

# The Quality of National Curriculum Lesson Study-Based Mathematic Learning Management in Junior High School

Sutama, Sabar Narimo, Samino, Meggy Novitasari, & Nugraheni Nur Janah  
 Graduate School Education Administration Magister  
 Universities Muhammadiyah Surakarta  
 Central Java, Indonesia  
 sutama@ums.ac.id

**Abstract—The aim of this research is to describe the increase of lesson study-based national curriculum mathematic learning management in Junior High School. In general, the research and development used mathematic teachers and students of eight Junior High Schools applying national curriculum in Salatiga Central Java, educational experts, and policy maker. Data collection techniques were observation, interview, documentation, and test. Data analyses were flow qualitative analysis and comparative techniques. Lesson study-based national curriculum mathematic learning management leads to an increase in quality. In learning plan aspects, there are 56,13% average increase in students' involvement indicator and 55,27% average increase in students' involvement in determining media. In learning process aspects, there are 55,63% average increase in students' motivational indicator, 51,83% average increase in self-experience learning, 53,83% average increase in students' willingness to create conducive situation indicator, 54,23% average increase in students' involvement in using learning sources indicator, 53,10% average increase in students' involvement in performing initiative shows, and 56,60% average increase in multi-direction interaction indicator. In learning evaluation aspects, there are 50,20% average increase in students' activeness in doing the tasks, 58,20% average increase in accomplishing learning result report, and 49,23% average increase in mastery learning result.**

**Keywords—**Management Quality; National Curriculum; Lesson Study; Mathematic Learning.

## I. INTRODUCTION

The changing of previous national curriculum is a government effort to develop and increase education quality, and in turn it is hoped will influence the increase of competitive and comparative Human Resources based on national and international standard. Education orientation is not merely on the human resources development, but also in developing human capability development. 2013 Curriculum (National Curriculum) is a government effort to develop education in Indonesia so it will not be left behind from other countries.

In national curriculum development process, learning syllabus and learning material are arranged, published, and sent to all target schools by Education and Culture Ministry to decrease teachers' burden and ensure its quality implementation. Before implementing national curriculum, teachers from target schools are trained and assisted. Education and Culture Ministry also compiles Learning Process Enforcement Handout, Evaluation Technical Guideline, and Learning Performance Plan Model (LPPM), and Learning Model Video by applying scientific learning approach. However, mathematic learning national curriculum implementation in Junior High School targets in Salatiga has not effective yet.

The first research result (Sutama, Narimo, and Samino, 2015) found that in national curriculum implementation there were three discrepancies of most mathematic teachers in Junior High School targets in Salatiga; 1) Method, learning activities, and evaluated aspects of LPPM management were varied from one teacher to others. 2) National curriculum mathematic learning implementation in Junior High School targets in Salatiga by using scientific approach was not optimum yet in room management and media usage to support Problem Based Learning (PBL), Discovery Learning (DL), and Project Based Learning (PjBL). 3) Mathematic learning evaluation management in affective aspect were performed by observation, teacher's journal, self-evaluation, and peer evaluation but it was not optimum yet. Evaluation management in cognitive aspect was performed by using written test, oral test, and task, but the questions were not challenging. Evaluation management in psychomotor aspect was performed by using work evaluation, project, and portfolio. It tended to be done in group.

Through reflective activity, research team and mathematic teachers discuss alternative solution to increase learning management quality and mathematic objectives to get optimum result. As offered alternative, mathematic learning management is aimed at creating a comfortable mathematic learning condition, related to LPMM, fun media and room, various learning materials, multi-direction interaction, and authentic learning evaluation. It would be wise to change the room management based on learning.

Various media management namely visual media and moving or static projection create motivation and concept mastery in

mathematic learning. Learning material management focuses on urgency, complexity, and material's depth will enable optimum learning result. Various learning material management will create the development student's reflective thought. Multi-direction interaction management makes a fun and conducive mathematic learning process and enables to reach an optimum learning result. Mathematic learning process and result evaluation authentically based on cognitive, affective, and psychomotor aspects also enable an optimum learning result.

Scientific approach in national curriculum mathematic learning stimulates students' knowledge in responding the environment. To strengthen scientific approach, mathematic teachers in research places can apply modified PBL, DL, or PjBL based on students' characteristic and its learning material. It is recommended in the first research reflection activity, by hoping that students get 1) qualified educational service, and 2) opportunity to express themselves freely, dynamically, and fun.

Qualified educational service can be seen from its learning and it can be performed if the teachers are professional in their main job. According to Utama, Narimo, and Haryoto (2013), lesson study is a model of founding teaching profession through collaborative and continual learning study based on collegiality mutual learning to build a learning community. It is appropriate with the national curriculum implementation principle i.e students have to get a qualified educational service and opportunity to express themselves freely, dynamically, and fun. Thus, lesson study can be understood as a strategy to develop teachers' professionalism and learning quality.

Activities performed in this collaborative lesson study is mathematic teachers in research places along with the research team collaboratively 1) studying curriculum, 2) design learning equipments and determining model teacher by turns suited with the teaching schedule, 3) model teacher performs teaching activity and partner teacher observes learning process, and 4) learning result reflection. Those activities are performed in cycle to manage qualified mathematic learning.

Mathematic learning management is inspired Ricky W. Griffin's management definition. Griffin defines that management is a process of planning, organizing, coordinating, and controlling resources to reach goals effectively and efficiently. Planning is a process of defining the goals of the organization, making strategies to reach the goals, and developing the plan of organization's work activities. Planning is the most important process among the management functions because without planning, the other functions-organizing, coordinating, and controlling will not be succeed.

Organizing is a process of formulating a strong and proper strategy and tactic in an organizational structure, and ensuring that all parties in the organization can work effectively and efficiently to reach the organization's goals. This organizing process is in inclusive learning management in planning, implementing, and evaluating.

Coordinating is process of implementing program so it can be performed by the whole parties in organization and motivates those parties to perform their responsibilities with high

productivity and awareness. In learning management, coordinating is called learning implementation.

Controlling is a process to ensure that all planned, organized, and implemented activities run as it is hoped even though there are many changes in business environment. In learning management, controlling is called learning evaluation.

Effective means the purpose can be reached based on plan. Efficient means works are performed correctly, organized, and on schedule. In learning management, effective and efficient are called learning management quality.

Based on management definition and the explanation above, qualified mathematic learning management in this article is a process of planning, implementing, and evaluating effective and efficient mathematic learning. In line with Utama (2011), lesson study-based mathematic learning quality in this research is observed from 1) qualified learning planning, 2) qualified learning process, and 3) qualified learning evaluation. Qualified mathematic learning planning is observed from the indicator of students' involvement in choosing resources and media used in mathematic learning. Qualified mathematic learning process is observed from indicator of well-motivated students, learning conductively and directly, and multi-direction interaction. Qualified mathematic learning evaluation is observed from indicator of students' activeness to do the task and submit learning result report, and the mathematic mastery learning.

Based on those explanations above, the main purpose of this article is to describe the increase of lesson study-based national curriculum mathematic learning management quality in Junior High Schools. The purpose of this article is taken from a part of research purpose of second year graduate team research performed by Utama, Narimo, and Samino (2016). Further, specifically, the purpose of this article are: 1) Describing lesson study-based national curriculum mathematic learning management quality in Junior High Schools in Salatiga, 2) Describing the increase of process quality in lesson study-based national curriculum mathematic learning management quality in Junior High Schools in Salatiga, and 3) Describing the increase of evaluation quality in lesson study-based national curriculum mathematic learning management quality in Junior High Schools in Salatiga.

## II. METHODOLOGY

This research, as a whole, used research and development approach. Research and development is process to develop a liable product (Sutama, 2012: 183; Gall, Gall, and Borg, 2003). This second year research used evaluative method.

The research was performed in 26 Junior High Schools in Salatiga Central Java. All Junior High Schools for initial exploration, eight Junior High Schools the second year research trial place and other sixteen Junior High Schools as learning implementation model developed in the third year research.

Teacher models chosen were from two state Junior High Schools and a private Junior High Schools of eight Junior High Schools. The research subjects were mathematic teachers and students of eight Junior High Schools in Salatiga Central Java.

The other research subjects were education experts and policy maker. Officials in Education, Youth and Sport Ministry (supervisor and Chief of Government Service) and Headmasters of Junior High Schools in Salatiga Central Java represented research subjects as the policy maker. Method and learning strategy experts, learning model developer, and figures with mathematic educational skills were chosen as the research subjects represented educational experts.

Data collection techniques were observation, interview, documentation, and test. (Denzin and Lincoln, 2009: 495). Data analysis was flow qualitative analysis and comparative techniques. (Flick, Kardorff, and Steinke, 2004: 266).

### III. RESULT AND DISCUSSION

Lesson study-based mathematic learning management in this research is a process of learning plan, implementation, and evaluation to reach the goals effectively and efficiently. Mathematic learning plan performed by the teachers in research schools based on lesson-study result is defining learning purpose, determining strategy to reach the goals, and developing learning activity plans.

Planning is the most important process among the management functions because without planning, the other functions-organizing, coordinating, and controlling will not be succeed. In accomplishing lesson study-based mathematic learning plan, it has to focus on principles (1) individual differences, (2) student's active participation, (3) centered to students, (4) reading and writing habit development, (5) giving feedback and reaction, (6) emphasizing in correlation and integration, (7) accommodation in integrated-thematic learning, and (8) communication and information technology application.

Students' individual differences are initial ability, intellectuality, aptitude, potential, passion, learning motivation, social ability, emotion, learning style, special needs, learning speed, cultural background, norms, value, and/or students' environment. Students' active participation is learning centered to students' activity, and teacher as it is meant to encourage students' motivation, creativity, initiative, inspiration, innovation, and independence. Development of students' culture or habit to read and write designed to develop reading habit and understand various reading sources, and express various writing. Giving feedback and reaction in learning plan is in the form of positive feedback, enforcement, and remedial. It is also emphasizing in the relation and integration of basic competence, learning material, learning activity, competency indicator, assessment, and learning sources in one integrated learning experience. It has to accommodate integrated-thematic learning, lesson integration, learning aspects, culture diversity, applying integrated, systematic, and effective information technology and information in line with the situation and condition.

Implementation of lesson study mathematic learning performed by teachers in research place is learning program implementation performed by teachers and students in a classroom or outside the classroom and process of motivating students so that they can have awareness liable and high

productivity. Learning implementation is an implementation of learning plan including introduction, discussion, and closing.

In the introduction, teachers have to (1) prepare students psychically and mentally to follow the learning process, (2) give motivation to students contextually appropriate to the benefit and application of learning material in daily life by giving examples and local, national, and international comparison, appropriate to students' characteristics, (3) give questions about the materials will be given related to prior, (4) explain the learning purpose or basic competence, and (5) state the purpose, materials and syllabus overview.

The main activity uses learning approach, strategy, method, and learning media and sources appropriate to students' characteristics and lesson. The approach is scientific approach by using discovery/inquiry learning, or project based learning to create a product appropriate to the competency characteristics.

Attitude competency and chosen alternative are affection process started from taking, accepting, understanding, until implementing. The whole competency stages encourage students to perform the activities.

Knowledge competencies are knowing, understanding, applying, analyzing, evaluating, until creating. To strengthen scientific approach, mathematic teachers in reasearch places apply discovery/inquiry learning. In encouraging students to create creative and contextual products, both individual and in group, it would be wise if they produce project-based learning products.

Skill competency is gained from observing, asking, associating, and creating process. The whole material of mathematic lesson has to encourage students' skill to observe and create things. To reach this goal, mathematic teachers apply discovery/inquiry learning and project based learning method.

In closing activity, teachers along the students, both individual and in group, do reflection to (1) evaluate whole activity and results gained and to find the direct and indirect benefit from the learning process, (2) give feedback toward learning process and learning result, (3) perform the next works both individual and in group, and (4) inform the next meeting learning activity.

Lesson study-based mathematic learning evaluation performed by teachers in research place are evaluating and measuring the set of affective, cognitive, and psychomotor competency to ensure the set of activity planned and implemented can run well although there are many changes in the educational environment. Learning process evaluation uses authentic assesment approach evaluates students' readiness, process, and learning result. The integration of those three components will describe capacity, power, and students' learning result will be able to produce instructional effect in cognitive aspect and nurturant effect in attitude aspect.

Teachers use authentic research result to plan learning remedial process, enrichment, and counseling service. Besides, authentic research result is used as a material to fix learning process suited to Educational Evaluation Standard. Learning process evaluation is performed in the learning process by using observation sheet, peer questioners, record, anecdote journal,

and reflections. Learning process evaluation is performed in and in the end of learning process by using method and equipments namely oral/attitude test and written test. The evaluation result is gained from the collaboration of process evaluation and learning result evaluation.

Effective means that the goals can be reached on time scheduled. Efficient means that the duty performed well, organized, and on scheduled. Thus, in turn, if lesson study-based mathematic learning management is applied suited to plan and evaluated authentically, gaining an optimum mathematic learning result is not merely a conceptual knowledge but also can involve problem solving process, heuristics, and meta cognitive aspects such as monitoring, creative thinking, curiosity, and zealous problem solving (Anggraeni, Sutama, and Samino, 2014).

Lesson study-based mathematic learning is implemented in many activities such as observing, watching, asking, listening, thinking, discussing, problem solving, demonstrating, and communicating things. Students’ activity in mathematic learning can be observed directly such as, asking, doing task, discussing, communicating; but there are also indirectly observed such listening and paying attention. Thus, lesson study-based mathematic learning quality is observed from the students’ involvement in (1) learning plan, (2) learning process, and (3) learning evaluation. The more students are involved in those three aspects, the better lesson study-based mathematic learning quality. The increase of lesson study-based mathematic learning quality is illustrated in Table 1.

Lesson Study-based Mathematic Learning Quality	State Junior High School 1 Salatiga (28 Students)			State Junior High School 6 Salatiga (30 Students)			Junior High School Kristen 2 Salatiga (23 Students)		
	Pre-Cycle	Cycle 1	Cycle 2	Pre-Cycle	Cycle 1	Cycle 2	Pre-Cycle	Cycle 1	Cycle 2
<b>1. Planning Aspects</b>									
a. Students’ involvement in choosing media	9 (32.10%)	16 (57.10%)	24 (85.70%)	8 (26.70%)	14 (46.70%)	25 (89.30%)	7 (30.40%)	17 (73.90%)	19 (82.60%)
b. Students’ involvement in determining and providing media	7 (25.00%)	13 (45.40%)	22 (78.60%)	6 (20.00%)	13 (43.30%)	24 (80.00%)	6 (26.10%)	16 (69.60%)	18 (78.30%)
<b>2. Learning Process Aspects</b>									
a. Students’ motivation	10 (35.70%)	18 (64.30%)	25 (89.30%)	9 (30.00%)	19 (63.30%)	26 (86.70%)	7 (30.40%)	18 (78.30%)	20 (87.00%)
b. Students learn directly	9 (32.10%)	15 (53.60%)	23 (82.10%)	8 (26.70%)	16 (53.30%)	24 (80.00%)	8 (34.80%)	17 (73.90%)	20 (87.00%)
c. Students’ willingness to create conducive learning climate	11 (39.30%)	18 (64.30%)	26 (92.90%)	10 (33.30%)	18 (60.00%)	28 (93.30%)	9 (39.10%)	18 (78.30%)	20 (87.00%)
d. Students’ involvement in using learning sources	9 (32.10%)	17 (60.70%)	25 (89.30%)	11 (36.70%)	19 (63.30%)	27 (90.00%)	8 (34.80%)	17 (73.90%)	20 (87.00%)
e. Students’ involvement in doing initiative	8 (28.60%)	15 (53.60%)	24 (85.70%)	7 (23.30%)	13 (43.30%)	22 (73.30%)	6 (26.10%)	15 (65.20%)	18 (78.30%)
f. Multi-direction interaction	7 (25.00%)	16 (57.10%)	25 (89.30%)	8 (26.70%)	15 (50.00%)	24 (80.00%)	5 (21.70%)	14 (60.90%)	17 (73.90%)
<b>3. Learning Evaluation Aspect</b>									

a. Students' involvement in doing tasks	11 (39.30%)	18 (64.30%)	27 (96.40%)	12 (40.00%)	19 (63.30%)	27 (90.00%)	10 (43.50%)	17 (73.90%)	20 (87.00%)
b. Students' willingness to compile learning result report	8 (28.60%)	16 (57.10%)	23 (82.10%)	6 (20.00%)	16 (53.30%)	28 (93.30%)	8 (34.80%)	18 (78.30%)	19 (82.60%)
c. Learning mastery	13 (46.40%)	18 (64.30%)	26 (92.90%)	12 (40.00%)	17 (56.70%)	28 (93.30%)	9 (39.10%)	17 (73.90%)	20 (87.00%)

Table 1. The Increase of Lesson Study-based Mathematic Learning Quality

From the planning aspect, the quality of lesson study-based mathematic learning management increased. Students' involvement indicator in choosing and determining learning sources was needed. State Junior High School 1 Salatiga increased 3.60%, State Junior High School 6 Salatiga increased 62.60%, and Junior High School Kristen 2 increased 52.20%. Students' involvement indicator in determining and providing learning media also increased. State Junior High School 1 Salatiga increased 53.60%, State Junior High School 6 Salatiga increased 60.00%, and Junior High School Kristen 2 increased 52.20%.

Planning aspects of lesson study-based mathematic learning showed 56.13% average increase in determining and choosing learning sources, Students' involvement in determining and providing media increased 55.27%. This result showed that students' positive attitude toward mathematic lesson increased and teachers' role as an educator successfully motivating students (Damayanti and Utama, 2016; Purwaningsih, Utama, and Narimo, 2013).

Students' attitude toward mathematic lesson is students' point of view about mathematic. This attitude includes a happy feeling about mathematic, willingness to learn, and awareness toward mathematic benefits. Teachers' role as an educator in giving task and encouragement, supervising and guiding, and making students discipline to make them aware that studying is a need. Teachers also have to remind them to obey rules and norms in society.

According to Martino and Zan (2009), building a mathematic learning attitude has to be done by teachers to students in learning. Attitude has a very important role for teachers and students in learning process. Li and Yu (2009) states that a mathematics teacher uses his pedagogic knowledge in teaching mathematic in order to build a learning attitude. Hansson (2010) gives guidelines for effective learning, namely a) teacher performs the suitable condition for learning mathematics to students, b) students build their own mathematic knowledge, c) relevant mathematic contents enable teachers to give materials fully or students build their own knowledge and attitude. In Utama (2011: 28-32), mathematic learning process is ineffective because of monotonous learning method, boring situation, students' unattractiveness toward teachers' explanation. Based on experts' opinion, it can be concluded that learning mathematic can be meaningful and fun if it is started with students'

positive attitude and independent toward mathematics, and teachers as a professional facilitator give students opportunity to develop their potential.

Learning independency also matters to mathematic learning process. Indarti (2014) states that learning independency is a strong courage to reach the aim without depending on other people. Strong courage here is self willingness, own choices, and self responsibility without others' help and being responsible toward his own decision. Through learning independency, students are aimed to think, act, and able to control himself.

Another factor influencing mathematic learning process is learning motivation. Majid (2013: 308) defines motivation as a positive energy causing a change in someone which can be seen in the emotion, feeling, and psycho symptom so that an individual can act or do something because of purpose, need, or desire to do something. It shows that motivation is the energy of every activity in order to reach the goals. The research shows that mathematic learning quality planning increases in the indicator of students' active involvement in planning with teacher as educator.

Teacher's role in motivating students relates to secondary encouragement including five aspects, namely (1) need for achievement, (2) need for power, (3) need for affiliation, (4) need for safety, and (5) need for self-actualization (Luthans, 2006: 273). Each will be explained below.

Willingness to take the task and self-responsibility show the need for achievement. He determines the purpose and takes responsibility by concerning the risk. He can do everything smartly, creatively, and innovatively. The need for achievement is measured from the indicator of (a) doing better than the rivals, (b) gaining something or passing difficult obstacles, (c) solving complex problems, (d) successfully finishing challenging task, (e) developing best way in doing something.

Someone who want to have control over other people, aware of influence structure between individuals, and tries to dominate others by controlling others' behavior, and always maintain his reputation and position show the need for power. There are some indicators of need for power, namely, (a) influencing other people to change behavior or attitude, (b) controlling other people's activities, (c) superior towards other

people, (d) controlling information and resources, (e) defeating enemies or rivals.

Friendship shows the need for affiliation. It can be measured from several indicators, namely (a) lovable and liked by many people, (b) accepted as a group or team member, (c) working with friendly or cooperative people, (d) defending a harmonious and less conflict-relationship, (e) participating in fun social activities.

The need for safety includes security and safety from learning accident, guarantee for the job/study, and guarantee for old days when they are no longer capable for working/studying. The need for safety can be measured from several indicators, namely (a) having a secure job/study, (b) protected from earning loss, (c) having health protection, (d) protected from physical disturbance or dangerous condition, and (e) avoiding risky job or decision.

Self actualization relates to someone's potential development process. This need shows someone's ability, skills, and potential. Need for self-actualization tends to increase because the person actualizes his behavior. Someone dominated by his needs will actualize himself, happy with job that challenges his skill and ability. Need for self-actualization has several indicators, namely (a) having ability, (b) having skill, and (c) having potential.

The better improvement in learning implementation process shows an increase in lesson study-based mathematic learning management quality. State Junior High School 1 increases 53.60%, State Junior High School 6 increases 56.70%, and Junior High School Kristen 2 increases 56.60%. Self-experience indicator of State Junior High School 1 increases 50.00 %, State Junior High School 6 increases 53.30%, and Junior High School Kristen 2 increases 52.20%. Students' willingness to create conducive learning climate indicator increases 53.60% in State Junior High School 1, 60.00% in State Junior High School 6, and 47.90% in Junior High School Kristen 2. Students' involvement in using material sources indicator increases 57.20% in State Junior High School 1, 53.30% in State Junior High School 6, and 52.20% in Junior High School Kristen. Students' involvement in performing initiative increases 57.10% in State Junior High School 1, 50.00% in State Junior High School 6, and 52.20% in Junior High School Kristen 2. Multi-direction interaction indicator increases 64.30% in State Junior High School 1, 53.30% in State Junior High School 6, and 52.20% in Junior High School Kristen.

Lesson study-based mathematic learning process aspects in each indicator show an increase. 1) Students' motivation to finish the task on time-indicator shows 55.63% average increase. 2) Self-experience indicator shows 51.83% average increase. 3) Students' willingness to create conducive learning climate shows 53.83% average increase. 4) Students' involvement in using learning sources- indicator shows 54.23% average increase. 5) Students' involvement in performing initiative- indicator shows 53.10 % average increase 6) Multi-direction interaction indicator shows 56.60 % average increase. These results indicate that lesson study-based mathematic learning planning successfully implemented

by partner teachers as a learner, administrator, facilitator, and model (Rahayu, Sutarna, and Narimo, 2014).

As a learner, teacher has to update his knowledge and skill. Mastering knowledge and skill is not merely knowledge related to professional duty development but also social and humanism duty. Teacher partners in collaboration with the researchers were able to apply it.

Teacher's role as an administrator means that teacher is not merely as an educator but also as an administrator in which he has to work administratively well. All learning process implementation need to be administrated well.

Teacher's task is not merely delivering information to students but also become a facilitator in giving learning assistant to the students in order to make them learn in a fun and enjoyable situation, enthusiastic, and brave to state their opinion. For that interest, coordinating conducive learning environment, and challenge students' curiosities are important in creating effective and efficient learning process. Creating a conducive, inspiring, and challenging yet fun learning process is not easy because it needs teacher's strategy and skill in arranging and implementing learning process inside and outside the class. There are many factors need to be created in order to create an effective and efficient learning such as arrangement of class physical and socio-physical environment.

Class physical arrangement influences students' participation and involvement in learning process. The main purpose of class physical arrangement is to direct students' activities and prevent unnecessary behavior through chairs, table, and other equipments arrangement. Class arrangement enables teacher to monitor students to prevent indiscipline behavior. By using class arrangement, students can focus more on the learning process.

Psycho-social relates to individual's relationship to teachers and to peers. A good relationship between teachers and students and students to students will create a healthy and psycho-social and effective learning process. Teachers' characteristic and students' social relation determined by teachers' characteristic and students' social relationship.

Teachers as a model means that teacher can be an example or model for students. Learning result in the form of behavior, spiritual, social behavior, and in choosing jobs can use teacher as the model. Teachers' role as a model inclusively applied to partner teachers by creating a multi-direction interaction and conducive mathematic learning.

Learning evaluation aspects show that there is an increase in lesson study-based mathematic learning management quality. Students' involvement in doing the task-indicator shows 57.10% in State Junior High School 1, 50.00% in State Junior High School 6, and 47.80% in Junior High School Kristen 2. Students' willingness to compile learning result increases 53.50% in State Junior High School 1, 73.30% in State Junior High School 6, and 47.80% Junior High School Kristen 2. Learning achievement mastery indicator increases 46.50% in State Junior High School 1, 53.30% in State Junior High School 6, and 47.90% Junior High School Kristen 2.

Lesson study-based mathematic learning evaluation aspects in each indicator shows an increase, 1) Students' involvement in doing the task shows 50.20% average increase, 2) Students' willingness to compile learning result shows 58.20% average increase, 3) Learning achievement mastery indicator shows 49.23% average increase. It proves that partner teachers can make students competent in learning mathematic. It is started by respecting each other, learning experience balance, encourage potential, inspiring, and creating learning.

By respecting each other, teacher can understand each students' abilities and arranging the appropriate strategy for them. In building students' competence in the classroom, the students have different treatment. By checking their initial ability, teachers can help students understand the lesson better. Students can feel the competencies and responsible with the learning result.

Students can have opportunity to make a learning experience balance by understanding, stating, and evaluating everything they have learnt. Learning experience also provides balance proportion between information giving and application. Reflecting the thought or performance is important in emphasizing the understanding. Reflection happens if understanding is communicated and reacted in the form of discussion. Reflection happens when the teacher asks a question, such as, "Why do you think that so?". Recalling that learning is a process of understanding by the students, then teacher needs to give a time for students to do the process. Giving opportunity to students in learning means giving opportunity to build their own ideas. Thus, students will master more lessons.

As a potential stimulator, teachers have to be able to multiply students' potential and develop them as their aspiration and ideas in the future. It is really important because teacher has a very important role in developing students optimally. Students' aptitude, ability, and potential will not develop optimally without other's help. In it, teacher needs to pay attention the students individually because each student is special. Thus, in developing students' potential and ability, they need special treatment also. Teachers also have to prepare the materials so that they can deliver it clearly and understandable.

As a learning inspiration, teacher has to be able to give inspiration to the students to stimulate various thoughts, and new ideas. Teacher can place himself as story teller. By using interesting stories, teachers can encourage students by giving many inspirations. Stories are good examples and measure instruments. By telling stories, people can observe and solve the problems, finding new ideas, and learn to appreciate their life after comparing what others' have in the past. Teachers try to find stories to stimulate ideas about future life. As a listener, students can identify the attitude of the characters, analyze, and understanding many events. Students can make those characters as the idol to encourage them reaching their dream.

Succeed or not, teachers play an important role in creating learning context based on syllabus and ability to apply it in learning process. Strategy and learning method designed by teachers may suit with the syllabus, but maybe it is not suitable

with students' abilities. Thus, it makes the learning process unsuccessful. Or, the strategy and method in learning are not applied effective although it is suited with the students' ability. Thus, teachers have to monitor and evaluate learning process performed, and modified it if is necessary so that learning process can be dynamic and contextual with students' development as explained before. If teachers can implement their roles, education process at school will produce smart, creative, innovative, and useful students.

#### IV. CONCLUSSIONS

There are three aspects in increasing lesson study-based mathematic learning management quality in Junior High School in Salatiga Central Java.

*First*, lesson study-based mathematic learning planning aspect in the indicator of students' involvement in choosing and determining learning sources shows 56.13% average increase. Students' involvement in determining and providing learning sources shows 55.27% average increase. It shows that students' positive behavior toward mathematic learning increases and teachers as educator succeed in giving motivation.

*Second*, lesson study-based mathematic learning aspects in each indicator show an increase. 1) Students' motivation in finishing task on scheduled shows 55.63% average increase. 2) Self-experience learning shows 51.83% average increase. 3) Students' willingness to create conducive learning climate shows 53.83% average increase. 4) Students' involvement in using learning sources shows 54.23% average increase. 5) Students' involvement in performing initiative shows 53.10 % average increase. 6) In multi-direction interaction indicator shows 56.60 % average increase. These results indicate that lesson study-based mathematic learning planning can be successfully implemented if partner teachers can perform their role as learners, administrators, facilitators, and as models.

*Third*, lesson study-based mathematic learning evaluation aspects in each indicator show an increase. 1) Students' involvement in doing the task 50.20 % average increase. 2) Students' willingness to compile learning result shows 58.20 % average increase. 3) Students' learning achievement mastery shows 49.23 % average increase. These results show that partner teachers can make students competent in mathematic learning. It is started from respecting each other, potential stimulation, giving inspiration, and creating learning.

#### V. ACKNOWLEDGMENT

We are thanking everyone supporting our research. We thank to Research and Society Submission, Directorate General of Research Enforcement and State Minister for Research and Technology, and Directorate General of Higher Education which have supported us in funding this multi-year research through Graduate Team Research Grant. We also thank to Graduate School Director and The Chief of Research Institution UMS and staff, for providing facilities and encouragement so that we can accomplish this research. We also thank to the Head of State Minister for Youth and Sport

Affairs, all headmasters, and mathematic teachers in Junior High School of Salatiga who have helped us in research process.

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