

The Implementation of Modified Lesson Study Integrated with PCK to Optimize the Professional Competence of Elementary School Teachers

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Abstract: This research was focused on the use of modified lesson study integrated with pedagogical content knowledge (PCK) to optimize elementary school teachers' professional competence. Professional competence expects teachers to acquire comprehensive knowledge of the subject matters they teach, know teaching methodology in the sense of acquiring theoretical and conceptual knowledge, and able to choose and apply the appropriate method to the teaching process. To solve the teachers' limited knowledge and skills in exploring subject matters, modified lesson study integrated with PCK framework was implemented in order for them to be able to do thematic instruction. Modified lesson study is aimed to optimize the process and the achievement of every phase by analyzing the content knowledge, pedagogical knowledge, and PCK. The present study was a qualitative-descriptive research. The study involved three teacher-mentor in the Program of Professional Education of Teachers (PPG) of elementary school and 35 students. The result of the study indicated that the teacher mastered the material, the concept, and the interrelations between different materials within a particular theme. The teacher was able to develop teaching materials and their interrelations, develop integrated assessment, and develop the reflective action ability. Also, increase students achievement in the teaching and learning process.

1 INTRODUCTION

Jones and Jones (1998) mentions school failures as one of critical obstacles at school. School failures were described as the difficulty in carrying out an effective teaching-learning process. Jones and Jones (1998) point out that school had a difficulty to determine the influencing factors of an effective teaching-learning process in achieving students' academic and social gains.

Teachers as professional educators and as parts of the school educational system are required to possess some teaching basic skills, one of which is professional competence. Professional competence refers to the ability of teachers to perform their duties as mentors, educators, and instructors. Professional competence can be perceived as teachers possessing comprehensive knowledge of the subject matters they teach, know teaching methodology in the sense of acquiring theoretical and conceptual knowledge, and

able to choose and apply the appropriate method to the teaching process.

In practice, teachers' professional competence should be improved in order for the teaching-learning process to be carried out effectively. Based on the data previously collected, teachers still have some difficulties in designing an integrated thematic instruction. Since the introduction of the school-based curriculum (KTSP) in 2006, there has been an educational paradigm shift, from centralistic to decentralist curriculum, including in elementary schools. The shift occurs in the teaching approach in lower grades, from subject matter approach to integrated thematic approach. Thematic instruction is one of integrated teaching techniques that links concepts of different subject matters within the same unifying theme. This way, the students will be trained to relate various information to one another, so that they can deal with cross-environmental situations, cross-knowledge, or cross-devices in a fun manner and at the same time make them learn to be actively and directly involved in the real-life situation. This

paradigm shift influences the school readiness to administer the teaching and learning process using the thematic approach, especially the readiness of the teachers as the instructors (Pudjiastuti, 2010).

2 PROFESIONAL COMPETENCE OF PRIMARY TEACHERS

Based on the Regulation of the Minister of National Education of the Republic of Indonesia No. 16/2007, there are at least five sub-competences of professional competence of primary teachers: 1) mastering the materials, the structure and the concept of the subject taught, 2) mastering standard competency and basic competencies of the subject taught, 3) developing the learning materials creatively, 4) developing professionalism in a sustainable manner by doing reflective actions, and 5) utilizing information and communication technology for communication and self-development.

Meanwhile, the Australian Institute for Teaching and School Leadership (AITSL) establishes the Australian National Professional Standards for Teachers which essentially outlines seven key elements for effective teachers as follows (Celik, 2011):

- Standard 1 : Know the students and how they learn;
- Standard 2 : Know the content and how to teach it;
- Standard 3 : Plan for and implement effective teaching and learning;
- Standard 4 : Create and maintain supportive and safe learning;
- Standard 5 : Assess, provide feedback and report on student learning;
- Standard 6 : Engage in professional learning;
- Standard 7 : Engage professionally with colleagues, parents/carers and the community.

3 LESSON STUDY WITH PEDAGOGICAL CONTENT KNOWLEDGE

Based on these conditions, the researcher attempts to intervene the learning process by applying the modified lesson study integrated with PCK framework. This is to solve the teachers' limited knowledge and skills in exploring subject matters and in order for the teachers to be able to do thematic instruction.

Lesson study is a teacher professional development model through collaborative and sustainable teaching analyses based on collegial and mutual learning principles to establish a study group (Hendayana, 2006). Lesson study is defined as teachers' assessment and development through the professional and pedagogical aspects (Rock and Wilson, 2005); and as learning approach to develop students' learning experiences (Meng et al., 2012). It is a long-term and collaborative in-service teacher training program. Through lesson study activities, the teaching process is developed collaboratively. One of the teachers will be selected to perform teaching activities with other teachers observing students' learning activities during the lesson. At the end, the teachers confer about the lesson, revise it and design the next teaching program based on the result of discussion. Lesson study encourages the teachers to be lifelong learners, to develop and improve the classroom teaching.

According to Lewis (2011), lesson study can be a professional development program for the teachers in which they analyze a research-based teaching practice to bring about teaching innovations. Lesson study is indeed a long-term teacher professional development that has origins in Japanese education and has then been adopted and developed in many developing countries, one of which is Indonesia. Generally, lesson study has the following phases: collaborative planning, teaching and observing, analytic reflection, and on-going revision (Curcio, 2002; Lewis, 2011). The focal point is the optimization of teaching and learning process, where teachers are expected to always be involved in the effort to improve the teaching material mastery through effective pedagogical practices (Chia and Kee, 2010).

The addition of the term "modified" in "modified lesson study" is oriented to the optimization of the process and the achievement of every phase by analyzing the content knowledge, pedagogical knowledge, and PCK. Content knowledge is able to

differentiate both general and specific content knowledge; Pedagogical Knowledge is able to (a) acquire how to assess students' ability and learning mastery, (b) choose teaching pattern towards students' needs and to the various students' ability, (c) use some teaching approaches and methods in the classroom, (d) know which student who already understand and not, (e) organize the teaching and learning process in the classroom; Pedagogical Content Knowledge is able to (a) know in choosing suitable learning approach and method, (b) differentiate which learning material that quite easy and hard for the students, (c) know how to deliver the suitable learning material that easy to be learned by students (Herring et al.,2014; Schmidt, 2009). The relation between lesson study and PCK in terms of main goal of lesson study, there are: Content Knowledge correspond with Improvement of learning material knowledge (plan); Pedagogical Knowledge and Pedagogical Content Knowledge correspond with improvements on learning knowledge, improvements in observing learning activities in the classroom, improvements through the quality of learning plan.

Pedagogical knowledge refers to 'how' of teaching, and content knowledge is 'what' of teaching. In Shulman (1986) perspective, PCK is the practical knowledge used by the teacher to orchestrate the teaching process. PCK can be defined as a teacher's understanding about a particular concept to help students understand a particular subject matter using various teaching strategies, representations, and assessments even with some contextual, cultural, and social limitations in the learning environment (Hurrell, 2013).

In Shulman (1986) perspective, PCK is the practical knowledge used by the teacher to orchestrate the teaching process. Such practical knowledge includes (a) knowledge to structure and simplify material delivery, (b) knowledge of general concepts, students' difficulties and misconceptions about a particular material, and (c) knowledge of teaching strategies relevant to what students need in certain conditions (Shulman, 1986). Hurrell (2013) argue that despite the fact PCK has been widely used, it has yet to be clearly defined in order to be correctly implemented. Hurrell (2013) then conducted a study that essentially attempted to reframe the concept of PCK with more emphasis on 'knowledge in and for teaching' than 'on the teacher's profile'.

Generally, the concept of PCK can be illustrated in the following figure 1:

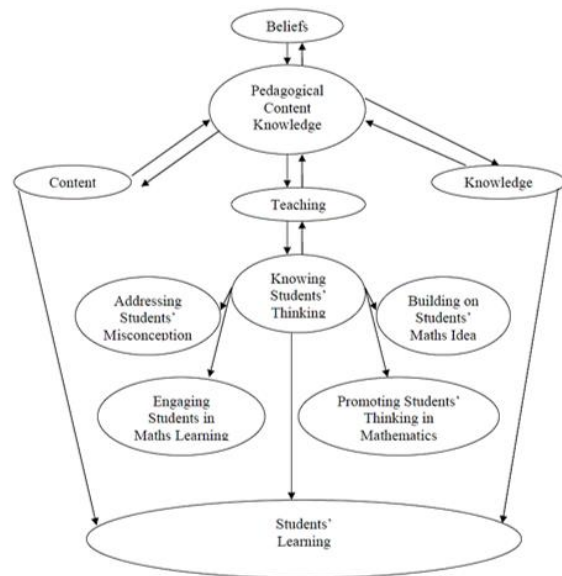


Figure 1: Network of PCK (An et al., 2004).

4 RESULT AND DISCUSSION

This study used paired t-test and Analysis Tools menu on the Microsoft Excel 2010. The result showed that significance (α) 0.05 (see Table 1). Moreover, students' average scores pre-treatment is lower than post-treatment. The calculation by using normalized gain Hake (1999) shows that the highest average comes from the students in the high group, which is 0.734 (the high category). Meanwhile, the middle group and below group are in the score of 0.662 and 0.544 which belong to the middle categories. According to the Table I, it could be stated that the changes of teaching pattern and teachers' understanding (after implementing lesson study integrated with pedagogical content knowledge) give positive feedback towards the students' improvement to the learning material.

Table 1: The comparison between before and after treatment.

	Variable 1	Variable 2
Mean	55.9150323	87.8261867
Variance	247.107308	168.670932
Observations	35	35
Df	34	
t Stat	10.116902	
P(T<=t) one-tail	1.0982E-14	
t Critical one-tail	1.4509812	
P(T<=t) two-tail	2.8721E-14	
t Critical two-tail	1.9400812	

t-Test: Paired Two Sample for Means

Furthermore, the findings show that teachers' development and experiences in participating lesson study activities helps them to select the most suitable learning content, process, product, and environment. In terms of content knowledge, the observation was conducted to find out if the teacher had adequate prerequisite knowledge, if he had adequate knowledge about teaching materials, if he could link the materials of different subject matters within a single theme, if he could tell general knowledge (acquired from textbooks) from specific knowledge (usually acquired from experience) available in the teaching materials. In terms of pedagogical knowledge, the observation was conducted to find out if the teacher could adjust the teaching pattern to the students' knowledge, if he could accommodate what students need, if he could execute the lesson plan, if he could organize the classroom activities, if he could implement the integrated thematic instruction, if he could carry out an authentic and integrated assessment of students' achievements. In terms of PCK, the observation was conducted to find out the teacher's selection of teaching method and approach relevant to the materials, if the teacher could tell the content students had a difficulty with from that they find it easy to understand, and if the material delivery was appropriate and student-friendly.

However, even though the findings present that the development and experiences have not seen in all indicators, but teachers show that the teacher mastered the material, the concept, and the interrelations between different materials within a particular theme. The teacher was able to develop teaching materials and their interrelations, develop integrated assessment, and develop the reflective action ability. The students were asked to identify some objects in the classroom that related with the current learning topic.

5 CLOSING REMARK

The study shows that modified lesson study integrated with PCK gives positive impact in the teacher's development, ability towards some thematic content and students understanding ability. The result indicated that the teacher mastered the material, the concept, and the interrelations between different materials within a particular theme. The teacher was able to develop teaching materials and their interrelations, develop integrated assessment, and develop the reflective action ability.

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