Obstacle on The Implementation of The Scientific Approach to The Curriculum 2013: a Case Study of Lesson Study in Palangka Raya City

Obstacle on The Implementation of The Scientific Approach to The Curriculum 2013: a Case Study of Lesson Study in Palangka Raya City

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Abstract. One of the backgrounds changing of the curriculum 2013 was in response to the low literacy of Indonesian children according to PISA and TIMSS test results. To overcome this problem, the government adopted a policy of implementing a scientific approach in schools. The purpose of this study was to explore the obstacles faced by science teachers in applying scientific approaches in schools. Data collection techniques using questionnaires, observations, and focus group discussion. The results of the research showed that (1) Lesson study can improve teacher's pedagogical competence in applying scientific approaches, (2) The main obstacle of teachers was the lack of time in carrying out the process of scientific approach in learning, especially at the stage of conducting experiments, (3) Lack of time preparation for national and entrance examinations to higher schools. It was concluded that although lesson study was effective in increasing the ability of teachers to apply scientific approaches, but they are reluctant to apply it because they were afraid of running out of time in conducting the experiment and achieving their national final exam material targets when a scientific approach was applied.

1. Introduction

One of the backgrounds of changing the curriculum 2006 to curriculum 2013 is to overcome Indonesian children's literacy is still low according to PISA (Program for International Student Assessment) and TIMSS (Trends International Mathematical and Sciences Study). PISA assessment Results showed that in 2009, Indonesia ranked 57th from 65 countries, ranked 64th out of 65 countries in 2012, ranked 64th out of 70 countries in 2015. In the TIMSS results in 2011, Indonesia raised its ranking to 38th out of 42 countries. In 2015, Indonesia ranked 45th out of 50 countries. To address this, the government adopted a policy of applying scientific learning in schools to improve student literacy.

The difficulty of teachers in implementing scientific learning and authentic assessment is caused by the limited training given to teachers.[1] Besides, this difficulty is caused by the short duration of the training and the training materials provided are not by what is needed by the teacher, but there are a lot of curriculum theories, not how to implement scientific approach in real context**.** **[**2] Appropriate training is needed in improving the pedagogical and professional competence of science teachers. One of the training that can be used is the lesson study. According to the results of research [3; 4; 5; 6], lesson study can improve teacher competence in teaching, improve the process and learning outcomes. Lesson Study has the potential to encourage an increased focus on teaching and learning and

consequent improvement in student learning outcomes. [7; 8)] Besides, through lesson study can help teachers develop better-integrated science learning tools. [9]

The research results of Cohan and Honigsfeld's [10] showed that the lesson study approach was effective for planning, implementing, and evaluating learning. This was because lesson study has advantages such as individual professional development, learning to pay attention to students, developing material content and new learning approaches, involving several teachers as colleagues, able to assess the implementation of learning, create requests for improvement, respect the central role of teachers. [11;12;13] To improve pedagogical competence and professional competence of teachers in learning, through lesson study activities can overcome the shortcomings and weaknesses that teachers have in the learning process. Through this activity, teachers can review their performance which can then be used as input to improve their performance. By carrying out a lesson study, the teacher's insights will develop and be motivated to always innovate which in turn will become a professional teacher. Lesson Study as a program that provides opportunities for participants to strengthen pedagogical, personality, professional, and social competencies to improve or improve the quality of learning in the classroom. [14]

The previous studies have revealed the effectiveness of lesson study in improving teacher competency using the action research approach. In this study, Besides using the action research approach, a qualitative approach was also conducted to explore the obstacles of implementing lesson study and applying a scientific approach. Departing from researchers' anxiety about the conditions of implementing the scientific approach and the educational background conditions of integrated science teachers in Palangka Raya City, the researchers were interested in increasing the pedagogical competence of integrated science teachers in junior high schools and exploring the difficulties of teachers in applying scientific approaches in schools through lesson study activities in the City of Palangka Raya.

2. Method

This research was a qualitative research with a repetitive action design (cycle) through lesson study activities with stages of the plan, do, and see. The subjects in this study were junior high school science teachers in Palangka Raya City. Samples were taken using the Purposive Sampling technique. To determine the subject of the study, the researcher communicated and coordinated with the Science Teacher Subject Meeting (STSM) of Palangkaraya City which consisted of 70 people but who attended the focus group discussion were 52 people. The teachers who were the subject of the study were 8 junior high school science teachers from 7 different schools.

Data collection techniques in this study were to observe the competence of science teachers to find out the improvement of the developed learning tools and their implementation during the learning process. Observations were conducted to photograph the development of teacher pedagogical competency improvement and the development of increased student activity in learning based on a scientific approach. Besides, data was also collected using documentation techniques to photograph unique things in the learning process. Besides, the distribution of questionnaires and focus group discussions was carried out to discuss the difficulties and obstacles in applying the scientific approach.

Indicators of the implementation of the scientific process refer to the curriculum 2013, namely: observing, questioning, experimenting, analyzing, and communicating.. Indicators of student activity in learning are taken from indicators developed by Syamsuri and Ibrohim, [15], namely: (1) Interaction between students, (2) Interaction of students with teachers, (3) Interaction of students with media/learning resources, (4) Interaction of students with other environments, (5) Times when students are inactive, (6) valuable experience for observers. Indicator of scientific approach obstacle were (1) Lack of equipment, (2) Lack of lesson hours, (3) Large number of students, (4) Students' disciplinary problems during lessons, (5) Lack of time preparation for national examination, (6) Lack of time preparation for national and entrance examinations to higher schools.

The data in this study were analyzed in a descriptive qualitative approach to describe the development of teacher competency in learning science through learning lessons. Data analysis

techniques using the Miles and Huberman models, namely data reduction, data display, conclusion drawing, and verification.

3. Results

3.1. Plan

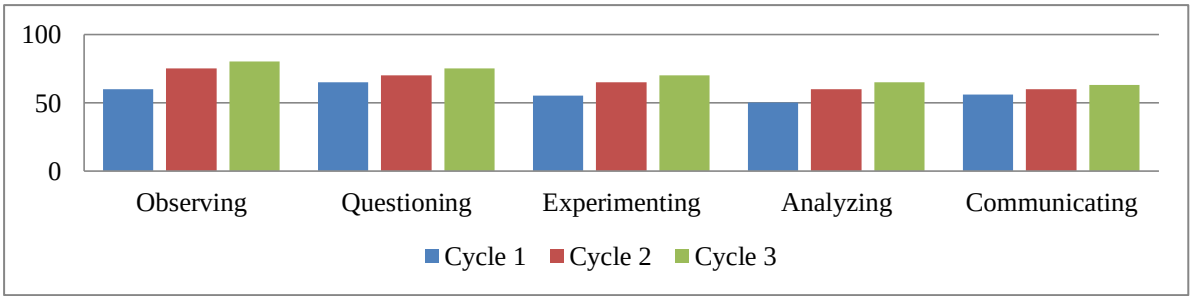
At this stage, the lesson study participants gather to discuss the learning tools that will be applied to the next year. The profile of the learning implementation plan produced in each package is by table 1.

Table 1. The Profile of The Learning Implementation Plan

Aspect	Description
Goal	Through learning activities using the Problem Based Learning model that guides students to observe (read) the problem, write down the solution and present the results in front of the class.
Topic	Classification of Living Things
Approach	Scientific
Method	Group discussions, questions, and answers, assignments
Model	Problem Based Learning 1. Orientation 2. Organizing learning activities 3. Guiding independent and group investigations 4. Develop and present the work 5. Analyze and evaluate the problem-solving process
Distinction	Integration of character values and 4C skills (*critics, creative, collaborative, dan communication*)
Problem Solving	adapted to the sub-theme
Evaluation	Instruments of spiritual attitude, social attitude, knowledge, and skills
Instrument	Self-assessment, peer assessment, written test, performance pick test, and portfolio

3.2. Do and See (Reflection)

At the *do* (implementation) stage, the model teacher implements a learning implementation plan that has been prepared in class. Other participants made observations using the prepared observation sheets and other necessary tools. These observers noted positive and negative things in the learning process, especially in terms of student behavior. Besides, a photo recording was made to photograph special events (to the teacher or student) during the learning process. The results of this recording are used as authentic evidence of events that need to be discussed in the reflection phase of implementation. The results of the analysis of the implementation of the scientific process on the problem-based learning model are shown in graph 1. The Reflection Phase is carried out to thoroughly review the actions that have been taken based on the data that has been collected, then evaluated to perfect the next plan of action.



Graph 1. Implementation of Scientific Processes in The Problem Based Learning Model

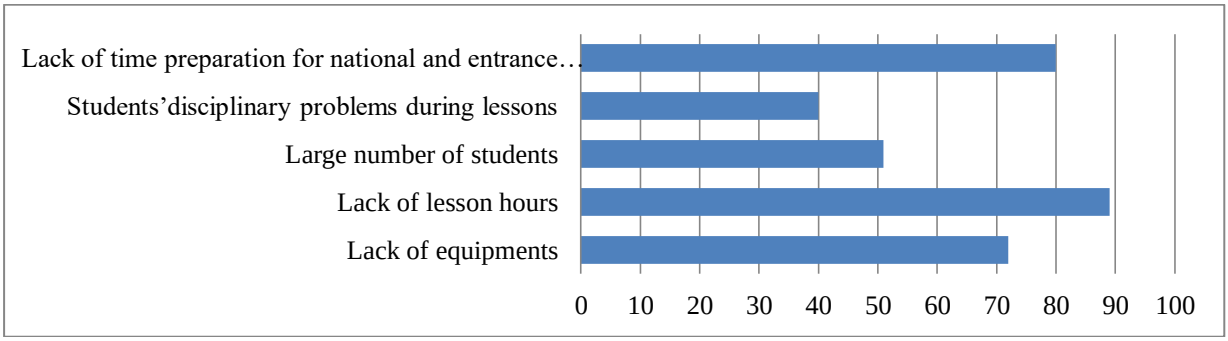
3.3. Obstacles of Implementation Lesson Study

The implementation of Lesson Study in STSM of Palangka Raya City is not carried out continuously every year because it is constrained by the motivation and awareness of STSM of Palangka Raya members still low to improve teaching competence through lesson study, especially for foundation / private science teachers not so interested in do that because there are no demands for promotion and self-development. It was also constrained by each teacher being busy teaching and it was difficult to gather often in one week.

The constraints faced in implementing lesson studies at STSM of Palangka Raya can be identified as follows. (1) The teacher views lesson study activities as less important. (2) Fear of being a model teacher, some teachers in a meeting with STSM of Palangkaraya City were not willing to participate because they were afraid to become model teachers. (3) Time limitations, and (4) The distance between schools was too far.

3.4. Obstacles of Implementation Scientific Approach

Although the teacher believes that a scientific approach was very important to empower students' scientific literacy and to achieve learning goals in the affective, cognitive, and psychomotor domains, teachers tend to be reluctant to apply them in the learning process. The results of the analysis of the obstacles of junior high school teachers in applying the scientific approach are shown in graph 2.



Graph 2. Junior High School Science Teacher Response on Obstacles of Scientific Approach Implementation

4. Discussion

4.1. Implementation of lesson studies and their constraints

The plan in this lesson study begins with the identification of the problem and discussion of the solution to its planning, then compiled and packaged in a learning tool consisting of 1) Learning Implementation Plan, 2) Student Worksheet, 3) Media or teaching aids learning, 4) instruments for evaluating learning processes and outcomes. The learning implementation plan produced by each cycle was improved based on the suggestions from the lesson study members. Based on observations conducted by researchers during the learning process the teacher model tried to turn on the classroom atmosphere so that students played an active role in the learning process. Teacher model provided opportunities for students to observe the picture. Furthermore, the teacher model provides the opportunity for students to ask questions to the teacher model. In addition, the teacher model also provided an opportunity for students to answer the questions raised by the teacher model. The teacher model succeeded in enlivening the classroom atmosphere by making students active in the learning process. This showed that the teacher model received input from the other lesson study teacher participants during the discussion in the reflection stage.

Based on the analysis of the implementation of lesson studies for three cycles an increase in the progress of the teacher's ability to implement scientific-based learning models, especially in the

problem-based learning model. Problem based learning models through lesson study helped teachers to develop a set of learning tools and provide better learning. [16] Lesson studies can increase teacher professionalism. [17] Besides, student activities in learning appeared to be more active, both in the form of interactions with fellow students, with teachers and with media/learning resources. Learning by using Problem Based Learning models through contextual approaches based on Lesson Study can be used as input for teachers to create creative learning to be able to develop students' thinking abilities. [18]

Thus, it can be said that lesson study is alternative guidance for the teaching profession through collaborative and ongoing activities. [19] The principle of collaboration will facilitate teachers to build effective and efficient learning communities, while the sustainable principle will provide opportunities for teachers to become lifelong learning communities. [20; 21] The impact felt by the teacher after implementing the lesson study program was the increased ability of pedagogical competencies. Teachers were more innovative with learning methods that were more varied and more relevant to students' ability levels. [22] For students the lesson study program causes an increase in understanding of the subject matter, increased student interest in the subject, increased motivation to learn, increased student activity in the learning process, no anxiety, students are happy, dare to ask, more confident, can work together with other students with groups or across groups, a sense of ego was reduced, an increase in the effectiveness of learning outcomes, and there was satisfaction in learning. Schipper, Goei, de Vries, & van Veen [23] research shows that lesson study is an effective method in developing teacher competencies. Ngang & Sam [24] shows that there are changes that occur in these schools before and after the lesson study cycle is done because the teacher uses alternative methods and strategies that are good for teaching, supporting students' ideas, helping and correcting their mistakes. respectively, promoting professional growth.

Besides lesson study has an impact on improving teacher pedagogical competence, but several obstacles often become obstacles to the successful implementation of lesson study, namely:

1) Looking at lesson study activities as less important

In the case of this study, although the STSM of Palangka Raya responded, it was not followed up consistently. Lesson study is seen as less important because the teacher does not understand deeply the philosophy and meaning and benefits of lesson study. To make teachers aware of the importance of lesson study requires educative approaches and policy-making authorities such as the involvement of education officials, school principals, school supervisors to motivate and reward those involved in the form of certificates for active participants. The role of the principal includes support in the implementation, assistance, and funding of lesson study activities. The role of the head of the office includes the provision of training and certificates for teachers, approving the use of school operational funds for lesson study programs.

2) Fear of being a teacher model

Some teachers in a meeting with STSM of Palangkaraya City were not willing to participate because they were afraid to become teacher model. The teacher is accustomed to teaching by himself and was not observed by others so that he feels embarrassed or nervous when someone observes. To anticipate this, clarification was made that the model teacher only carried out learning by the learning syntax agreed upon at the time of the plan. The important object that is the focus of observation is the aspect of the student's reaction to the teacher's instruction in applying the model. The aspects of the reaction are the interaction of students with students, student interactions with teachers, student interactions with media/ learning resources, student interactions with other environments. The ability of teachers to apply the learning model is observed on the side of the syntax of problem-based learning models and learning of teacher innovations in maintaining student motivation to remain actively involved in learning from beginning to end.

3) Time constraints

In general, civil servant teachers and private teachers who have been certified teach 24 hours of lessons per week so that the opportunity to take part in lesson study activities is not the main focus but time is used to fulfill teaching hours. To overcome this, teachers are required to use Sunday vacation

time to participate in the plan, but this solution is difficult to implement because vacation time is family time. Another alternative is the principal's policy not to schedule teaching hours on certain days simultaneously for lesson study participants and teachers assigned to attend lesson study activities on that day.

4) The distance between schools is too far

Sciences teachers of Palangkaraya Junior High School were less motivated to take part in lesson study activities because the distance between one school and another is too far. Long distances require time, energy, and high transportation costs to attend lesson study activities every week. To overcome this, the school should allocate transportation funds for lesson study participants.

4.2. Obstacle in Implementing Scientific Approach to The Curriculum 2013

Although the results of the lesson study show the increase in pedagogical competence in applying the problem-based learning model using science approach as shown in graph 1, the teacher model is reluctant to do it in every learning process with the main reasons being (1) Lack of lesson hours, (2) Lack of time preparation for national and entrance examinations to higher schools. The obstacle of lack of equipment, large numbers of students and students' disciplinary problems during lessons can be overcome during the learning process. Running out of time in carrying out the process of conducting experiments is sometimes difficult to control even more so if the problem-solving process is open-ended and students free to construct their problem-solving solutions.

This process requires a long time so that the material learning target was sometimes not achieved optimally. On the other hand, teachers are required to achieve the target of all materials for the preparation of the national final examination and entrance tests for higher education. To address this, teachers prefer to use the direct learning model to maximize the delivery of concepts and practice questions so that students are accustomed to answering national exam preparation questions. Of course, this causes an imbalance in the realm of attitudes, cognitive, and psychomotor competencies. The cognitive domain received high attention in learning because of the demands of the Indonesian government policy which only tested the cognitive domain as a national graduation requirement. So between the policies of applying a scientific approach to increasing student literacy, however, it conflicts with policies that determine student graduation through national exams only on cognitive aspects.

The obstacels faced by the teachers lesson plans are still not referring to the Curriculum 2013: (1) application of learning the scientific approach by teachers less than optimal, (2) teachers are less than optimal in applying the learning model, and (3) teachers are not optimal assess student learning outcomes that cover three domains of learning that is the attitude, knowledge, and skills. Yesildag & Kinger [25], has found the problems of implementing a scientific approach using the argumentation-based science inquiry that was questioning, classroom interaction, classroom management, and accessing resources and equipment.

Time obstacles in implementing learning: difficulties related to learning tools, and difficulty activating students and grading systems are complicated and take a long time to prepare reports. This difficulty is also even more experienced by science teachers in implementing integrated science learning. [26] The amount of time spent doing scientific activities was due to the lack of guidelines for problem-solving because students are required to think creatively themselves to find solutions and problem-solving plans. Minimally guided instruction was less effective and less efficient than instructional approaches that place a strong emphasis on the guidance of the student learning process. The guidance begins to recede only when learners have sufficiently high prior knowledge to provide "internal" guidance.[27] To overcome the obstacle of obstruction instruction, the teacher should include quality teachers, collaboration, and sustained professional development. [28]

Ogura [29] reports two important weaknesses of teaching inquiry-based science in Japan that (1) Lack of lesson hours was the most difficult obstacle for high-school teachers. (2) lack of time due to preparation for the entrance examination to university. To overcome this, Japan allocates one year after graduating from Senior High School for university entrance preparation courses.[30] It was

different from the Philippines carrying out the revolution of primary and secondary education with the policy of extending the junior secondary time to 4 years and reducing senior high school time to 2 years.[31]

5. Conclusion

Lesson study through a problem-based learning model has an impact on increasing teacher pedagogical competence and increasing student activity in the learning process. The main obstacle for the science teacher in applying the scientific approach to the curriculum 2013 is that learning the scientific process requires so much time, especially at the experimental stage. Besides, teachers are also afraid of running out of time to achieve the learning material target to prepare the national exams and higher education entrance exams. To maximize the implementation of the scientific approach, the government should review national examination policies that only measure cognitive aspects and they should provide a special time to face higher education entrance exams (reflection on the education system in Japan).

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