers participated in Step 2 (plan lesson plan collaboratively), Step 3 (teach/ observe research lesson), and Step 5 (reflect and refine lesson plan). The researchers guided the teachers the process of lesson study, for example, the preparation of detailed lesson plans and the method of observing research lesson. Besides, during the reflection session (Step 5), the researchers gave final comments after all the teachers reflected and also asked probing questions to help the teachers to reflect deeper.

When participating in these lesson study steps, the researchers observed the teachers' activities, behaviour, commitment as well as the interaction between the participating teachers. The researchers recorded the observations by writing field notes.

(ii) Reflection session

This is Step 5 of the lesson study. The lesson study group conducted five reflection sessions. All the reflection sessions were video-recorded with permission for analysis purposes. These videos recorded the teachers' and researchers' reflections, conversations and gestures during the reflection sessions. In addition, these videos captured the teaching material, questions and writing presented during the reflection sessions.

(iii) Collection of artefacts

The artefacts collected in this study included observation sheets, lesson plans, and the worksheets given during the research lessons.

(iv) Interview

Two types of interviews were conducted in this study, which were focus group interviews with pupils and individual semi-structured interview with the participating teachers. All interviews were audio recorded with permission for analysis purpose.

Procedure of the research

Lesson study was still new in Malaysia when this study was conducted. Therefore, at the beginning of the study, the project leader provided an introductory workshop to all the participating headmasters and teachers. The workshop aimed to introduce them to the origin and the process of lesson study. The teachers set up a lesson study group after the introductory workshop. The lesson study group carried out five lesson study cycles. Each lesson study cycles comprised of five steps, namely:

Step 1: Identify and formulate goals

The teachers identified the learning problems faced by their pupils. Then, they set a goal for their lesson study group to address to pupils' learning problems.

Step 2: Plan lesson plan collaboratively

The teachers and researchers planned a lesson collaboratively based on the goal set.

Step 3: Teach/ observe research lesson

One of the teachers in the lesson study group taught the research lesson based on the lesson plan to a class. Other teachers and researchers observed the lesson. Each of the observing teachers and researchers were given an observation sheet to fill in during the research lesson.

Step 4: Focus group interview with six pupils

Six pupils were selected by the teachers from the class. These pupils were selected based on their academic performance, from which two each were from high, moderate and low academic performance. Immediately after the research lesson, the focus group interview was conducted with the six pupils in order to record their perception regarding the research lesson.

Step 5: Reflect and refine lesson plan

The teacher who taught the research lesson, the observing teachers, and researchers gathered to reflect on the research lesson. The session started with the teacher who taught the lesson reflecting on his/her lesson. Then, the teachers took turns to reflect and lastly, the researchers gave their comments and suggestions. The teachers and researchers refined the lesson plan based on their reflection.

After the lesson study group finished conducting five lesson study cycles, the researchers conducted a semi-structured interview with all the participating teachers individually. This interview aimed to explore the teachers' perceptions regarding lesson study.

Findings and Discussion

An analysis of the findings revealed that there were eight topics reflected during the five reflection sessions, namely: pupils' learning, pupils' behaviour, teaching strategy, time management, instructional content, mathematical task, teaching materials, as well as teacher's personality and behaviour. However, the major four topics reflected on were pupils' learning, instructional content, teaching strategy and mathematical task. These four topics were reflected in all the five reflection sessions. Furthermore, the percentages of utterances of these four topics

were relatively high if compared with other topics of reflection during the latter stages of lesson study.

Pupils' learning

Pupils' learning refers to the pupils' learning process during the research lesson, it includes the pupils' understanding, misconception, mistakes, and answers given. This topic was reflected on by the teachers and researchers all in all five reflection sessions. This finding is in line with the findings by Posthuma (2012) and Postholm (2008). They also found that the teachers reflected on the pupils' learning when they were reflecting together with their peers.

The analysis of data disclosed that the teachers' reflection on the pupils' learning became more in-depth at the latter stages of the lesson study. At the beginning stages of the lesson study, the teachers' reflection on the pupils' learning was general and superficial. They described the questions the pupils answered correctly or incorrectly. They also described what the pupils understood and not understood. For instance, T4 expressed, "*I think the pupils did not understand the concept, they did not understand when we carried out the activity of assembling the building*" (Reflection Session LS2).

Comparatively, at the later stages of the lesson study, the teachers were able to pinpoint the pupils' misconceptions that cause the pupils to not be able to answer the questions correctly. For example, during the fifth research lesson, the pupils were required to identify the improper fraction of a picture, as shown in Figure 1.

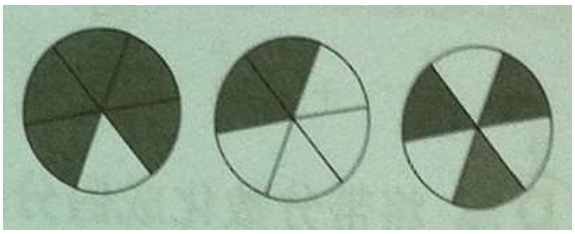

Figure 1. The question in the worksheet.

The pupils were not able to answer correctly. T6 explained that "*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). Analysis from T6 revealed that the teachers' reflection became more in-depth, they were able to identify the pupils' misconception which caused the pupils to not be able to answer the question correctly.

Instructional content

Instructional content was reflected on by the teachers and researchers in all the five reflection sessions. This topic refers to the content knowledge delivered by the teachers during the research lesson, which includes the scope of the content, the mathematical concept and the development of the content.

The teachers commented on the scope of the research during the first reflection session. They found that the pupils did not understand the concept taught during the research lesson. T4 perceived that it was because the scope of the lesson was too wide. As she expressed, "*too full, today teach too many content, three days, seven days…*" (Reflection Session LS1). Her statement was supported by T1 and T3, as T3 articulated, "*too many*" (Reflection Session LS1).

The teachers and researchers reflected on the mathematical concept during the second reflection session too. The teacher taught the pupils that volume is the product of length, width and height during the second research lesson. The researcher, R1 critiqued that this explanation was not suitable because "*in future, when [the pupils] learn the [volume of] other shapes, like sphere, cone, they will be confused*" (Reflection Session LS2). She suggested that the teacher explain the concept of volume as capacity. As she emphasized, "*for primary level, you have to make [the pupils] understand it's the capacity of the space that is needed*" (Reflection Session LS2). She suggested that the teacher explain the concept of volume using a real life example:

> "*When you want to buy a piece of land, what do you want to know? You want to know the area only. Next, you want to build a house on the land, it's 3D now, now we are talking about volume already*" (Reflection Session LS2).

Furthermore, the teachers and researchers reflected on the development of content in the lesson. During the third reflection session, the teachers and researchers found that the pupils did not understand the concept of volume. T4 commented that it was caused by the development of the content delivered during the research lesson. As she justified, "*the teacher did not revise [the concept of] perimeter and area, she straight away taught the volume*" (Reflection Session LS3). So, R1 suggested, "*should start the lesson by revising the prior knowledge about [perimeter and area]*" (Reflection Session LS3). The teachers and researchers reflected on several aspects of the instructional content based on the pupils' learning.

Teaching strategy

The teachers and researchers believed that the pupils learned best if they participate actively in the class. As articulated by T2, "*[the pupils] learn when they are manipulating, looking, thinking and talking. They do not learn if only the teacher is talking*" (Reflection

Session LS4). Thus, they focused on getting the pupils involved actively when they were reflecting on the research lesson. For instance, during the second reflection session, T2 realised her weakness when she reflected on her research lesson, she said, "*only teacher was talking, the pupils did not talk. This is my drawback, I always forget to give the pupils chances to speak*" (Reflection Session LS2). She perceived that she should give the pupils more chances to give comments or answers during the lesson.

In addition, during the second research lesson, the teacher taught the concept of volume. She invited two pupils to insert small cubes into an empty box. This activity was critiqued by T4, "*only two pupils played, other pupils did not have chance to play*" (Reflection Session LS2). Her comment was supported by T1, as he said: "*pupils sitting at the back, Mary observed from the back, she did not understand the concept, need to let them experience, then only they understand the concept*" (Reflection Session LS2). T1 suggested to "*involve more pupils, especially pupils sitting in the second row*" (Reflection Session LS2). Similarly, T2 suggested involving more pupils in the activity, as stated by her, "*maybe next time we make more boxes, so all the pupils can experience"* (Reflection Session LS2).

Mathematical task

Mathematical task was reflected on by the teachers in all the five reflection sessions. Mathematical task refers to the task given by the teachers to the pupils during the research lesson or as homework. The teachers reflected on the difficulty level of the mathematical task during the reflection sessions. For instance, during the fourth reflection session, T6 commented on the worksheet given during the lesson, as displayed in Figure 2. She perceived that the task was too easy because "*the questions in the worksheet were in one form only…".* (T6, Reflection Session LS4). She then suggested to "*maintain these questions, then add questions that required them to*

mix and match the figures with equivalent fractions, for example match the figure of $\frac{1}{2}$ *with the figure of* $\frac{2}{4}$". (T6, Reflection Session LS4).

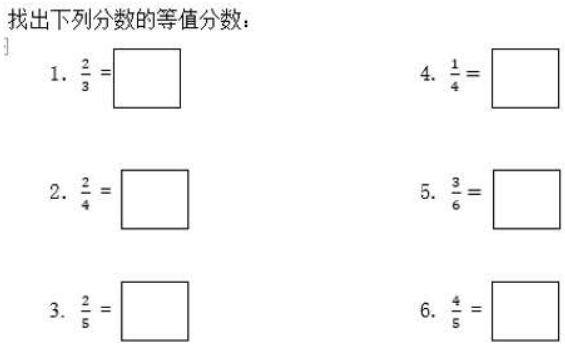

Figure 2. Some questions in the worksheet

Furthermore, the teachers related the pupils' learning with the mathematical task and the instructional content. The pupils faced problems in answering a question in the worksheet, as shown in Figure 3. T6 perceived that the pupils were not able to answer this question correctly (pupils' learning) because this question (mathematical task) was too difficult compared to the examples she discussed during the research lesson (instructional content), as shown in Figure 4. As she pointed, "*maybe because the examples I gave were too simple, 1 in the mixed number was represented by a full shaded diagram. But, for the questions in the worksheet, the pupils need to think deeper in order to get the correct answer*" (Reflection Session LS5). Her statement was supported by other teachers. Therefore, T1 suggested, "*maybe we posed this kind of question in the next lesson. In this lesson, we give simple [diagram]*" (Reflection Session LS5).

*Figure 3.*Question in students' worksheet. .

Figure 4. Example discussed during the research lesson

Conclusion

This paper discusses the content of teachers' reflection in the lesson study. The analysis of data revealed that the four major topics of reflections were pupils' learning, instructional content, teaching strategy and mathematical task. These four topics were interrelated. The teachers and researchers focused on pupils' learning when they were reflecting about instructional content, teaching strategy and mathematical task. When the pupils faced problems answering the mathematical task, the teachers and researchers analysed the instructional content and the mathematical task given during the research lesson. Besides, the teachers and researchers focused on teaching strategy which encourages active participation among the pupils so that the pupils would learn well in the class. The findings of this study could be a guideline for future educators who intend carry out lesson study as their professional development.

Acknowledgement

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The Content of Teachers' Reflection in Lesson Study: A Case Study

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Overview of this presentation

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- Objectives of the Study and the Paper
- Introduction to Reflection
- Introduction to Lesson Study
- Participants
- Methods of Data Collection
- Procedure of Data Collection
- Result
- Conclusion

Objectives of the Study

To explore the content and levels of teachers' reflection as they engaged in lesson study.

Objectives of the Paper

To explore the content of teachers' reflection as they engaged in the lesson study.

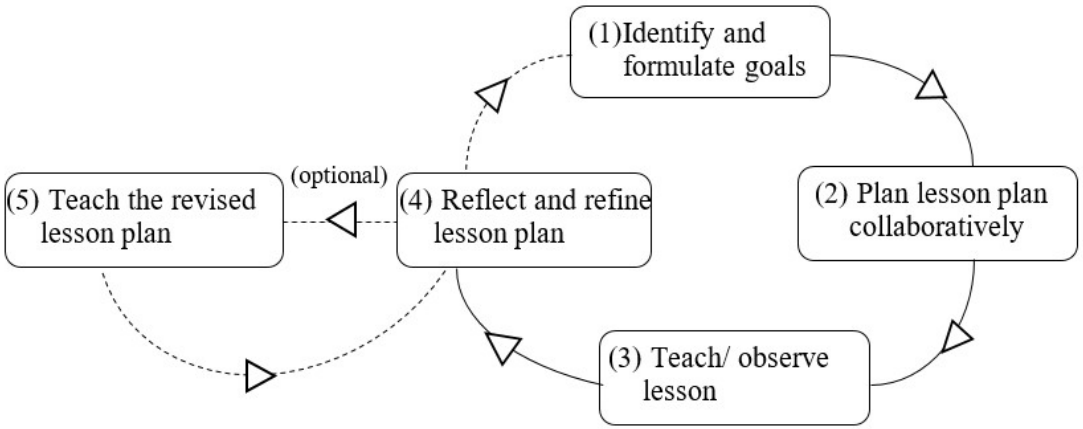
Introduction to Reflection

- “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” (Dewey, 1993).
- Through reflection, the teachers understand the complex nature of their classroom (Zeichner & Liston, 1996) as well as recognize their own strengths and weaknesses (Boon, 2002).

- Studies (Siti Mistima Maat & Effandi Zakaria, 2010; Suraya Sulyman, 2005) showed that Malaysian teachers’ reflection were descriptive and not in-depth.

Introduction to Lesson Study

- Originated from Japan.
- Long term teacher-led professional learning.



- Some researchers (Suratno & Iskandar, 2010; Burghes & Robinson, 2009; Chiew, 2009; Fernandez & Chokshi, 2002) reported that lesson study enhance the teachers' reflection thinking. BUT, they did not explore in detailed how the teachers' reflective thinking was enhanced in the lesson study.

Participants

- A case: A lesson study group set up in a school.
- National Type Chinese School (SJKC)
- Small school: 1 headmaster, 10 teachers, 138 pupils

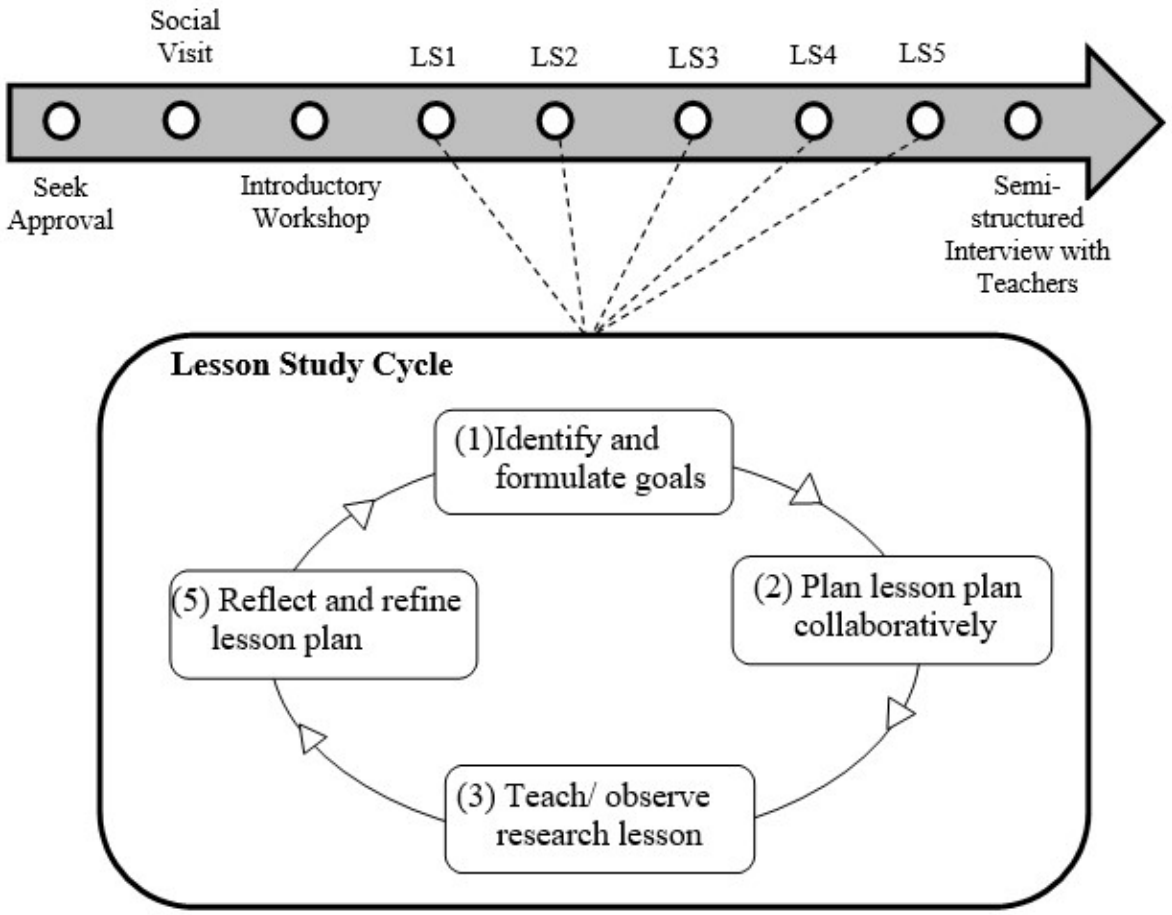
Participating Teacher	Gender	Teaching Experience (years)	Level of Mathematics Teaching (Year)
T1	Male	1	4
T2	Female	5	5
T3	Male	4	1-6 (Tutoring Class)
T4	Female	7	1 & 6
T5	Female	10	2
T6	Female	6	3

Methods of Data Collection

Qualitative data were collected through

- **participatory observation**
  - Field notes
- **reflection sessions**
  - Videos of 5 reflection sessions
- **collection of artefacts**
  - Observation sheets, lesson plans, worksheets, and teaching materials
- **Interviews**
  - Semi-structured interviews with teachers

Procedure of Data Collection



Result

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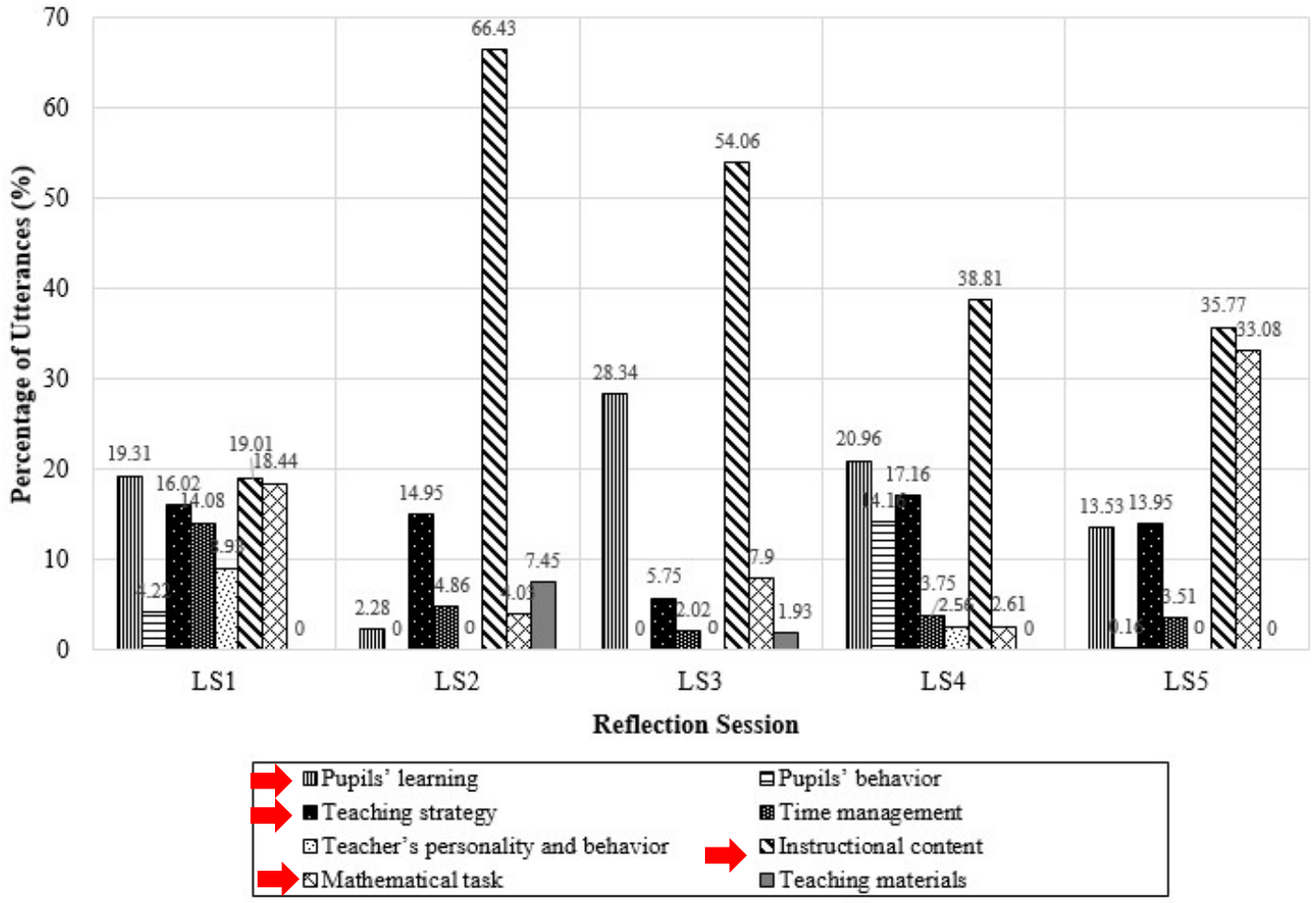


Result (Continued)

1. Pupils' Learning

- The pupils' learning process during the research lesson, it included the pupils' understanding, misconceptions, mistakes, and answers given by the pupils.
- The teachers' reflection about the pupils' learning became more in-depth at the later stages of the lesson study.

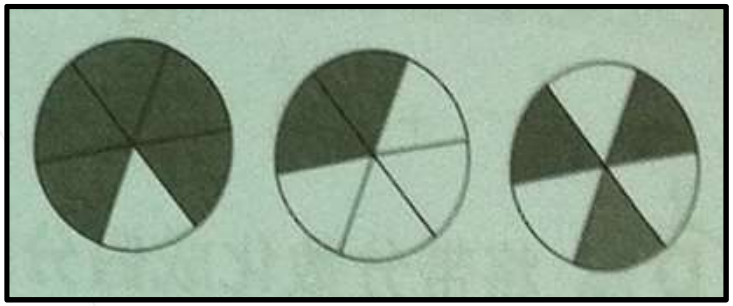
- At the **beginning stages** of lesson study, the reflection on the pupils' learning were superficial and general.

"*I think the pupils did not understand the concept, they did not understand when we carried out the activity of assembling the building*"
(T4, Reflection Session LS2)

Result (Continued)

1. Pupils' Learning

- At the **later stages** of lesson study, the teachers pinpointed the pupils' misconceptions.



Identify the improper fraction of the diagram.

"*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*" (T6, Reflection Session LS5)

Result (Continued)

2. Instructional Content

- The content knowledge delivered by the teachers during the research lesson, which included the scope of the content, the mathematical concept and the development of the content.

Scope of content delivered

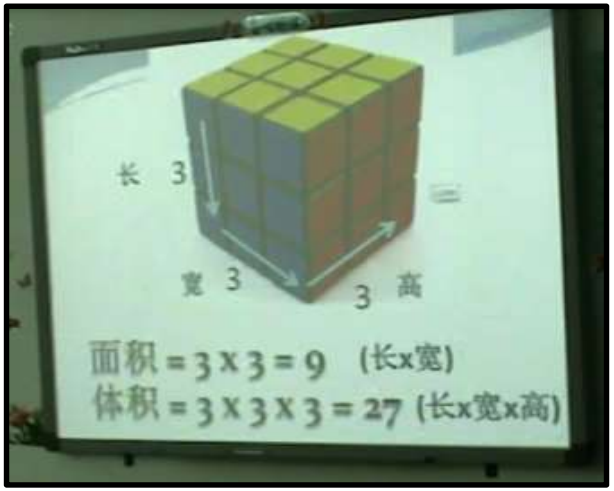
"*too full, today teach too many content, three days, seven days…*" (T4, Reflection Session LS1)

"*too many*" (T3, Reflection Session LS1)

Result (Continued)

2. Instructional Content

Mathematical concept



Area = 3x3 = 9 (length x width)
Volume = 3x3x3 = 27 (length x width x height)

"*in future, when [the pupils] learn the [volume of] other shapes, like sphere, cone, they will be confused*" (R1, Reflection Session LS2)

Suggestion

"*for primary level, you have to make [the pupils] understand it's the capacity of the space that is needed*" (R1, Reflection Session LS2)

"*When you want to buy a piece of land, what do you want to know? You want to know the area only. Next, you want to build a house on the land, it's 3D now, now we are talking about volume already*" (R1, Reflection Session LS2)

Result (Continued)

2. Instructional Content

Development of content

"*the teacher did not revise [the concept of] perimeter and area, she straight away taught the volume*" (T4, Reflection Session LS3)

Suggestion

"*should start the lesson by revising the prior knowledge about [perimeter and area]*" (R1, Reflection Session LS3)

Result (Continued)

3. Teaching Strategy

- The strategy used by the teacher to help the pupils engage and learn in the classroom.

"*[the pupils] learn when they are manipulating, looking, thinking and talking. They do not learn if only the teacher is talking*" (T2, Reflection Session LS4)

Result (Continued)

3. **Teaching Strategy**

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"*only two pupils played, other pupils did not have chance to play*" (T4, Reflection Session LS2)

"*pupils sitting at the back, Mary observed from the back, she did not understand the concept, need to let them experience, then only they understand the concept*" (T1, Reflection Session LS2)

Suggestion

"*involving more pupils, especially pupils sitting in the second row*" (T1, Reflection Session LS2)

"*maybe next time we make more boxes, so all the pupils can experience*" (T2, Reflection Session LS2)

Result (Continued)

4. Mathematical Task

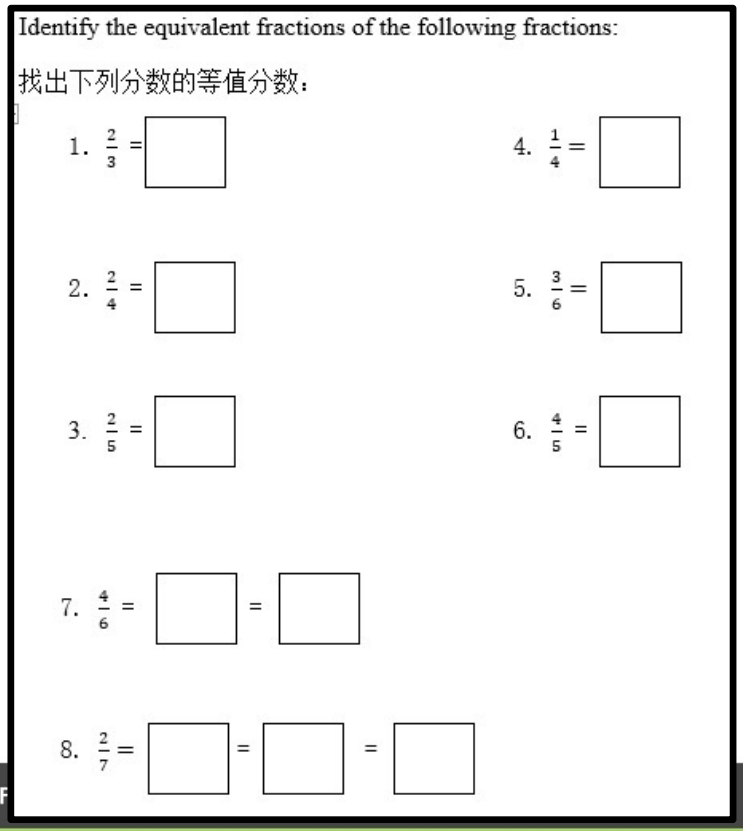
- The task given by the teachers to the pupils during the research lesson or as homework.

Difficulty Level of the Mathematical Task

"*the questions in the worksheet were in one form only…".* (T6, Reflection Session LS4)

Suggestion

"*maintain these questions, then add questions that required them to mix and match the figures with equivalent fractions, for example match the figure of* $\frac{1}{2}$ *with the figure of* $\frac{2}{4}$". (T6, Reflection Session LS4)


Identify the equivalent fractions of the following fractions:

找出下列分数的等值分数：

1. $\frac{2}{3}$ = ☐

2. $\frac{2}{4}$ = ☐

3. $\frac{2}{5}$ = ☐

4. $\frac{1}{4}$ = ☐

5. $\frac{3}{6}$ = ☐

6. $\frac{4}{5}$ = ☐

7. $\frac{4}{6}$ = ☐ = ☐

8. $\frac{2}{7}$ = ☐ = ☐ = ☐

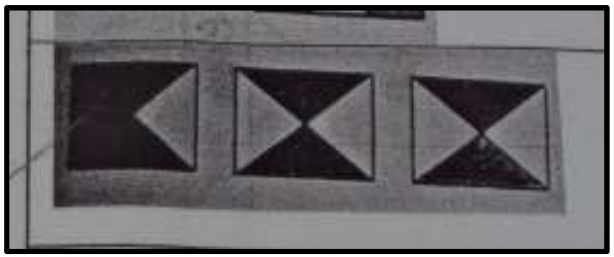
Result (Continued)

4. Mathematical Task

Compare with The Examples Discussed During the Research Lesson

Identify the mixed number of the diagram

Example discussed during the research lesson



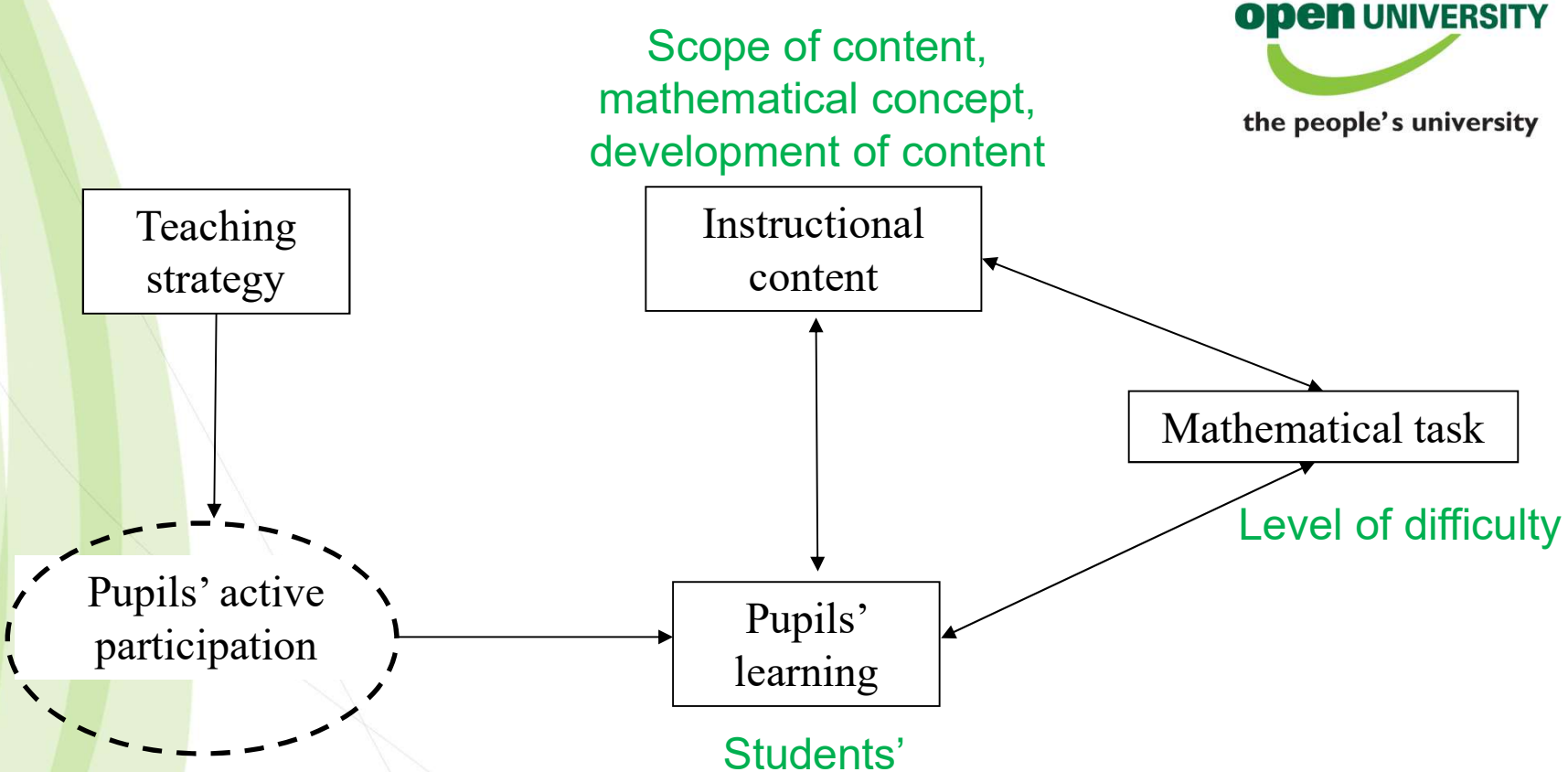
Question in the worksheet

"*maybe because the examples I gave were too simple, 1 in the mixed number was represented by a full shaded diagram. But, for the questions in the worksheet, the pupils need to think deeper in order to get the correct answer*" (T6, Reflection Session LS5)

Suggestion

"*maybe we posed this kind of question in the next lesson. In this lesson, we give simple [diagram]*" (T1, Reflection Session LS5)

Conclusion


Scope of content, mathematical concept, development of content
Teaching strategy
Instructional content
Mathematical task
Level of difficulty
Pupils' active participation
Pupils' learning
Students' understanding, answers, mistakes and misconceptions

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Thank you

Flexible • Affordable • Accessible