

# Pre-Service Teachers as a Part of Lesson Study Team

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## Abstract

This study aimed to investigate how pre-service teachers work as a part of the lesson study team. Participants were the first grade lesson study team which consisted of one teacher, two graduate students, two university professors, and two pre-service teachers (2017-2018 academic year) in Mathematics Education Program, Faculty of Education, Khon Kaen University, Thailand. The lesson study team implemented open approach lesson study weekly cycle in the school. Data were collected from two sources. The first, by observing the pre-service teachers during: 1) classroom at school, 2) reflection at school and 3) six reflection meetings during the academic year. Secondly, according to the process outlined by open approach lesson study (Inprasitha, 2017c; 2018), by reviewing the documents from lesson plan, students' work sheets, the reflection of pre-service teachers and lesson study team, and the observation notes from their classes. The results revealed that 1) in order to collaboratively design problem situations; two pre-service teachers solved the task in the textbook. They and the lesson study team created two word problems and anticipated four students' ideas. Moreover, they prepared the main materials as well as the supplementary materials such as blocks. Furthermore, they planned the teacher's role for each step in open approach, 2) pre-service teacher taught by following the open approach, and they changed to post four word problems instead of two problems. The lesson study team observed and took note about students' ideas. Pre-service teacher asked the question such as how you know during the student' problem solving and the classroom discussion in order to encourage students to explain their ideas. Every student used the blocks to support their thinking, 3) pre-service teachers and lesson study team reflected about students' ideas that they were anticipated such as drawing the blocks, using blocks. They also reflected some ideas that they did not anticipate such as using the arrows. Moreover, the pre-service teachers observed the student' difficulty about place value and their number

of blocks. The pre-service teachers and lesson study team developed a broader understanding of their students' ideas from the various perspectives given by the lesson study team.

### Keywords

Pre-Service Teacher, Teacher Education, Lesson Study

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## 1. Introduction

Teacher was the most important element in an education system because the quality of the teacher and teaching influence the quality of education and students' learning (Inprasitha, 2015d; Takahashi, 2015; Yeap, Foo, & Soh, 2015). However, Stephens (2003) mentioned that in many countries, students learned mathematics from low quality teachers that reflected on the weakness of teaching approach, mathematical knowledge, and teacher preparation. Furthermore, there was the gap between pre-service teachers and in-service teachers (Office of the Education Council of Thailand, 2015; Inprasitha, 2006, 2017a).

Even though the pre-service teachers learned many courses in the university, however, it was very difficult for them to learn and think from the perspective of teachers (Isoda, 2007). Many pre-service teachers who expected to encourage students in learning regressed to teach in lecture style (The National Commission on Teaching and America's Future [NCTAF], 1996 cited in Fernandez, 2005). Moreover, some pre-service teachers thought the courses in university were not sufficient to understand teaching (Commission on Behavioral and Social Sciences and Education [CBSSE], 2000 cited in Fernandez, 2005). Furthermore, the transition period from pre-service teacher to in-service teacher was not easy. Ovens, Garbett and Hutchinson (2016) mentioned that learning to think and act in ways expected of teachers was a difficult process, particularly in the sense of being able to enact effective actions in situations that were dynamic, ever-changing and require complex professional decision making.

Moreover, for the in-service teachers' side, Chapman (2013) mentioned that there was more to professional practice than mathematics knowledge for teaching, for example consider not only what teachers know but also who they were and how they see themselves as teachers, related to students, deal with problem, reflect on issues, and identify themselves with the profession. Unfortunately, teaching professions in many countries were focused on how to develop teachers' knowledge and most of them were the workshops that isolated teachers from the classrooms (Office of the Education Council of Thailand, 2015; Takahashi, 2015; Inprasitha, 2017a). In addition, research and progress during the past few decades reported that the slow pace of reform in classrooms suggests that our understandings of teachers were still lacking and there was still much more we need to know to help teachers transform their practice and make a difference to mathematics education (Chapman, 2013).

## 2. Professional Development

Professional development was one major importance for supporting improvement of teaching that will impact students' learning (Coldwell, 2016; Postholm, 2012; Takahashi, 2015; Yeap, Foo, & Soh, 2015). Teacher professional development program should be designed into two aspects, Phase 1 PD focused on participants acquiring new ideas and knowledge, and Phase 2 PD focused on participants practicing using ideas and knowledge in classroom (Takahashi, 2015). Unfortunately, most teacher professional development programs were short term, lack innovation, outside of school training, and had disconnections between theory and classroom practice (Inprasitha, 2006, 2017a; Takahashi, 2015). However, Lesson Study was accepted as a main method of professional development for Japanese teachers (Fujii, 2016; Inprasitha, 2006; Lewis, 2016; Shimizu & Chino, 2015; Takahashi & McDougal, 2016). It was currently an important method in a pre-service education for new teachers and in-service professional development for licensed teachers in Japan (Shimizu, 2006; Shimizu & Chino, 2015). Lesson Study came to the attention of international educators and researchers through the publication of *The Teaching Gap*, the well-known book of Stigler and Hiebert in 1999, which described findings from the TIMSS video study focusing on the eighth grade mathematics lessons in USA, Germany, and Japan. In chapter seven in this book, Stigler and Hiebert described Lesson Study for Japan's structured problem-solving in mathematics, and Lesson Study as Japan's approach to the improvement of classroom teaching (Fujii, 2016; Inprasitha, 2003, 2010; Lewis, 2016; Shimizu & Chino, 2015). Inprasitha (2017b) mentioned that lesson study as the teaching professions in Japan which were developed more than 140 years were differenced and focused on student learning in the classroom, live classroom, teacher learning, and school based development.

Nevertheless, develop innovations in teaching and learning mathematics by focusing on the process of developing and sharing good practices instead of importing good practice from other places was very important point (Inprasitha, Isoda, Wang-Iverson, & Yeap, 2015). Moreover, beginning to do lesson study in a school was not an easy task. One of the major issues that accounts for a Lesson Study program to be sustainable for introducing new ideas or new innovations was proper preparation (Inprasitha, 2015c). In Thailand, the traditional teaching approach was transmitting contents to students. Therefore, Inprasitha (2003) implemented Japanese teaching profession in Thailand by focusing on teachers work together in order to improve teaching practice in the classroom continually. The heart of this teaching profession was the classroom; we can also call "classroom study" (Inprasitha, 2017b). Inprasitha (2003, 2015c, 2017b) arranged many proper preparations as the following; in 2002 started "new teaching approach" in the classroom through the pioneers of 15 pre-service teachers, in 2003-2005 implemented this new teaching approach in the classroom through the in-service teachers around 4 - 5 periods per semester, and in 2006 started the project schools where implemented "Open Approach" as the new teaching ap-

proach and “Lesson Study” as the professional development.

The most difficult part of implementing lesson study in schools in Thailand is how to form lesson study teams. Because in Thailand we do not have senior or expert teachers in schools like in Japan as well as the external knowledgeable persons. Therefore, in 2003 the graduate students in master degree program in Mathematics Education were assigned as members of lesson study teams working with the in-service teachers in schools (Inprasitha, 2015e). Moreover, since 2008 the pre-service teachers were assigned as members of lesson study team to work together with the teachers in schools.

### 3. Context of Study

Implementing lesson study in Thailand context has a long history. Inprasitha (2017b) reported that in 2002, started with pioneers of 15 pre-service teachers. In 2003, established Center for Research in Mathematics Education and started the master degree program of Mathematics Education, Khon Kaen University which focused on work together with the in-service teachers at school. In 2004, created the 5-year initial teacher education program in mathematics education and start implemented lesson study and open approach with the pre-service teacher courses. In 2005, conducted the workshop by using lesson study and open approach. In 2006, the first group of Ph.D. students in mathematics education program, Khon Kaen University as the “school coordinator” work together with the in-service teachers in 2 pioneers project schools according to the lesson study steps. Moreover, in the same year, the APEC-Lesson Study project that proposed by Office of the Higher Education Commission, Ministry of Education, Thailand and Ministry of Education, Culture, Sports, Science and Technology, Japan and organized by Khon Kaen University, Thailand and University of Tsukuba, Japan was started and work until present. In 2008, the first group of pre-service teachers in 5-year initial teacher education program had their internship in the project schools. They worked with the in-service teachers in the lesson study process. In 2009, the project was extended by the support from Office of the Higher Education Commission, Ministry of Education, Thailand. Now, there are more than 120 schools in the Lesson Study project across Thailand. Moreover, there are several networks universities work together through the mathematics education alumni network (Inprasitha, 2018). The schools in project call for pre-service teachers to have field experiences as well as internship or student teaching experiences in their school because they need pre-service teachers to join up their lesson study team and expect to build more understanding in reading mathematics textbooks, prepare the meaningful material, and so on. Furthermore, the schools certainly know that these pre-service teachers are studied and practiced in the 5-year initial teacher education program.

The ultimate goal for changing from 4 to 5 year was to elevate teaching profession. *Mathematics Education Program, Faculty of Education, Khon Kaen*

University (2004, 2016, 2018) started to provide the new teacher education program regarding with Inprasitha's idea to prepare and form the background of pre-service teachers in Y1-Y4 through the various courses in the program and several times for field experience and teaching practice courses in order to open their mind and change paradigms about teaching and learning. For instance the Y1 pre-service teachers go to school for 1 week to familiarize with the context of school, the Y2 pre-service teachers go to school for 2 weeks to familiarize with the classroom, teachers' work, and community near school, the Y3 pre-service teachers go to school for 3 weeks to familiarize with school culture, classroom culture, student's life, the Y4 pre-service teachers go to school for 4 weeks to teach in the classroom, and the Y5 pre-service teachers go to school for 1 year to teaching practice or internship. Moreover, before they go to school, the program conducts the intensive workshop for them such as how to read and understand the textbook. In addition, there are many social activities which are designed in the program among pre-service teacher, graduate students, and university professors in order to form their characteristics to work collaboratively with other. For example in Y1, they are responsible for the Children Day. Y2, they do the Sports Day. Y3, they have the Mathematics Seminar that go aboard with hundreds of students. In Y4, they conduct the Mathematics Camps for elementary and secondary students (Inprasitha, 2015a). These social activities are encouraged the pre-service teachers to have the good characteristics in the classroom such as waiting for students think in the classroom because they used to wait and listen for everyone in the reflection after all activities end (Inprasitha, 2015a).

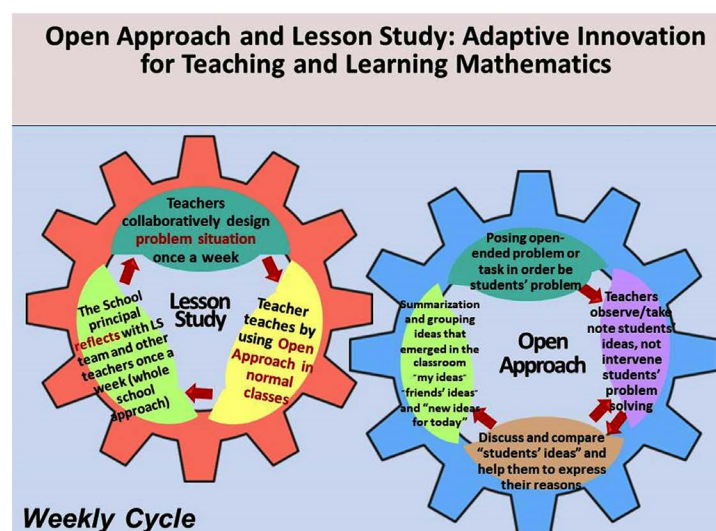
#### 4. Methodology

The qualitative research design was used in this study, 1) participated observations during the academic year, take the participated observations in the pre-service teachers' classrooms and in the reflections after the classes in the schools and in the six reflections conduct by the faculty of education, 2) review of documents of lesson plan, students' work sheets, the reflection of pre-service teachers and lesson study team, the observation notes from their classes, and the reflection from six reflection meetings.

Inprasitha (2003, 2006, 2010, 2015b, 2017c, 2018) described Lesson Study conducted in Thailand had having a weekly cycle which includes three phases; 1) Collaboratively design research lesson (Plan), teachers collaboratively designed problem situations, once a week 2) Collaboratively observing research lesson (Do), teacher taught by using Open Approach in classes and 3) Collaboratively enacting a post-discussion or reflection about the teaching practice (See). In this model the school principal reflected with the Lesson Study team and other teachers, once a week (Whole school approach). Moreover, this Lesson Study was incorporating Open Approach. An Open Approach was a teaching approach that had four steps according to Inprasitha (2003, 2006, 2010, 2015b, 2017c, 2018). 1) Posing an open-ended problem such as a task or problem situation that was within the students' real world context, 2) A time of students' self-learning

through solving the problem for themselves while the teacher observed and took notes about students' ideas or ways of thinking, 3) Teacher orchestrated students to do whole-class discussion and comparing students' representations, reasoning, and connections, and 4) Teacher facilitated summarizing student's ideas that emerged during instruction focusing on mathematical ideas such as generalization and extension. The teacher encouraged the students to take notes as "my ideas", "friends' ideas", and "new ideas for today" (Figure 1).

Normally, lesson study team in the project school consists of pre-service teachers or/and the in-service teacher. They take the role as the teacher as well as the observers. The school usually sets up the weekly cycle of lesson study such as one day in the week for collaboratively design research lesson that everyone in the lesson study team have the meeting together for reading the textbook, prepare the problem situation, anticipate students ideas, prepare the materials. Furthermore, the school sets up the whole school academic schedule to support teachers to teach and observe the classes in lesson study weekly cycle. One teacher in the lesson study team teaches and other members observe the classroom which focuses on observing students learning. Finally, the school sets up one day in the week for reflection, the principal take the leadership in the meeting, each member in each lesson study team reflect about their class as well as students ideas that occurred in the class. The lesson study team in this study was the first grade lesson study team which consisted of one teacher and two graduate students who graduated from the 5-year initial teacher education program, Khon Kaen University and had the experiences as pre-service teachers in the project school, and two university professors who had experiences about lesson study and open approach more than 15 years, and two pre-service teachers (2017-2018 academic year) in Mathematics Education Program, Faculty of Education, Khon Kaen University, Thailand. This lesson study team implemented open approach lesson study weekly cycle in the school.



**Figure 1.** The weekly cycle of Open Approach Lesson Study (Inprasitha, 2003, 2006, 2010, 2015b, 2017c, 2018).

The objective of this study aimed to investigate how pre-service teachers work as a part of the lesson study team. Participants were the first grade lesson study team which consisted of one teacher, two graduate students, two university professors, and two pre-service teachers (2017-2018 academic year) in Mathematics Education Program, Faculty of Education, Khon Kaen University, Thailand. The pre-service teachers studied in the 5-year initial teacher education program. They took courses for professional related courses, math contents, MPCK, GE, and SC during Y1-Y4. They participated in the field experience and teaching practice courses at the schools as well as the extra activities that provided by the program.

**Method:** Data were collected from two sources. The first, by observing the pre-service teachers during: 1) classroom at school, 2) reflection at school and 3) six reflection meetings during the academic year. Secondly, according to the process outlined by open approach lesson study (Inprasitha, 2017c, 2018), a weekly review of documents from lesson plan, students' work sheets, the reflection of pre-service teachers and lesson study team, and the observation notes from their classes.

**Participated observations:** During the academic year, take the participated observations in the pre-service teachers' classrooms and in the reflections after the classes in the schools. Moreover, take the participated observations in the reflections conduct by the faculty of education that usually has six reflection meetings per one academic year.

**Review of documents:** Review of lesson plan, students' work sheets, the reflection of pre-service teachers and lesson study team, the observation notes from their classes, and the reflection from six reflection meetings. In 2017-2018, every pre-service teacher had to do their lesson plans with the lesson study team. Furthermore, they had to write a reflection of their teaching practice for the reflection meeting.

**Analysis:** The text from the participated observation notes and the review of documents were considered together and coded through Open Approach Lesson Study weekly cycle (Inprasitha, 2017c, 2018).

## 5. Results

The elementary and secondary schools in Thailand usually start the first semester around on mid-May until early-June. When the pre-service teachers go to school, they start to attend the lesson study team that follows the open approach lesson study weekly cycle. However, since the pre-service teachers are very novices in teaching profession, they are assigned to observe their in-service teachers' teaching practice in the classroom for 4 weeks in order to familiarize with school culture, classroom culture, teaching practice, and student's learning. Normally, for grade 1 - 3, the students study mathematics around five hours per week, grade 4 - 6, the students study mathematics around four hours per week, and grade 7 - 9, the students study mathematics around three hours per week.

### **Open approach lesson study weekly cycle**

Inprasitha (2017b) mentioned lesson study as the teaching professions in Japan which were developed more than 140 years and focused on student learning in the classroom, live classroom, teacher learning, and school based development. Furthermore, an open approach was a teaching approach that had four steps according to Inprasitha (2003, 2006, 2010, 2015b, 2017c, 2018). Lesson study conducted in Thailand had having a weekly cycle.

#### **5.1. Teachers Collaboratively Design Problem Situations, Once a Week**

At the beginning of the semester, pre-service teachers and lesson study team start to plan the units of the lessons to allocate the lessons and periods from the textbook. For the weekly cycle, the two pre-service teachers solve the task in the textbook. They and the lesson study team created two word problems and anticipated two students' ideas for each word problem. Moreover, the pre-service teachers and lesson study team prepared the main materials such as word problem sheet, picture of the problem situation and work sheets as well as the supplementary materials in order to support students' thinking such as blocks and big paper blocks. They need to think about color, size, and number of materials that they use in the class. Furthermore, they planned the teacher's role for each step in open approach.

#### **5.2. Teacher Teaches by Using Open Approach in Classes**

Pre-service teacher taught by following the four steps in open approach. The other members in lesson study team observed the class.

##### **5.2.1. Posing Open-Ended Problem or Task in Order to Be Students' Problem**

Pre-service teacher began the class by asking students to talk about 13 that learnt in the previous class. Then, pre-service teacher put four word problem sheets instead of two problems as they planned on the magnet blackboard and asked students to read the word problems. Furthermore, Pre-service teachers gave work sheet, pen, and blocks to each student and asked them to solve the problem by individual.

##### **5.2.2. Teachers Observe/Take Note Students' Ideas, Not Intervene Students' Problem Solving**

Each lesson study team's member observed students when they solved the problem. The lesson study team took note about students' ideas. Moreover, pre-service teacher asked the question such as how you know during the student' problem solving in order to encourage students to explain their ideas. Every student used the blocks to support their thinking.

##### **5.2.3. Discuss and Compare "Students' Ideas" and Help Them to Express Their Reasons**

Pre-service teacher selected the first student to go to the in front of the black-



board and put this student's work sheet on the blackboard as well as prepared the big paper blocks in front of the classroom. Then, pre-service teacher asked student to explain her idea for solving the first word problem to the class. Student put the big paper blocks on the blackboard to show what she thought. In addition, pre-service teacher selected different three more students to explain their ideas for the second word problem, the third word problem, and the fourth word problem. Pre-service teacher also asked students for example how you know, what your friend does when they explained their ideas in order to encourage the students to give more details about their thinking. After that the pre-service teacher selected the student to write the math sentence on the blackboard from their friends' works.

#### **5.2.4. Summarization and Grouping Ideas That Emerged in the Classroom—"My Ideas", "Friend's Ideas", and "New Ideas for Today"**

As the lesson study team planned, time is up, pre-service teacher asked the students to write the ideas from the classroom in their notebook later.

#### **5.3. The School Principal Reflects with LS Team and Other Teachers Once a Week (Whole School Approach)**

The lesson study team reflected about the lesson after the class. Everyone had to reflect by began with the pre-service teachers. They reflected about students' ideas that they were anticipated such as drawing the blocks, using blocks. They also reflected some ideas that they did not anticipate such as using the arrows. Moreover, the pre-service teachers observed the student' difficulty about place value and their number of blocks. The pre-service teachers and lesson study team developed a broader understanding of their students' ideas from the various perspectives given by the lesson study team.

Furthermore, in the six reflection meetings that provide by the faculty of education, the pre-service teachers reflect about their own learning from participate in open approach lesson study weekly cycle as following:

1) Collaboratively design research lesson (Plan), some reflections were as below:

PT1: Textbook had many details. Therefore, planning the lesson together helped me to see the connection of the content in each topic and helped to understand the students' ideas from the in-service teacher who had the experiences with the kid.

PT2: I had more understood about the different of students and the way to get to know them and familiar with them.

2) Collaboratively observing research lesson (Do), some reflections were as below:

PT1: I tried to form behavior of my students to listen to their friend in the classroom. I also made myself closer to my students in order to learn and get closer to their ideas that made me knew that everyone was difference; therefore, I need to be patient, wait for the kid's ideas.

PT2: I observed another class and got some ideas to use in my class. Moreover, I thought every student can learn through open approach. The main point was selecting the appropriate problem situation.

3) Collaboratively doing post-discussion or reflection on teaching practice (See), some reflections were as below:

PT1: My students changed from quiet and shy person to the independent person, they can present their ideas in the classroom.

PT2: In lesson study team, I listened the point of view and reflection from my team. This part helped me to know the weakness point that I can improve for the next class. Weekly reflection with the lesson study team made me knew more detail about each of my students.

## 6. Concluding Remarks

The various courses, field experiences, workshops, and social activities that provide from the teacher education program during Y1-Y5 encourage the pre-service teacher to get ready for working with the in-service teachers in the school. The pre-service teacher can fulfill the lesson study team to improve the classroom in the school. Moreover, pre-service teachers and in-service teachers as well as the principals, graduate students, and university professors can learn from the lesson study team by work together through the open approach lesson study weekly cycle as Inprasitha (2015a) mentioned that building a community is an immediate link between pre- and in-service program. Working as a part of lesson study team is the important basic element of the professional learning community.

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## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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