Lesson Study Based Contextual Mathematics Learning Quality in Elementary School of Selo Boyolali

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Abstract

The purpose of this study is to describe the increase of quality of lesson study based contextual Mathematics learning in elementary schools post mount Merapi eruption. This study uses qualitative approach. The site of the research was State Elementary School Selo 1 Boyolali. The teachers of class four in that school were used as model. Data were collected by observation, in depth interview, documentation, and test. The results of this study are: (1) the quality of the learning plan shows an average increase of 22:23%. 2) The quality of the learning process shows an average increase of 39.44%. 3) The quality of the learning evaluation shows an average increase of 39.44%. The conclusion is there is an increase in the quality of lesson study-based contextual Mathematicss learning in elementary school after the eruption of Merapi. By this, it means the students are involved in all three aspects of Mathematicss learning.

Keywords: contextual, elementary schools, learning quality, lesson study

Introduction

Implementing lesson study-based contextual Mathematics learning needs to consider and apply three principles of Cronbach and Snow (1979). First principle, interaction between ability and learning treatment is continued in a complex pattern and always affected by task variable, position, and situation. It means that in implementing lesson study-based contextual Mathematics learning needs to minimize bias from those variables. Second principle, structured learning environment is suitable for low-ability students; meanwhile flexible learning environment is suitable for clever students. Third principle, less-confident students tend to learn better in structured environment; conversely, independent students learn better in flexible situation. Besides those three principles above, the process of lesson study-based contextual Mathematics learning needs to consider characteristic: (1) Cooperation, (2) support each other, (3) fun, not boring, (4) passionate learning, (5) integrated learning, (6) use references from many sources, (7) active students, (8) sharing with friends, (9) critical students, creative teacher, (10) class wall and corridor are full of students' works (table, diagram, problem solving process), (11) report for parents is not only a rapport, but also students' works.

Mathematics learning approach in Elementary School of Selo Boyolali Subdistrict is mostly centered to the teacher. This is called as teaching activity, not learning activity. Teacher's domination in teaching is clearly seen from the method used namely preaching, tasking, and exercising. Sutama (2011: 28) states that Mathematics learning inneffective because (1) Mathematics learning tends to text-book oriented and abstract, and less connected to students' daily life, and (2) teacher is less in performing meaningful learning with fun strategy. Based on that background, it would be wise if teacher focuses learning management with appropiate strategy namely developing lesson study-based contextual learning. Contextual learning can stimulate children's knowledge in responding to the environment (Johnson, 2009: 15). Lesson study is a model in teacher's creation through collaborative and continuity learning study based on collegiality mutual learning principles to build learning community(Susilo, dkk., 2009: vi). In general, this third year research is aimed to analyze and testify the effectiveness of developing lesson study-based (LS) contextual Mathematics learning. Specifically, one of the aims is to describe the quality increase of lesson study-based contextual Mathematics learning in school post Merapi eruption.

The quality of lesson study-based contextual Mathematics learning is observed from students' envolvement in (1) learning plan, (2) learning process, and (3) learning evaluation. The more a student involves in those three aspects, then there will be a better quality of lesson study-based (LS) contextual Mathematics learning.

Research Method

In general, based on its approach, this research uses qualitative research and development (Sutama, 2010). Place of research was Elementary School in Selo Boyolali Central Java. Subjects of research in model implementation (product assessment) were teachers and students of nine Elementary School post Merapi eruption in Selo Boyolali Central Java. Subjects of research in this paper were 36 students of class IV and teacher in Selo Boyolali Central Java. Data collection were done through observation, in depth interview, documentation, and test(Denzin dan Lincoln, 2009: 495). Data analysis techniques were done by doing comparative and flow method (Gall, Gall, and Borg, 2003: 402).

Research Result and Discussion

Management design of LS contextual Mathematics learning is developed through opening, core, and closing activities. Those three stages are formed in a peer learning group. Each meeting is 35 minutes divided into four parts namely 7 minutes for the opening, on the core activity are 9 minutes for concept development and 12 minutes for controlled and independent exercise, and 7 minutes for the closing activity. As Walmsley and Aaron Hickman (2007) state that learning design needs to consider individual difference in every meeting. Students divided into several groups consist of 4 students. To reach optimum Mathematics learning process, students are grouped into small heterogenic group. Opening activity includes 1) conditioning, 2) homework review, 3) apperception, 4) motivation, and 5) understanding learning purpose. Conditioning activity means conditioning students to be ready to study by greeting, opening, making desk, praying, and checking students' presence and condition. Homework review means discussing essential and difficult task by giving chances to students to ask and get feedback. Apperception activity means connecting material will be discussed with materials that have been mastered by the students. Motivational activity means showing that the material given is useful in daily life. Meanwhile, understanding learning purpose activity means understanding material general description and activity process description will be performed.

Teacher's performance in various teacher and student' activity as subjects learning opening activity as explained above needs support such as work motivation, work discipline, competence, and principal's leadership. Susanto's research (2012) shows that teacher's performance is influenced by headmaster's leadership, competence, and teacher's work motivation. Wulan's research (2013) shows that teacher's performance related to teacher's work discipline. It means that teacher's performance in learning process in influenced by three factors namely 1) individual variable, 2) organizational variable, 3) psychological variable. The purpose of opening activity is fixing student's mistakes and understanding previous concept to make connection with next concept will be discussed through contextual framework. The research of Deen and Smith (2006) conclude that teacher can apply contextual learning strategy by connecting learning material with students' daily life. Thus, by applying those three variables, teacher has to develop students based on their potency, not only can adopt but also create and imitate.

Core activity includes concept development and application. Concept development stage means discussing teaching material through inductive strategy and using media and learning sources, and learning activity based on students' daily experience (contextual). It is supported by research of Ellis and Berry (2005). It states the best learning activity related to students' experience and interest. Thus, in order to conduct meaningful Mathematics earning, activity is opened with students' mastered material by brain and body movement altogether, teacher gives students chances to develop their potential, and teacher as a guide does not take the main role in learning. In creating fun learning, teacher applies tactics:1) performing friendly attitude, 2) preventing any disturbing act, 3) showing fair attitude to all students, 4) using many ways to manage students' behavior, 5) appreciating every different opinion, 6) emphasizing important parts, 7) helping students in difficulties, and 8) encouraging active students, appearing students' confidence, and creating conducive condition. Those tactics or teachers' style assume that, 1) students have freedom to develop themselves naturally, 2) students' interest is a motivation for all activities, and (3) teacher is a facilitator and doesn't take the main role in learning activity. Application stage discusses controlled and independent exercise. Controlled exercise is made on a small group consist of 4 students with various initial ability.

This exercise includes 1) giving clear exercise direction, 2) guiding and helping students' learning, 3) demanding students' responsibility, 4) appearing students' cooperation, and 5) appearing students' initiative in studying. Independent exercise includes: 1) personal communication showing warmness, 2) responding students' opinion, 3) guiding students in study, 4) encouraging students to create many things in study, and 5) appearing students' self-confidence. This research result is in line with Kocak, Bozan dan Isik (2009). They state that learning Mathematics in a group is better in understanding problems. Through work group, students can apply their understanding, not memorizing formula to develop their potential and testify their potency in independency. Closing activity includes reflection, conclusion, and advanced action. Reflection activity is reflecting things they have studied about 1) mastered material, 2) material has not mastered yet, 3) why they have not mastered the material, and 4) determining alternatives of the next action. Concluding activity means 1) directing students to make a summary, and 2) making clear summary that includes all learning material. Advanced activity means 1) evaluating students' learning result, 2) suggesting to re-study given material at home, 3) giving homework with its steps and 4) suggesting to study the next material before meeting in the next class. Teacher's activity in closing activity is influenced by professional competence. It is in line with the opinion of Yudani, Natajaya, dan Dantesa (2013); Barinto (2012); and Wahyudi (2010). They state that professional competence plays important role in increasing teacher's performance. Research result of Ayu, Susilawati, and Patonah (2011); Udiyono (2011); and Apriyani (2009) also conclude that there is a significant role between professional competence and teacher's performance. It means that one of alternatives in increasing teacher's performance is by optimizing teacher's professional competence. This optimalization includes wide and in-depth material mastery and developing professionalism through reflective action.

In general, the design of LS-based contextual Mathematics learning is performed through many steps: 1) appropriate with students' daily life, student's thought is developed by doing meaningful learning activities (changing paradigm that learning is an obligation into learning as needs, 2) performing guided inquiry activity for all given topics, 3) developing students' curiosity by appearing questions, 4) creating learning society through peer study group activity (discussion, question-answer, problem solving), 5) presenting model as learning example, such as model illustration and real media, 6) accustoming students to reflect every given learning activity (what already succeed, has not succeed, why it happened, and what is the next activity), and 7) doing assessment objectively, namely evaluating students' real ability. Those steps of LS-based contextual Mathematics learning are aimed to build Mathematics learning attitude. This learning attitude is prominently to have sensitivity toward situation and condition in students' environment so that they can understand and feel the phenomenon before they take decision. Li dan Yu (2009) state that a Mathematics teacher uses pedagogic knowledge in teaching can build learning attitude. Hansson (2010) gives effective learning direction namely 1) teacher provides appropriate condition for study, 2) students build their own knowledge, 3) relevant learning material. Based on these experts' opinion, it can be understood that Mathematics learning will be fun and meaningful if professional teacher as facilitator gives students opportunity to develop their potency.

LS-based contextual Mathematics learning quality can be seen from plan aspects. Student's involvement in determining and choosing learning sources needed increase from initial condition 44.44%, cycle 1 into 55.56%, and cycle II into 63.89%. Student's involvement in determining and providing learning media used increase from initial condition 36.11%, cycle 1 into 47.22%, and cycle II into 61.11%. All plan aspects of LS-based contextual Mathematics learning show 22.23% average increase. This result shows that students' positive attitude toward Mathematics learning increases and teacher's role as educator is succeed. Students' attitude toward Mathematics learning is student's point of view on Mathematics learning. This attitude includes happy feeling to Mathematics, willingness to learn, and awareness to Mathematics benefit. Teacher's role as educator related to thetask to help, give support, guide and control, and task related to give awareness to students about learning as needs and obey school's rules and life norms in family and society. LS-based contextual Mathematics learning quality can be seen from the increase of a better learning process aspects. Aspect of students' motivation to finish their task on time increases from initial condition 52.78%, cycle I into 72.22%, and cycle II into 83.33%. Aspect of self-experience learning increases from initial condition 38,89%, cycle I into 52.78%, and cycle II into 69.44%. Aspect of students' motivation to create conducive learning climate increases from initial condition 44.44%, cycle I into 55.56%, and cycle II into 75.00%. Aspect of students' involvement in giving question increases from initial condition 13.89%, cycle I into 41.67%, and cycle II into 66.67%. Aspect of students' involvement in solving problem during class increases from initial condition 19.44%, cycle I into 52.78%, and cycle II into 72.22%. In each learning, it tends to occur multi-direction interaction (evenly students' involvement).

All LS-based contextual Mathematics learning shows 39.44% average increase. It signs that all teachers in performing their role as student, administrator, and model are succeed in performing LS-based contextual Mathematics learning plan. Teacher role as student means that a teacher is demanded to add knowledge and skill in order to update their knowledge and skills. Knowledge and skill mastered are not only knowledge related to professional task development, but also social and humanity tasks. It is proved from learning result from cooperation with researchers. Teacher's role as an administrator means that a teacher is not merely as an educator but also as an administrator in education and teaching. Thus, a teacher is demanded to work regular administratively. All performance related to learning process need to be administrated well. It is proved from good teacher's plan, performance, and evaluation. Teacher's role as model means that a teacher can be a good example or role model for student. Teacher can be a role model in individual, spiritual, social attitude, and in choosing job in society. Teacher's role as a model inclusively applied by all teachers by creating conducive Mathematics learning climate and tend to do a fun multi-direction interaction. Based on this research, it can be seen that optimizing teacher's performance can be done by increasing teacher's motivation. Teachers have to be able to motivate themselves maximally in order to increase their abilities to perform their duties and functions. Ormrod (2008: 58) states that motivation is something energizing, directing, and defending attitude. Educational organization and problem solver have to consider aspects influencing teacher's motivation. Those aspects are wise and fair treatment, provided facilities, career support, and conducive work condition.

LS-based contextual Mathematics learning can be seen from a better increase in learning evaluation activity. Students' involvement aspect in doing exercises increases from initial condition 30.56%, cycle I into 72.22%, and cycle II into 86.11%. Students' willingness to accomplish learning result report-aspect increases from initial condition 8.33%, cycle I into 63.89%, and cycle II into 88.89%. Students' complete study achievement aspect increases from initial condition 13.89%, cycle I into 77.78%, and cycle II into 83.33%. All evaluation aspects of LS-based contextual Mathematics learning show 39.44% average increase. This result shows that all partner teachers can make students competence in Mathematics learning. It is started from choosing learning strategy, media used, and how teachers behave in front of the students. By respecting each other, teachers can understand each student's ability. Thus, teachers can re-manage appropriate strategy for all students. In establishing students' competence in the classroom, all students are not treated the same, but treated based on their initial ability. Through initial ability, students will be easier to understand learning material optimally. Thus, students can feel the competence and be more responsible to their learning result. The increase of learning quality affects Mathematics learning result. Students' learning result in this result was collected from daily test result (in the end of each cycle). Minimum Mastery Criteria (MMC) of Mathematics in Class IV of Elementary School Selo Boyolali is 60. Mastered Mathematics learning result (more than or same as MMC) is illustrated in figure 1 below:

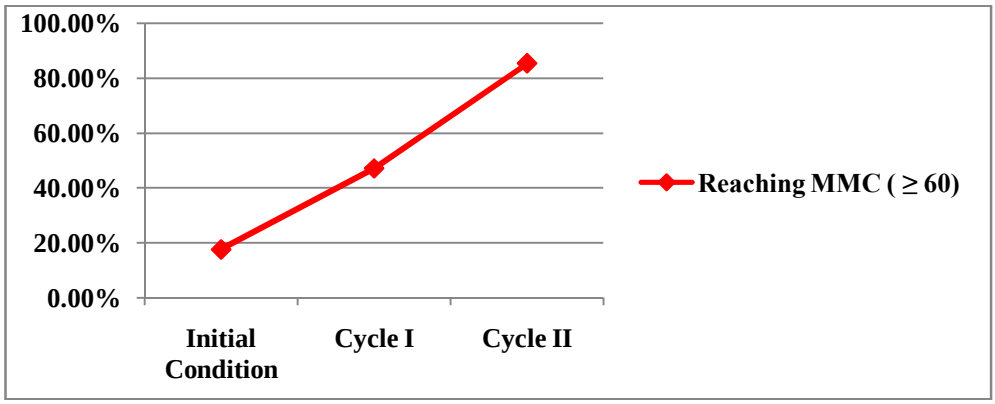

Figure 1. The increase of Mathematics learning

Initial conditions of Mathematics learning result are various. In learning process, students are rarely get learning material connected to daily life. Thus, students feel difficult facing complex problem. Tella (2007) states that well-motivated students tend to have an increase in academic achievement, compared to non-well motivated ones. In this research, students' Mathematics learning result is influenced by their Mathematic learning communicative attitude. Good Mathematics communicative students have good Mathematics learning result too.

In cycle I, there was an increase in students' Mathematics learning result. LS-based contextual Mathematics learning strategy gives students chances to deliver their ideas. Zaini (2010) states that there is an increase in Mathematics learning result in writing fraction symbols through discussion method. In this research, there was also an increase in students' ability in writing Mathematics ideas through group discussion. Students were able to write various symbols, notation, and Mathematics structure in solving problems contextually. In cycle II, teachers did remedial activity by placing students with high initial ability in every group, hoping that every group's ability will be the same. Teachers were able to make a climate where students willing to think and communicate about what they have got. Adedoyin (2010) concludes that there is a significant gender difference in teacher's questions toward Mathematics learning achievement. In this research, female students dominated the class more than male students. Many male students sometimes made noise in the discussion, and bored to Mathematics. Due to those factors, teachers made innovation in cycle II by rotating groups heterogeneously. It affected positively to students' behavior so their learning result increased.

Conclusion

There is an increase in lesson study-based contextual Mathematics learning in Elementary School post Mount Merapi eruption. 1) The quality of learning plan shows 22.23% average increase. 2) The quality of learning process shows 39.44% average increase. 3) The quality of learning evaluation shows 39.44% average increase. Lesson study-based contextual Mathematics learning is done through five stages. Stage 1) Student's orientation on problem situation. Stage 2) Organizing students to study. Tahap 3) Guiding individual and group investigation. Stage 4) Developing and presenting work result. Stage 5) Analyzing and evaluating problem solving process. The increase of learning quality affects increase of Mathematics learning result. The increase of Mathematics learning result is measured from students' mastered test score. The Minimum Mastered Criteria (MMC) for Mathematics in partner teachers' school is 60. We deliver our gratitude to DIKTI DP2M and KOPERTIS Area VI who already helped the fund of this multiyear research through Postgraduate Team Grant Research. Our gratitude to the Director of Postgraduate Program and the Head of Research Organization of Muhammadiyah University Surakarta and its staffs, who already facilitated and supported us in doing this research. Our gratitude also to the Head of UPTD, all headmasters and teachers of Elementary Schools Selo Boyolali, who helped this research process so it ran as planned.

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