

# USING LESSON STUDY TO DEVELOP THE COMPETENCE OF DESIGNING MATH LESSON PLAN FOR PRIMARY EDUCATION STUDENTS AT DONG THAP UNIVERSITY

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*Received: 21/10/2017; Revised: 19/11/2017; Accepted: 02/01/2018.*

**Abstract:** The paper presents a number of issues in the lesson study, which identifies the learning process through lesson study and proposes the process of teaching through the form of lesson study and the results of applying the process in teaching “mathematics lesson plan” for primary education students at Dong Thap University. The quantitative and qualitative results from the initial empirical process demonstrate the effectiveness of implementing the process of lesson study in teaching in order to develop a professional competency for students.

**Keywords:** Lesson study, professional competency, lesson plan.

## 1. INTRODUCTION

Lesson study is a model of teacher professional development which is rooted in Japan. In recent years, various educational researchers have also studied lesson study in terms of the concept, characteristics, procedures, and benefits. Some noted works include “Case study as an approach in developing teachers’ professional competencies” by Vu Thi Son [1], “Using case study as a tool to develop mathematics teachers’ professional competencies” [2], [3]; and other materials such as [4], [5], [6], [7], etc. This article discusses the application of the lesson study model to instruct primary education teacher students to design mathematics lesson plans in Dong Thap University.

## 2. CONTENT

### 2.1. Overview of lesson study model

Lesson study is a teaching model which involves different activities including designing, implementing and adjusting one or more lesson plans (lesson research) in order to improve teaching and learning practices. In this process, teachers improve their teaching methods gradually and systematically by examining and reflecting on each other’s teaching techniques based on other teachers’ lessons. C. Lewis divided lesson study into four steps: (1) Focusing on research; (2) Developing and designing research lessons; (3) Teaching and discussing research lessons; (4) Reflecting and proceeding to teach or plan the next [7].

In this research, the researchers investigate the lesson study as a way to develop professional competencies of teacher students. This process includes the following steps: planning → conducting → surveying → analysis → discussion and reflection. Results from the lesson

study process provide students with knowledge, skills, experience and qualities required with students in the pedagogical school.

#### 2.1.1. Training process through lesson study

In the lesson study model, learning activities of students followed these four steps:

Step 1: Preparing to design the lesson plan. This step is crucial to determine the quality of the lesson plan. Determining the goal of lesson is to identify the knowledge, skills and competencies that learners need to develop through the unit. In this step, students need to read the content of the lesson, the knowledge and skills outcome of mathematic subject to determine the detailed goal of lesson. Based on the objective of the lesson, the students then need to identify the learners’ background knowledge (knowledge, skills and experience) in order to determine how to effectively construct new knowledge. Finally, they design the main learning activities of the lesson and analyze the component activities.

Step 2: Designing the lesson plan. At this stage, students will: - Analyze the use of teaching methods for each activity, select appropriate teaching methods; - Select the suitable teaching aids for the specific contents and activities; - Analyze what content can be exploited; - Anticipate the problematic pedagogical situations; - Select the form, method and tool of assessment for each activity based on learners’ competency; - Make the drafts of the lesson plan and finalised the lesson plan within the group.

Step 3: Presenting, discussing and reflecting on the lesson plan. The student representatives present the completed lesson plan to the group/class; then the student group (or student) analyzes, discusses, and reflects on the lesson plan (appropriate factor, inappropriate factor, varied factors...).

Step 4: Completing the lesson plan: reconciling the comments, discussing, reviewing the inappropriate points from step 1 to finalize and complete the lesson plan.

These steps are conducted continuously until the lesson plan is completed. Thanks to this process, the students trained and developed their professional competencies (diagram 1).

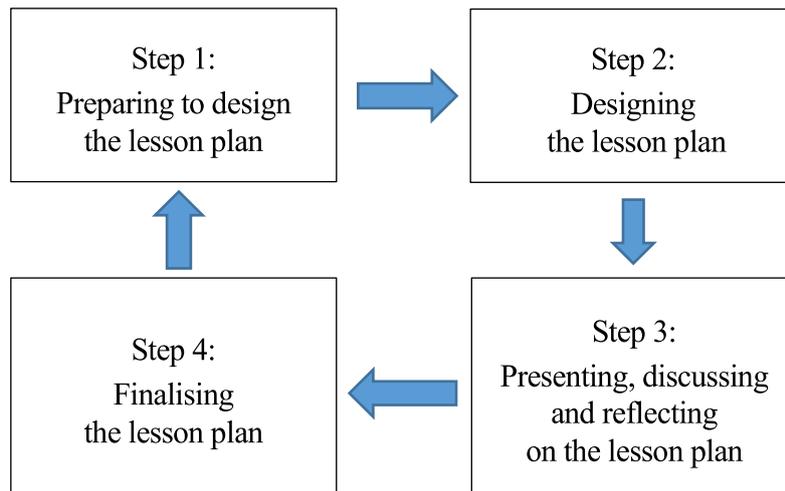


Diagram 1. Training process through lesson study

### 2.1.2. The process of conducting the lesson study: activities of lecturer

The process consists of the following steps:

**Step 1: Planning.** In this step, the lecturer prepares the full teaching plan which includes: achievable goals, expected learning tasks, knowledge needed to equip students, classroom organization, evaluation form and criteria,...

**Step 2: Organizing students to carry out activities** according to the lesson study process (Diagram 1).

**Step 3: Observing.** The lecturers observe the students' activities for timely support. Observing provides the lecturer with sufficient information for formative and summative assessment.

**Step 4: Analyzing and evaluating the outcome.** At this stage, the lecturer should thoroughly analyze the implementation process as well as the results in terms of contents/methods/... to evaluate degree of achievement of the process. Also, the lecturer would determine the contents to be adjusted to improve the performance in the next learning task.

### 2.2. Sample lesson plan using lesson study model

In teaching Math Teaching Methodology courses, lecturers maximize the use of class meeting time and

self-studying hours to create favourable conditions and opportunities for students to train and develop their professional competencies. Moreover, it's important to nurture teacher students' love, passion and positive attitude towards their future career. According to the curriculum, the content of the Maths Teaching Methodology for Primary Education course A is divided

into 2 chapters. Chapter 2 "Organising Maths learning activities in Primary School" consists of three main contents. This part focuses on how to deliver the content "2.3. Designing a lesson plan".

#### Step 1: Planning

- Lesson title: Designing lesson plans.
- Background Knowledge:
  - + Standardised knowledge and skills stated in national elementary mathematics curriculum;
  - + Primary education mathematics curriculum;
  - + Methods of teaching primary education mathematics;
  - + Forms of Primary education mathematics teaching.
- Duration: 09/18 (09 contact hours per class/18 self-study hours, equivalent to 03 credit hours/01 class meeting).
- Objectives: students are expected to be able to:
  - + Design an efficient and appropriate math lesson plan for Primary education;
  - + Evaluate the effectiveness of the lesson plan;
  - + Develop the competency of designing lesson plans.
- Extra targeted soft skills:

+ Collaborative skills (teamwork skills);  
 + Communication skill;  
 + Presentation skill (report); +) Problem solving skills.

- Materials:

+ Detailed course syllabus;

+ Lectures on Primary Education Mathematics A Teaching Methodology;

+ Coursebooks of Primary Education mathematics teaching methodology course;

+ Maths Textbook 1, 2, 3, 4, 5.

- Assessment: Combining two forms of assessment:

+ Formative assessment accounts for 40% of the final result, employs scale 10, and is measured based on specific criteria (in the rubrics below);

+ Summative assessment accounts for 60% of the final result, employs scale 10. Students are required to design a complete lesson plan as a final product, which is evaluated based on the following rubrics.

*Table 1. Rubrics for assessment*

Criteria	Point
<b>A. Formative Assessment - weighting 40%</b>	
1. Students actively participate in teamwork	1.0
2. Students make meaningful contribution to group's achievement	3.0
3. Students demonstrate sufficient problem analysis skill	2.0
4. Students demonstrate sufficient problem solving skill	2.0
5. Students effectively cooperate and take responsibility for their work	2.0
<b>B. Summative Assessment - A complete lesson plan - weighting 60%</b>	
1. The learning objectives of the lesson are clearly stated	1.0
2. The lesson employs a range of teaching facilities	1.0

3. The learning activities achieve the set objectives	2.0
4. The teaching methods are appropriate to the content of activities	2.0
5. The form of teaching is appropriate to the content of activities	2.0
6. The learning objectives, content, and teaching methods are close integrated	2.0

- Classroom Management: Classes are divided into groups, each group designs a typical elementary mathematics lesson selected based on the topic. The lecturer informs the rules for groupwork activities. The lecturers and students reach an agreement on the learning methods and organisation, timing and the form of assessment.

Step 2: Organise the activities that correspond to the lesson study model. At this stage, each group of students carrying out the group's lesson study which was described in the plan, following a 4-step process: For example, a group of students design the lesson plan for the unit "Adding 9 and a number:  $9 + 5$ ".

Expected group lesson plan:

(1) Learning Objectives: at the end of the lesson, pupils are expected to be able to:

- Use mental calculation to add number 9 and a number together by separating 1 in the latter to switch to adding 10 and a number.

- Create and memorise the addition table.

- Write the correct result in the calculation.

- Find the result of the calculation using the commutative property

- Do exercises 1, 2, 3, 4.

**(2) Teaching facilities**

Sticks, sub-tables / sub-tables, textbooks.

**(3) Learning activities**

**Activity 1: Construct the mental calculation**

*Component activity (1): Calculating with sticks*

Pupil: Get 9 A-sticks and 5 B-sticks (different colors) and discuss in the pair to answer the question: "How to turn into the calculation of adding 10 and a number".

Pupil: (2-3 minutes) Agree on how to calculate: "move 1 stick in 5 B-sticks and add to 9 A-sticks to get a group of 10 sticks, Add these 10 sticks and 4 B-sticks to

have 14 sticks together “ - Pupils follow the instruction and repeat.

*Component activity 2: Calculating with numbers:*

Pupil: Discuss in pairs the question: “How do we do the mental calculation  $9 + 5$ ?”

Pupil: (1 minute) Agree on how to calculate: “take 1 from 5 to add to 9 to have 10,  $10 + 4 = 14$ ”. Pupils practice and repeat.

Teacher: Write the summary on the board and ask pupil to repeat the calculation

$$9 + 5 = ? \quad 5 - 1 = 4 \quad 10 + 4 = 14$$

*Component activity 3: Present the mental calculation*

Teacher: instruct the mental calculation: “minus 1 from 5 to have 4. Thus,  $9 + 5 = 14$ .”

Pupil: do the mental calculation.

**Activity 2: Construct and memorize the addition tables**

Pupil: Complete the the addition tables in the textbook.

Teacher: give feedback to pupils and ask pupils to peer-feedback to each other.

Pupil: Memorize the addition table

**Activity 3: Write the calculation, find the result using the commutative property**

Pupil: Write the calculation on the small board/sub board

Teacher: Feedback

Pupil: Find the results of calculations  $5 + 9, \dots$

**Activity 4: Practice**

Teacher: Ask pupil do the exercises in the textbook and give feedback and correction.

### 2.3. Experiment and results of the experiment

The purpose of the experiment is to evaluate the effect of using the lesson study model on the development of a student’s professional competency.

The subject of the research is 2 classes with 90 students at Primary Education and Early Childhood Education Department, Dong Thap University. They were divided into two classes (01 experimental class and 01 control class). The experimental lessons in the research were delivered in the second semester, school year 2017-2018.

The content of the experiment: Developing the competency of designing mathematics lesson plan for primary teacher students by “Designing the lesson plan”.

In the control class, traditional teaching methods were employed, such as teachers’ presentation followed by students’ practice in designing lesson plans. In the experimental class, the lessons were organised using learning activities in the lesson study process described above.

The two classes followed the same timeline and at the end of the both lessons, the same qualitative and quantitative research tools were used to evaluate the two lessons. On qualitative terms, we conducted a survey on the level of formation and development of the professional competences (Figure 1). On quantitative terms, we required students to take the individualized test (to design a lesson plan) which is scored according to the criteria presented in the teacher’s plan (Figure 2), on the scale 10. The results are as follows:

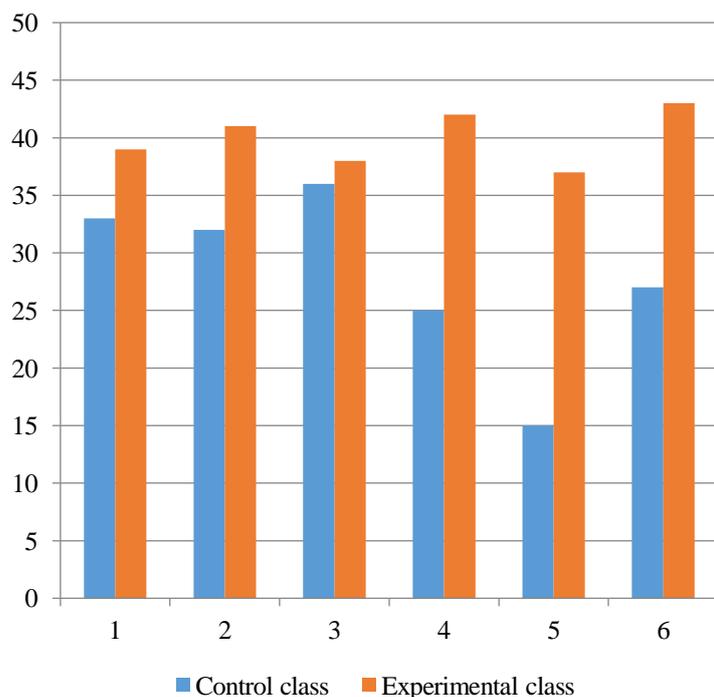


Fig. 1. Students’ professional competency in the control and experimental classes

In Fig. 1: 1. Competence to apply methods, forms of teaching, teaching facilities; 2. Competence to analyze the lesson; 3. Competence to make decisions and solve problems; 4. Presentation/reporting competence; 5. Competence to think critically; 6. Communication competence.

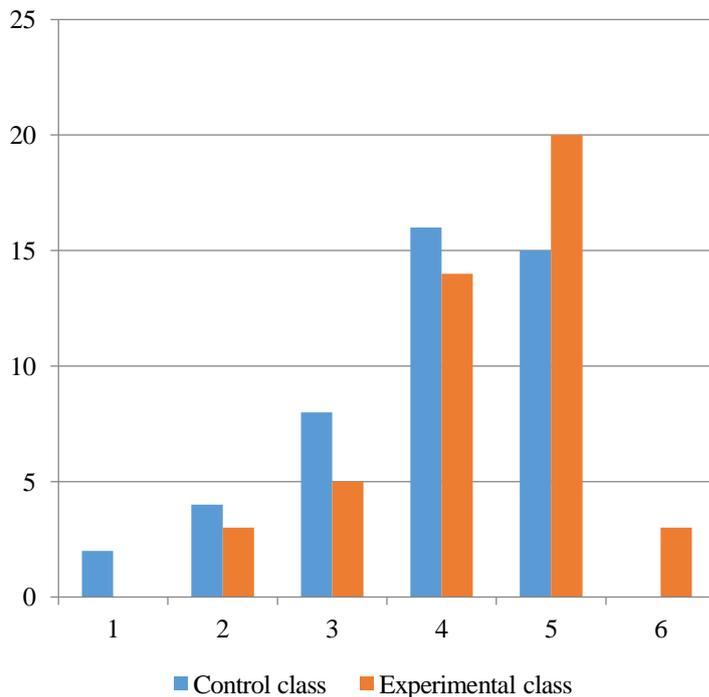


Figure 1 shows the difference in the level of  
 Fig. 2. Scores of student-designed lesson plans  
 in the control and experimental classes

development of the component competencies. The result in Figure 2 demonstrates the impact of lesson study model on students' academic performance. In particular, presentation/reporting competence; critical thinking and reflection competence, communication competence are dramatically improved in the experimental class. The scores on students' lesson plans show that the proportion of student achieving grade 8 in the experimental class is much higher than that in the control class. Meanwhile, in the control class, there were students scoring 9 while none in the experimental group was recorded. However, the number of students scoring 5, 6, 7 on the lesson plan of the experimental class was lower than that of the control class. It is also a matter that further research, should investigate to discover the reasons: student's self-control, proactiveness in teamwork activities, student's self-study competence.

### 3. CONCLUSION

Designing a lesson plan is an important task for the teacher. Therefore, teaching profession-related content at the pedagogical institutions should provide students with more authentic experiences. Training the professional competencies for student through lesson study model has a positive impact on the professional development of

pedagogical students. Therefore, the use of lesson study model in teaching is necessary to develop professional competence. With the abovementioned training process, the lesson study model proves to be potential and promising in teacher training.

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