

IMPLEMENTATION OF LESSON STUDY AMONG PHYSICS TEACHERS: A PRELIMINARY STUDY

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Lesson Study is a form of in-service professional development for teachers where a group of teachers work together to identify long term goal(s) or problems in teaching and learning for their students, plan a lesson, conduct the lesson by one of the teachers while other group members observe the lesson, and conduct a group reflection session after the lesson. The Malaysian Ministry of Education has introduced Lesson Study as one of the methods to form professional learning communities (PLC) in schools. This paper describes the process of implementing Lesson Study among Physics teachers in a public secondary school as a form of in-service training. This study focuses on two physics teachers who participated in a series of trainings on Lesson Study and a lesson was conducted at the end of the training. Employing ethnographic study, the process of teachers undergoing the training and teaching the lesson was captured through participation-observation. Fieldnotes were taken for each session of meetings and also the research lesson conducted. Semi-structured interviews were conducted with the participants. Data collected and transcribed were analysed thematically. The preliminary findings presented in this study which includes teachers' readiness and their opinions of implementing Lesson Study. A teacher generally thinks that Lesson Study is mainly about group work. The main constraints of implementing Lesson Study at school as the teachers perceived were limited time; extra work load and group work a nature of Lesson Study. The paper also presented teachers' opinion about external parties' role in Lesson Study.

Keywords: Lesson Study, Physics Teachers, Teacher Education, In-Service Professional Development.

1. INTRODUCTION

“Teaching” is the most significant activity that influence student learning (Stigler and Herbert, 1999). Despite the number of years in the teaching profession, teachers need to continuously learn to cope with continuous changes and reforms in educational settings, including new policies and also new research findings on teaching and learning approaches. Hence, it is not an overstatement that teacher learning becomes the centre to all educational reform (Lieberman and Mace, 2008; Wallace and Loughran, 2012).

Science education in Malaysia is showing an alarming drop in performance in international assessment, including Malaysian students performing below the international average in Trends in International Mathematics and Science Study (TIMSS) 2011, with 35% of the participating students failed to achieve the minimum standard in Science. Similarly, 43% of Malaysian participating students failed to achieve the minimum standard in Science in another international assessment,

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Programme for International Student Assessment (PISA) 2009, putting Malaysia among one third of the lowest performing countries from a total of 74 participating countries (Kementerian Pelajaran Malaysia, 2013). Stigler and Herbert (1999) in their video study comparing teaching practices from three countries has singled out that “teaching” is the main key to student achievement, putting teacher learning the key to student learning.

Teachers’ learning, their learning process and the application of their knowledge into classroom practices are generally referred as teacher professional development (Avalos, 2011). Malaysia Education Development Plan 2013-2025 (Pelan Pembangunan Pendidikan Malaysia, PPPM 2013-2025) has a focus on teachers and their teaching practices, stressing the importance of continuous professional development through in-service training (Kementerian Pelajaran Malaysia, 2013). The Plan, in line with findings from Postholm (2012) and Avalos (2011), has pointed out that real-time classroom-based practices (in-service training, INSET) are more effective. INSET in Malaysia often takes form of teachers attending courses and workshops, when they return to their respective schools they are expected to train other teachers (Cheah and Lim, 2010). However, it is doubtful whether these newly gained knowledge is actually transformed into real classroom practice. Cheah and Lim (2010) proposed that Lesson Study as an alternative approach to strengthen continuous teacher professional development in Malaysian schools.

Lesson study is a school-based teacher professional development which is conducted by teachers in actual classrooms (Stigler and Herbert, 1999; Lewis, 2009). It centres on joint study of lessons through “observation of live classroom lessons by a group of teachers who collect data on teaching and learning and collaboratively analyse it” (Lewis, Perry and Murata, 2006, p.3). It has impact on teacher learning and more important, a direct impact on student learning. Figure 1 shows a Lesson Study cycle.

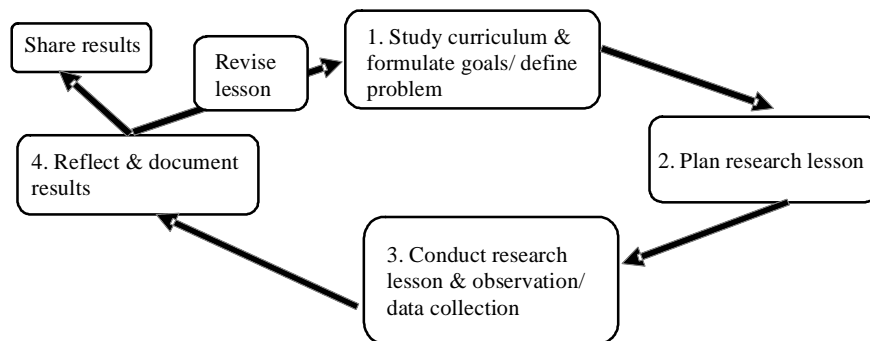


Figure 1: Lesson Study Cycle (Stigler and Herbert, 1999; Fernandez and Yoshida, 2004; Lewis, Perry and Murata, 2006).

The first reported investigation of Lesson Study in Malaysia was initiated by researcher from Universiti Sains Malaysia, Penang in year 2005 (Cheah and Lim, 2010), and has expanded to nine schools. Lesson Study in Malaysian schools needs to take a rather top-down approach with support from school administrative level personnel. Malaysian Ministry of Education has been implementing Lesson Study gradually in schools (Zanaton *et al.*, 2014). However, there was limited published record found on the programme, its implementation as well as its results.

In the Malaysian context, Cheah and Lim (2010) have found that lesson study has positively promoted collaborative culture among teachers, strengthened teachers' mathematical and pedagogical content knowledge, helped teachers to better prepare student-centred learning activities and improvement in teachers' questioning technique (Ong, Lim and Munirah, 2010). This is similar to findings from international studies (Lewis *et al.*, 2004; Ylonen and Norwich, 2013). In Singapore, Tan and Nashon (2013) found that lesson study has helped teachers coping with changes in new curriculum.

Although studies on lesson study has repeatedly reported success of lesson study in instructional improvement, Murata (2011) have cautioned that the specific processes that make lesson study work are only beginning to be understood, hence it is critical to identify these tools and processes that make lesson study effective. Lewis, Perry and Murata (2006) have also stated that innovation must be continuously studied at dissemination sites to identify the effectiveness of local adaptation of that particular innovation. The identified three main factors challenging the implementation of lesson study in Malaysia namely school administrator support, time constraint and teachers' attitude or mindset (Cheah and Lim, 2010) were not well elaborated. The lack of proper model for its implementation in Malaysia school context has prompted the need of addressing this. This paper presents the implementation process of Lesson Study in a national public secondary school to a group of teachers and to investigate Physics teachers' understanding and perception about Lesson Study. The findings from this study will be used as a part of a larger study to produce an implementation model of Lesson Study in Malaysian schools

2. RESEARCH METHOD AND DATA COLLECTION

This study employs ethnography as the strategy of inquiry. It explores a particular social or cultural setting in its natural setting based on participant observation through first-hand experience (Atkinson *et al.*, 2010). As teaching is a cultural activity, employing ethnography and studying teaching as a culture would enable making out meaning from interactions among teachers in the setting of school or classroom (Hammersley, 1980). This investigation was carried out in a national public secondary school.

The implementation process started with discussion with the principal. This was followed by a more detailed discussion with senior assistant (academic) and teacher in charge of in-service training on planning the meeting schedule with teachers. Cheah and Lim (2010) have stressed that the support and commitment of school headmasters was a critical factor to the success of the lesson study project. The material used for guiding this lesson study programme were drawn mainly from a guide book published by the Teacher Education Department from Ministry of Education Malaysia entitled “Komuniti Pembelajaran Professional (PLC) Strategi 2: Amalan Penswastaaan” (Professional Learning Communities (PLC) Strategy 2: De-privatization of Practise) (Bahagian Pendidikan Guru, 2011) and “Lesson Study Step by Step: How Teacher Learning Communities Improve Instruction” (Lewis and Hurd, 2011). The lesson study cycle was planned to be completed in five weeks, as shown in Table 1.

TABLE 1: LESSON STUDY SCHEDULE

<i>Week</i>	<i>Activities</i>
Week 1	Introduction to Lesson Study
Week 2	Discuss and decide long term goal Discuss and decide lesson/ topic/ sub topic/ learning objective(s) Draft research lesson
Week 3	Refine research lesson Include questions to be asked, anticipated answers, observation
Week 4	Finalise research lesson Prepare documents (observation sheet)
Week 5	Training session by expert Research lesson Post lesson reflection

A concise training session was recapped by an expert teacher who is experienced in lesson study in week 5 before the research lesson started. The training included theoretical knowledge and underlying concepts about lesson study cycle. Research lesson was conducted and participating teachers observed the lesson for two periods (40 minutes each). After which a post lesson reflection was conducted. A question and answer session was conducted before the training session were wrapped up.

There were six participants (two physics teachers, two chemistry teachers and two biology teachers) in the lesson study group in this investigation. However, this paper only focuses on two physics teachers. Field notes were written during the implementation process of lesson study in this school and semi-structured interviews were conducted with the two physics teachers at the end of the lesson study cycle. The interviews focused on teachers’ understanding about lesson study, their perceived challenges with lesson study, their perceived difficulties and external parties’ role in lesson study. Data collected were analysed and themes emerged were presented.

3. RESULTS AND DISCUSSION

Field notes and interview transcripts were openly coded and similar codes were grouped under broader themes. Table 2 shows the themes emerged from the data collected with their respective descriptions.

TABLE 2: THEMES AND DESCRIPTIONS

<i>Theme/Sub theme</i>	<i>Description</i>
1. Lesson study as group work	Teachers general understanding about lesson study as a research on lesson, where a group of teachers plan a research lesson together.
2. Perceived constraint	
(a) time	It includes limited time for teacher discussion, difficulties in finding common time for group discussion, insufficient time to discuss all lessons, insufficient time to conduct lessons planned in lesson study
(b) extra work load	Teachers perceived that planning research lesson as an extra work load for them, as there are other commitments to pursue.
(c) group work	Teachers think that it is difficult to work in groups of teachers who do not teach the same subject or forms. Lesson planning together was perceived as uncommon among teachers.
3. External party(ies)' roles	Teachers' view about external party's role in teacher professional development.

3.1 Theme 1: Lesson Study as Group Work

Teachers thought that lesson study is about lesson planning, lesson observation and reflection on lesson, which they had learned all these steps in a lesson study cycle during their teacher training, and also a similar process as their daily teaching and learning routine but conducted in a group in contrast to conducting lessons individually (a common practice). The following excerpts show comments from different participants:-

So, like this kind of monitoring [observation], in fact has been done in Malaysia, in the Malaysian education system, meaning this lesson study is not something new. Teachers actually just need to refresh, it was taught in the university or any teacher training institutes by teacher educators, this means that all teachers already have basic things about all this, but just that they need to know how to apply only. (FN01150813-translation).

It is a pedagogy only that when we learned at U[niversity] we did it individually, we plan we apply we evaluate ourselves, but now this lesson study, it is more towards group work, and each member gives their own opinion [or idea]. (IN04151117-translation)

Making lesson plan together, compared to usually we make our own [lesson] plan. (IN05151119)

However, it was worth noting that there was no mention about lesson study as an in-service, classroom based teacher professional development programme, as a research or investigation on student learning, nor a way to achieve long term goal(s) for the students. Teachers' understanding about lesson study as a group work is highly related to the next theme, where they perceived certain constraints when conducting lesson study in a group.

3.2 Theme 2: Perceived Constraint

There were three sub themes identified under this main theme namely,

- (a) time constraint,
- (b) extra work load and
- (c) group work

3.2.1 Sub theme 2a) Perceived Constraint–Time Constraint

Time was perceived as the biggest challenge faced when conducting lesson study. This is supported by previous studies (Cheah and Lim, 2010; Chiew and Lim, 2005). Related to Theme 1 and Sub theme 2c (discussed below), teachers think that finding common time for group discussion is a big issue, which leads to limited time for teacher discussions. Exam-oriented environment in Malaysia was also deemed to be the factor leading to limited time for lesson study, both to complete the syllabus and time needed to prep students to sit for examinations.

The teaching and learning situation in Malaysia is, it is exam oriented, exam oriented that's mean it has to finish the syllabus, and syllabus in Malaysia is very long. (IN04151117)

It is difficult because time problem. Because not all teachers are available at the same time [for discussion]. To have discussion session after school hours, teachers have other commitments, which is time problem. (IN04151117)

It was undeniable that teachers and schools were evaluated based on examination results. However, teachers often set such 'exam-oriented' goals when left on their own. I asked [the principal] how are school scored, based on what criteria. He replied 70% on students' performance in standardized tests and 30% on school management.

Mr Adams sat down again, then he asked me what I was looking at. I replied I was looking at the school's vision and mission. He said the school adopts the ministry's vision and mission, but in a recent meeting, teachers had come out with their own goal. It is pertaining to the school's score. (FN03150609)

3.2.2 Sub-theme 2b) Perceived Constraint–Extra Workload

This sub theme is strongly tied to Sub theme 2a). Although teachers think that lesson study is what they are usually doing on a daily basis (except that it is group

based), teacher perceived that it is an extra work load. It was hypothesized that the extra workload comes from forming a group leading to perceived extra time involved in lesson study (discussion sessions).

For me, lesson study is an extra load for teachers. We are already very busy with work, too stressed [out]. To plan lesson is still ok, but the time for teaching and learning (shake head), adding exams, I'm so stressed [out]. (IN05151119-translation)

There are just too much work for teachers. Other than classes, there are work for extracurricular activities too...we need to bring our work back home. (IN06151119-translation)

3.2.3 Sub theme 2c) Perceived Constraint–Group Work

As teachers understood lesson study as a group work, they also perceived it as a constraint. Other than facing difficulties in finding common discussion time among teachers, teachers also expressed difficulties for teachers from different subjects providing ideas to a lesson.

How can other teachers give ideas? They really cannot give any ideas because they teach other subjects. Hah, like that day, Sam [another physics teacher] was not around, I have to do everything at the end. (IN05151119-translation)

Teachers discussed about hypotheses forming in Physics and Biology subjects and found that they were formed differently. Upon prompting them to discuss further, teachers from different subjects gave examples and discovered the differences between them. Teachers concluded that this is a constraint that they could not support each other in designing a lesson for a particular subject. (FN01150827)

This finding is in contrast to some lesson study groups where the groups were formed by teachers of different disciplines (Cerbin and Kopp, 2006) or different levels (elementary and middle school) (Lewis *et al.*, 2009) to offer a holistic view about student learning and how different subjects supports student learning. Grouping interdiscipline teachers offers new perspectives for teachers as some might find themes across curriculum to be used as learning medium or understand students learning styles in different disciplines.

3.3 Theme 3: External Parties' Roles

External parties or peers play key roles in facilitating teacher learning through partnerships (school-university partnerships) and collaborative networks (teacher co-learning) (Avalos, 2011). In lesson study, external parties are commonly known as “knowledgeable others” serving as facilitators, moderators or commentators (Watanabe, 2011). However, in this study, teachers initially indicated that they do not know what role external parties can play in lesson study.

Honestly lah I have not thought about it, uh, like what you [researcher] can help me [teacher], only that, uh, knowledge and publicity [publication], that is what I think, the rest, I don't think you can help, because one thing, we have never, never collaborate, so we don't know how we can collaborate, so this is the first time, first experience lah. (IN04151117-translation)

I cannot think of anything [you] can help. (IN05151119-translation)

But after some discussion about challenges they faced in their daily teaching and learning process, they mentioned several potential roles by external parties, including knowledge sharing, expertise in developing teaching material and teaching aid and teaching demonstration by expert teachers.

4. CONCLUSION

This paper discusses the implementation process of lesson study in a public national school in Malaysia with six teachers focusing on two physics teachers. It has shown us a glimpse of teachers' understanding about lesson study after under-going a lesson study cycle, which included a general misconception that lesson study is mainly (and only) about group work. Teachers have revealed their perceived constraints in lesson study which is hypothesized to be closely linked to their understanding (and misconception) of lesson study. They had also stated what they expect from external parties such as subject experts in teacher professional development. The results served as a preliminary foundation to further build a framework for lesson study implementation in Malaysian public national schools. Several limitation were acknowledged in this study, the first being only one cycle conducted due to limited time allowed, views about administrator support were not explored and researcher's role is not fully understood.

5. ACKNOWLEDGEMENT (OPTIONAL)

This research is sponsored by Ministry of Higher Education Malaysia under the Fundamental Research Grant Scheme R.J130000.7831.4F754. The authors would like to thank the Ministry of Higher Education Malaysia and Universiti Teknologi Malaysia.

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