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The Implementation of Lesson Study in Teaching Mathematics in Region 3 Cluster XI South Palu

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Abstract

This research is a descriptive study with a qualitative approach, which aims to describe the application of Lesson Study in mathematics learning to teachers and students in Region 3 Cluster XI Palu Selatan. Lesson Study is effectively applied in learning mathematics. This can be proven from the results of interviews which explain that the application of lesson study in learning mathematics can be understood by most of the teachers who are members of the 3 Cluster XI area of South Palu. In addition, the results obtained in the activity plan are lesson plans, media used in learning, learning modules, and observation sheets. In the activities carried out, there are three important activities, namely the activities of the teacher carrying out mathematics learning in mixed arithmetic operations, observers observing learning, and students in learning. In the listening activity, the model teacher starts the discussion by conveying his impressions, experiences, and opinions about the implementation of the learning he has carried out.

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Introduction

Many efforts have been made to improve the teaching and learning process of mathematics in schools, but it cannot be denied that there are still obstacles faced in the implementation process such as the difficulty of students understanding the lessons presented. Similar to what happened in grade IV SD Inpres Palupi Paluit obtained an illustration that the learning process, especially in understanding the concept of mixed arithmetic operations, turned out that students did not really understand and master the material well.

Attention to the education system in schools is classified as not paying attention to the evaluation system and the learning process that takes place in the classroom. In line with this statement, the results of observations and interviews with teachers at the Teacher Working Group show that: (1) the teacher has not been fully able to put the idea of implementing learning in accordance with the 2013 Curriculum into lesson plan because most teachers use existing lesson plans, (2) teachers cannot describe the material that is in accordance with Main Competence and Basic Competence and (3) the teacher has not been able to manage the learning implementation time which can cover every learning process in the scientific approach in the 2013 Curriculum. Therefore, the teacher has an important role in designing learning that can meet the demands of teaching mathematics. The demands of curriculum development also require teachers to provide memorable and interesting learning in accordance with established process standards. High-quality learning is the key to educational improvement in realizing the essential features of strong professional learning (Suratno 2012).

One of the activities to improve the learning process with Lesson Study, According to Rusman (2011), Lesson Study is an effort to foster the teaching profession through collaborative and continuous learning studies based on the principles of peer-to-peer cooperation to build a learning deliberation. Lesson studies can be used as a bridge to pursue the ideal learning process as stated in the National Education Standards.

Lewis (2002) states that the ideas contained in lesson study are actually short and simple "if the teacher wants to improve learning, one of the best ways is to collaborate with other teachers to design, observe and reflect on the learning to be carried out".

Lesson Study activities are very suitable to be applied in Cluster XI, South Palu Region because at every meeting held every month by mathematics teachers in Cluster XI, Lesson Study has never been applied. According to Wulandari (2016), "the application of Lesson study can be chosen as an alternative that can be used to improve teacher professionalism which has an impact on improving the quality of the learning process". It is the same with Rif'at et al. (2015) who stated that the implementation of lesson study can improve teaching skills.

So far, the teacher has discussed the learning approach, the procedure for designing lesson plans, the making of exam questions, but they have never tried to collaborate in evaluating the teaching methods of each teacher. Chandrasari et al. (2015) argued that, in implementing Lesson Study, the teacher collaboratively and continuously implements, observes, then reports learning results, with collaborative learning, the teacher can find out their weaknesses and strengths of himself in terms of teaching so that the teacher will always want to fix himself in the future. be better. The learning process with Lesson Study requires all learning members to be able to work collaboratively with both teachers and students,

This paper presents the description of the researcher who conducted a study entitled the implementation of lesson study in teaching mathematics at Region 3 Cluster XI of South Palu.

Materials and Method

This research was conducted on elementary mathematics teachers who are members of Region 3 Cluster XI South Palu. The research time was planned for September 2020. Cluster XI was chosen as the research site because the researchers were members of the mathematics teacher association in the cluster. Meetings of Cluster XI are routinely held every week for 4 meetings based on the agreement of the members. The research schedule starts on 9 September 2020 plan activities, 21 September 2020 activities do meeting 1, 28 September 2020 activities do meeting 2, 5 October 2020 activities do meeting 3, 12 October 2020 activities do meeting 4, and 19 October 2020 activity see.

Research design

Descriptive research has work procedures including those shown by Elliot as a refinement of Kurt Lewin's model. Elliot (1991) suggests that a spiral cycle of action research consists of 1) identifying the initial idea (initial identification), 2) general planning, 3) developing the first step (Development of the first step), 4) implementing the first action steps (implementation of the first step), 5) monitoring/observation of implementation, 6) results, 7) evaluation includes an explanation of the success or failure of implementing the action, and 8) Revising General Idea (Revision of action planning at the next stage if it is still needed for improvement.

Research design and procedures

The following are the stages or steps for implementing the lesson study.

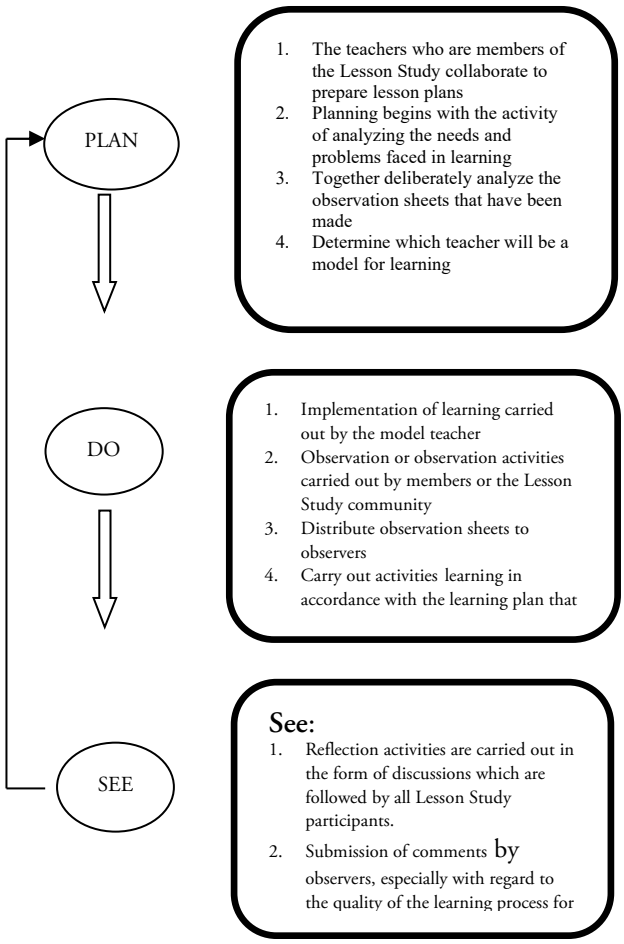

Figure 1. Following are the stages or steps for implementing the lesson study

Data source

Sources of data in this study are aspects related to the process of implementing lesson study in teaching mathematics mixed arithmetic operations material for mathematics teachers who are members of the 3rd Cluster XI, South Palu. Types of data in research are in the form of words, written sources or through video recordings, taking photos, and other documents.

Research steps

The steps for implementing this research were carried out following a flow of action which included the following activities:

1. Planning Stages (Plan)

a. The teachers who are members of the Lesson Study collaborate to prepare lesson plans with mixed arithmetic operations.
b. Planning begins with the activity of analyzing the needs and problems faced in learning, regarding basic competencies, how to teach students, anticipating lack of learning facilities and facilities, and so on, so that various real conditions can be used for learning purposes.
c. Together deliberately analyze the observation sheets that have been made.
d. Determine the teacher who will be the model for learning the mixed arithmetic operation material.

2. Implementation Stages (Do)

a. Learning implementation activities carried out by one of the teachers agreed to practice the lesson plans that had been prepared.
b. Observation or observation activities carried out by members or other Lesson Study communities who act as observers.
c. Distribute observation sheets to observers
d. Carry out learning activities in accordance with the learning plan that has been prepared.

3. Steps of Reflection

The third stage is a very important stage because efforts to improve the subsequent learning process will depend on the sharpness of the observation analysis on the implementation of the learning that has been carried out.

a. Reflection activities are carried out in the form of discussions which are followed by all Lesson Study participants.
b. Submission of comments by observers, especially with regard to the quality of the learning process for further improvement.

Data collection technique

In the data collection technique in this study, various techniques were used, namely interviews, observation, and documentation. The three techniques are used to obtain data and information that support and complement each other. The methods used in this qualitative research are:

1) Observation
Used to determine the learning process that applies lesson study in teaching mathematics. Observations are made by collaborators by filling in the observation sheets provided.
2) Interview
Interviews were conducted to determine the advantages and disadvantages of the learning process that had been carried out.
3) Documentation and video recording
Used to record the learning process carried out
4) Notes on observation results from collaborators
Used to record things that happen during the learning process, whether the teacher is aware of it or not. The results of these notes are used as material for discussion with collaborators.

Data analysis technique

Data analysis techniques used in qualitative research include transcripts of interview results, data reduction, analysis, data interpretation, and triangulation. From the results of the data analysis, conclusions can be drawn. The following are the data analysis techniques used by researchers:

1. Data reduction

According to Sugiyono (2013), data reduction means summarizing, selecting the main things, focusing on important things, and looking for themes and patterns.

Data reduction begins when the researcher focuses on the research area, the implementation of workshops, the implementation of plan activities, the implementation of learning carried out by the model teacher, and finally on reflection activities (see).

2. Presentation of data

The presentation of data can be done in several forms. According to Sugiyono (2013), in qualitative research, data presentation can be done in the form of brief descriptions, charts, relationships between categories, flowcharts, and the like.

3. Draw a conclusion

The third analysis activity is to draw conclusions and verification. “Final” conclusions will emerge depending on the size of the field record collections, their coding, storage, and retrieval methods used, the ability of the researcher, and the donor's demands, but often these conclusions have often been predefined from the start.

Data validity

Qualitative research must reveal objective truths. Therefore, the validity of the data in a qualitative study is very important. Through data validity, qualitative research confidence can be achieved. Triangulation is a data validity checking technique that utilizes something other than the data for checking purposes or as a comparison to the data (Moleong, 2007). In this study, triangulation of sources will be used by comparing and checking back the degree of confidence of information obtained through different data sources with the

same focus, data sources in this study by conducting interviews, observation, and data documentation. Interviews were conducted with teachers who are members of the Teacher Working Group of Region 3 Cluster XI South Palu. Furthermore, observations are made in activities *lesson study starting* from the plan, do, and see stages. Then the data documentation is obtained from the syllabus and learning process plan (lesson plan).

Results and Discussion

Plan activities

The lesson planning for open lessons is first discussed in a workshop activity. At this stage, the researcher coordinates with the teachers who are members of the lesson study activities to jointly conduct discussions regarding the implementation of the learning process. The teachers share ideas, ideas, and opinions about the material to be taught and plan activities that will be carried out later during the learning process in class.

Do activity

In the implementation of learning activities with lesson study, both model teachers and observers begin to carry out their respective tasks. In this study, the model teacher was tasked with carrying out learning in accordance with the learning implementation plan agreed upon in the previous planning activities. Observers are tasked with observing everything that happens during the learning process from beginning to end. According to (Saiful et al., 2018), qualified teachers are those who are best able to help their students learn and have deep mastery of subject matter and pedagogy. Furthermore, the results of research conducted by Murtisal (2016) show that the application of lesson study in increasing teacher pedagogical competence is a means of improving the quality of learning and increasing the quality of teacher resources.

Learning implementation activities with lesson study are carried out in four meetings. The first meeting was held on September 21, 2020, for the material for the counting operations of addition and subtraction, the second meeting was held on September 28, 2020, for the material on the operations of counting the counts of addition and subtraction, the third meeting on October 5, 2020, and the fourth meeting on October 12, 2020, the material at the meeting of three and four is the operation of counting mixed numbers (addition, subtraction, division, and multiplication). However, at the fourth meeting, the questions were discussed in the form of story questions.

Analysis of data on the results of the observation of the lesson study process

Table 1. Data analysis of observation results

Stages	Type of activity	Result
Plan	The teachers who are members of the Lesson Study collaborate to prepare lesson plans with mixed arithmetic operations	lesson plan with the main material of mixed calculation operations
	Planning begins with the activity of analyzing the needs and problems faced in learning	overcome the lack of learning facilities such as the use of simple teaching aids
	Together deliberately analyze the observation sheets that have been made	Observation sheet for the implementation of lesson study
	Determine which teacher will be a model for learning	Implement learning or model teacher
Do	Learning implementation activities carried out by one of the teachers	Model teacher practices lesson plans in class
	Observation or observation activities carried out by members or other Lesson Study communities who act as observers	Observation results
	Distribute observation sheets to observers	Observation results
	Carry out learning activities in accordance with the learning plan that has been prepared	Learning documentation
See	Reflection activities are carried out in the form of discussions which are followed by all Lesson Study participants	The results of reflection by the model teacher
	Submission of comments by observers, especially with regard to the quality of the learning process for further improvement	The result of reflection by observers

See activity

This stage aims to find the advantages and disadvantages of implementing the learning that has been implemented. The model teacher as an object begins the discussion by conveying the impression

of experience, constraints, and an opinion regarding the implementation of learning that has been implemented. Furthermore, the opportunity for observers to explain the activities of the students they observed and then gave input to the model teacher in the form of solutions, criticisms, and suggestions conveyed in good language and wisely without humiliating and hurting the model teacher. Based on all the input, the teachers can design a better next lesson.

The results of reflection can be obtained from several new knowledge or important decisions for improvement and enhancement of the learning process, both at the individual and managerial levels. At the individual level, the various findings and valuable input that were delivered during the discussion in the reflection stage (check) would certainly be an asset for teachers, both acting as teachers and observers, to develop the learning process in a better direction. At the managerial level, with the direct involvement of the principal as a participant in the lesson study, of course, the principal will get a number of valuable inputs for the benefit of developing education management in his school as a whole Murtiani et. al. (2012).

Discussion on the implementation of lesson study

Several phases of the activities carried out in the lesson study, such as planning and lesson preparation (plan), implementing learning in the form of open lessons (do), and learning reflection (see) are a series of activities that are usually carried out by a teacher in his daily life. Behind all of this, there are other things that teachers do not normally do, namely working collaboratively to do them all.

Based on the activity evaluation, teacher motivation in the lesson study activities was felt to be very high. First, their attendance at every meeting that was held, either in planning or in the plan, almost reached 100%. Second, teachers' participation in every discussion opportunity shows that they are serious about carrying out this activity, especially in expressing experiences, responses, and input/suggestions, as well as asking questions when faced with things that are not clear or do not understand. Third, their seriousness in preparing and implementing the plan.

Learning activities that were jointly observed, analyzed, and discussed by the team were prepared by showing all their potential. Finally, the wishes of the participants that this activity should be continued, the teachers are of the opinion that lesson study activities like this actually have to be carried out continuously. This is what teachers really need, not activities such as training that have no follow-up.

Lesson study activities are felt by the teachers as activities that are truly beneficial. The same is the case with research conducted by Ciptianingsari (2016) which states that the competence of students as prospective mathematics teachers in preparing lesson plans and practicing their learning increases. The lesson study activities are collaborative activities carried out by teachers starting with lesson planning. The learning plan is compiled together by paying attention to the potential that is owned, existing shortcomings, the right context or theme, media, materials, scenarios/learning paths, and efforts so that learning can take place effectively and efficiently. The preparation and review of lesson plans like this is rarely or never done before. Assessment activities like this will build teacher competence in designing the implementation of learning. From the learning designs that have been compiled and discussed collaboratively, in the lesson study activities, the implementation of learning is carried out through Plan.

In Plan activities, one of the teachers must become a model teacher and carry out the learning implementation according to the plan that has been compiled together. All lesson study participants will act as observers in Plan activities. This is what encourages model teachers to carry out learning as well as possible.

The next stage that must be done in the lesson study activities is reflection. In this section learning activities that have been carried out openly will discuss their strengths, weaknesses, things that should be done, things that should not be done, suggestions, and other things related to the learning that has been and or will be done. The readiness of the model teacher in conducting self-evaluation, and receive input, suggestions, or criticism is needed by a lesson study participant teacher.

From the overall lesson study activities that have been carried out, it can be concluded that all participants took the activities seriously and showed high dedication in carrying out all lesson study activities.

Discussion of interview results

Lesson Study is an activity that can improve the quality of teachers in carrying out learning. For teachers, lesson study is new because there has been no previous implementation of this activity. Therefore, researchers are tasked with explaining an overview of lesson study activities. With the implementation of this lesson study, the teachers involved will learn new things about how to teach properly. To find out the teachers' knowledge about the implementation of lesson study, an interview was conducted after the reflection (See).

The interview in this study was a structured interview because the interview questions had been compiled and discussed with the lesson study team. Interviews were conducted with 3 teachers from different schools. The interview questions consisted of 8 items related to the implementation of the lesson study. Based on the results of the interviews which were presented in the research results, each teacher presented different statements according to their knowledge. Even so, the application of lesson study in teaching mathematics can be understood by most of the teachers who are members of Cluster XI in the South Palu region. This was also supported by the results of the evaluation record

format, where each interview subject gave a Good and Very Good assessment of the lesson study activities.

Discussion of student activities and results

The interaction between students and teachers during learning has shown good intensity. Students actively participate in learning, especially when involved in working on problems in groups and presenting the results of their work. This is in accordance with the results of Siska's research which states that the implementation of a lesson study can increase motivation and learning outcomes.

Good communication between students and teachers makes the learning process more meaningful. The interactions that occur between students and students appear when they discuss working on questions, help each other and respond to each other in the question and answer process. The students looked enthusiastic when interacting with teaching materials. For them, the media provided by the teacher during learning is very interesting. Students' enthusiasm and interest in media are something that can make it easier for students to understand the material.

Basically lesson study is an open learning model, which is to bring observers into the class when the learning process takes place. The lesson study model focuses on how the learning process is in the classroom without neglecting student learning outcomes because learning outcomes are an indicator of the success of a learning process itself. Based on the results of the analysis of the research data, it was found that classical student learning completeness had been achieved (Rismawati, 2017).

Based on the explanation above, lesson study is effectively used in teaching mathematics. This is also evidenced by the results of research conducted by Herman (2012) entitled improving the quality of primary school teaching mathematics through Lesson Study. This study found that lesson study was one of the most effective ways to improve the quality of basic mathematics teaching and learning through teacher professional development programs. Dudley (2013) states that the application of lesson study to teachers or a group of teachers can increase the ability of teachers to build and develop their abilities, so that the purpose of learning, namely teaching students, can be achieved. Furthermore, Rustono (2008) in his research "Improving the Ability of Students to Implement Learning Strategies Through Lesson Study" found that lesson study as a collaborative and collaborative teacher coaching model can be used as a model for tutoring by lecturers to students. In line with this, Marble (2007) shows that lesson study is one approach that can be taken to improve the skills of prospective science teachers in designing and delivering material, managing classes and managing student involvement, and evaluating student learning outcomes. Taking into account the facts above, it stands to reason that lesson study can be used as a strategy that can be used to improve teaching skills Tunnisa (2018).

Conclusions

Lesson study activities are carried out in 3 stages, namely planning (Plan), implementation (Do), and reflection (See). At the plan activity stage, a discussion was held starting with adjusting the material to the syllabus, then preparing lesson plans, learning modules, and compiling observation sheets. At the do activity stage, there are three important activities, namely the teacher's activities to carry out teaching mathematics in mixed arithmetic operations, observers observing learning, and students in learning. The model teacher carries out the learning in accordance with the lesson plan sequence and distributes modules. The observer observed the implementation of learning.

At the see activity stage, it aims to find the advantages and disadvantages of implementing the learning that has been implemented. The model teacher begins the discussion by conveying her impressions, experiences, opinions regarding the implementation of the learning she has carried out, and the obstacles faced such as (1) difficulty determining the right time to invite students to come to school in the current Covid-19 conditions, (3) There are still students who have not been able to do the questions correctly, especially in the story questions (2) there are still teachers who do not understand the lesson study when the interview is conducted. Furthermore, the opportunity for the observers to explain the activities of the students they observed was then provided input to the model teacher in the form of solutions, criticisms, and suggestions.

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