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Literature Study on the Impact of Mathematics Learning Implementation with Lesson Study for Learning Community (LSLC)

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ABSTRACT
This study aims to determine the impact of implementing mathematics learning with LSLC in schools so that it can be a consideration for teachers so that they can be applied in the next learning process. The research method used is a literacy study with a meta-analysis type of research. After analyzing, the implementation of LSLC in mathematics learning in schools has a good impact on mathematics learning itself. Collaborative learning appears in learning, mathematical concepts are easily understood by students, and indicators of mathematical processes appear in learning. Students are also more active because learning is centered on students, while the teacher only serves as a facilitator. Most of the findings explain the effectiveness of implementing LSLC in learning mathematics in schools. So, Research on the implementation of LSLC in learning mathematics in schools should be increased in order to reduce problems in learning mathematics.

Keywords: *Collaborative learning, LSLC, Literacy studies.*

1. INTRODUCTION

One of the major problems in education in Indonesia is the low quality of education. This is reflected in the low average learning achievement of students [1]. One of the main subjects that students must learn from basic education to higher education is Mathematics. In general mathematics has five objectives, namely: developing mathematical attitudes, gaining proficiency in the use of mathematical language, gaining insight into the applications of mathematics in other disciplines [2]. [3]explains that the mathematics curriculum basically focuses on two main domains of mathematics, namely numbers and geometry/spatial skills; intertwined in this domain are subthemes, such as selection and sorting, as well as mathematical processes such as communication, reasoning, representing and solving problems and mathematical wholes and specifics, such as numbers or shapes, compositions and patterns[3].

Mathematics is one of the subjects with low student achievement. Indonesia itself is ranked 72 out of 78 countries that participated in the assessment conducted by PISA (*the program for international student assessment)* 2018 in mathematics category. This means that Indonesian students' mathematical abilities are in the bottom 10 countries. In the same assessment, Indonesia's average math score is 379. This score is far from the international average score of 500.

The low mathematical ability of students is certainly caused by several factors. One of the factors that affect the quality of students' mathematical abilities is that teachers place students more as objects and not as students' subjects [1]. Generally, teachers are more active in transferring their knowledge while students are passive during learning[4]. [5]explains that mathematics education has been more successful in fostering feelings of fear, perception of mathematics as a science that is difficult to master, meaningless, boring, causing stress to students[5]. Whereas a good mathematics learning process should involve the activeness of the students themselves so that the material or concepts conveyed can be understood properly and correctly [6]. Teachers also need to make students aware of learning mathematics [7]. Mathematics teaching and learning should also emphasize a student-centered approach and require students to build knowledge and ability to think mathematically in their own schools [8].

The 2013 curriculum in its development is supported by various policies developed nationally, one of which is 21st Century Competence [9]. In practice, teachers can implement Strengthening Character Education (PPK) in the learning process. [10] mention that the demands of curriculum development require teachers to provide memorable and interesting learning according to the standard process that has been set. In addition, improving the quality of 21st century education can also be realized through the 4Cs, namely: *communication*, *collaboration*, *critical thinking*, and *creativity*[10].*Collaboration* in this case it can be interpreted as collaboration between students as well as collaboration between teachers and students. One way that can be done in meeting the demands of 21st Century Competence is to implement *Lesson Study for Learning Community (LSLC)* in learning.

Lesson Study is an activity where teachers are required not only to teach butalso to be able to analyze or review when the teacher sees how students learn or the confusion experienced by students [11].Activity *Lesson Study for Learning Community (*LSLC) is a refinement of the activities *Lesson Study* [12]. One of the elements in learning with LSLC is *collaborative learning* or *learning communities.* In practice, the LSLC emphasizes studies on how students learn and collaborate, compared to studies on how teachers teach and mastery of materials[13]. [14] in her research results stated that the applied collaborative learning stages have succeeded in increasing student learning activities. Because all stages of learning activities emphasize student involvement from the beginning to the end of learning.

Based on the description above, this literacy study aims to determine the impact of implementing mathematics learning with LSLC in schools so that it can be a consideration for teachers so that they can be applied in the next learning process.

2. RESEARCH METHODS

The research method used in this study is a literature review with the type of meta-synthesis research. Literature review is a research activity that uses data collection techniques in the form of notes, books, papers, and journal articles [15]. This synthesis review only focuses on learning mathematics with LSLC in schools. The writing of a literature review is presented in the form of a narrative. A narrative review synthesizes nonnumeric data in a systematic way to identify the required meta-analysis [8]. [16] describes the steps of a literature review in Figure 1.

At the data collection stage, the researchers collected journals related to the implementation of LSLC in learning mathematics in schools. at this stage, the researcher got 30 journal titles. In the data reduction stage, the researcher re-selects the journals that are in accordance with the objectives of this study. At this stage, the researcher got 7 journal titles. At the data display stage, the researcher presents the data in tabular form so that it is easy to understand and connect. At the discussion stage, the researcher begins to study and relate the data that has been displayed. The last stage is the conclusion, the researcher concludes the findings from the existing data.

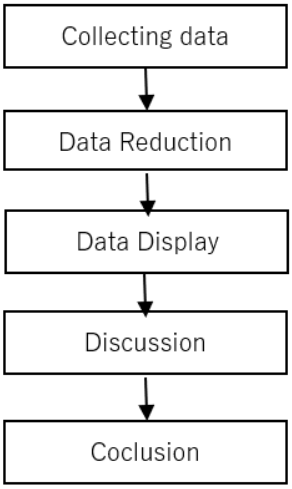

Figure 1 Literature review steps

3. RESULTS AND DISCUSSION

In one cycle of LSLC implementation, there are 4 stages that must be carried out, namely: Plan (Planning), Do (Implementation), See (Reflection), and re-design (Redesign) [11]. After the redesign stage, the second cycle was carried out with the same stages as in the first cycle. In practice, Plan is the process of designing learning tools which include LKPD Sharing Task, LKPD Jumping Task, and Evaluation. Do is a learning process in the classroom together with the model teacher and students. At this stage, students are asked to actively ask questions and collaborate with their group friends while working on the LKPD Sharing Task. At this stage *collaborative learning* between students will appear. Meanwhile, when working on the LKPD Jumping Task, students are prohibited from asking their friends. In the see stage, the teacher and the observers convey their findings during the implementation of learning in the classroom. Re-design is the process of redesigning learning devices based on the evaluation results that have been carried out at the see stage.

From the results of the electronic search, it was found 30 research titles that discussed LSLC, but there were only 7 titles that discussed the implementation of LSLC in learning mathematics in schools. While the other 23 titles discuss LSLC in general or the implementation of LSLC in learning other subjects. The Table 1 is data on 7 studies that discuss the implementation of LSLC in schools and their results.

Table 1. Review of the implementation of mathematics learning with LSLC in schools

No	Research Title & Writer	Result
1	Implementation of Lesson Study in Mathematics Learning Materials Multiplication and Division of Integers for Class VII Students (Nuraida & Putri, 2018)	Lesson study has a positive impact on the learning process because learning with Lesson Study can help students understand the concept of multiplication and division of integers, this can be seen during the activity, students in their groups can learn collaboratively and care for each other.
2	Students' Mathematical Reasoning in Pattern Learning Numbers Using PMRI And LSLC (Octriana, Putri, & Nurjannah, 2019)	Through learning mathematics with PMRI and LSLC approaches, students can find concepts in number pattern material by completing the LKPD that has been given. By completing Given contextual problems, students can estimate the right solution steps. Students are also given the opportunity to discuss, ask questions, and think in groups through group discussions. That way, students also look more active during the teaching and learning process.
3	Analysis of Mathematical Connection Ability in Statistical Subjects Based on Lesson Study for Learning Community (Rahmanti, Hobri, & Oktavianingtyas, 2018)	To improve students' mathematical connection skills, in learning using lesson study-based learning for the learning community, lesson elements are used. The study for learning community used is collaborative learning and caring community. In collaborative learning, students are encouraged to work together with group friends, while in caring community, students are trained to care for each other in group activities, so that the presence of these two elements can improve students' mathematical connection skills. Students become more understanding in solving mathematical connection problems. The subject of S1 in solving statistical problems is very good and fulfills three indicators of mathematical connection ability.
4	Analysis of Students' Critical Thinking Ability in Solving Social Arithmetic Problems Based Lesson Study for Learning Community in terms of Mathematical Logical Intelligence (Yunita, Hobri, Oktavianingtyas, Sunardi, & Yudianto, 2018)	Students' critical thinking ability in solving social arithmetic problems in LSLC-based learning with high logical mathematical intelligence shows that students can meet all indicators of critical thinking ability
5	The Effect of Collaborative Learning Based on Lesson Study Learning Community (LSLC) on Student Learning Outcomes in Principal Opportunity Discussion (Asih, Hobri, & Oktavianingtyas, 2018)	There is an effect of collaborative learning based on Lesson Study Learning Community (LSLC) on student learning outcomes on the subject of opportunity, this is supported by the results of the F test analysis on the Post-test value showing the value of Fcount = 11.67 and Ftable = 3.08, from the data obtained Ftable<Fcount, then H0 rejected. This means that there is an influence of learning-on-learning outcomes.
6	HOTS Analysis of Students on Number Pattern Material using the PMRI Approach through the LSLC System (Situmorang, Putri, & Lelyana, 2020)	From the research that has been carried out, it can be seen that after the implementation of learning with PMRI and LSLC, students' higher order thinking ability (HOTS) indicators were raised by students in solving jumping tasks and test questions, although not all students achieved maximum scores.
7	Student Mathematics Presentation on Application Realistic Mathematics Approach in Lesson Study Implementation in Junior High School (Yuanita, Zakaria, & Marianti, 2015)	The results of the lesson study activities carried out showed that student activity increased and students' perceptions of teachers, on the implementation of learning and on mathematics subjects were good. Learning is more student-centered. The teacher acts more as a facilitator.

[10] in their research conclusion explain that Lesson study has a positive impact on the learning process because learning with Lesson Study can help students understand the concept of multiplication and division of integers, this can be seen during the activity, students in their groups can learn collaboratively and care for each other [17]. [9] explain that Through learning mathematics with PMRI and LSLC approaches, students can find

concepts in number pattern material by completing the LKPD that has been given. By completing Given contextual problems, students can estimate the right solution steps. Students are also given the opportunity to discuss, ask questions, and think in groups through group discussions. That way, students also look more active during the teaching and learning process[9]. [13]explain In collaborative learning, students are encouraged to work together with group friends, while in caring community, students are trained to care for each other in group activities, so that the presence of these two elements can improve students' mathematical connection skills. Students become more understanding in solving mathematical connection problems. The subject of S1 in solving statistical problems is very good and fulfils three indicators of mathematical connection ability[13]. [18] explain that Students' critical thinking ability in solving social arithmetic problems in LSLC-based learning with high logical mathematical intelligence shows that students can meet all indicators of critical thinking ability[18]. [19]explain that There is an effect of collaborative learning based on Lesson Study Learning Community (LSLC) on student learning outcomes on the subject of opportunity, this is supported by the results of the F test analysis on the Post-test value showing the value of F_{count} = 11.67 and F_{table} = 3.08, from the data obtained $F_{table} < F_{count}$, then H_0 rejected. This means that there is an influence of learning on learning outcomes[19]. [20] explain that From the research that has been carried out, it can be seen that after the implementation of learning with PMRI and LSLC, students' higher order thinking ability (HOTS) indicators were raised by students in solving jumping tasks and test questions, although not all students achieved maximum scores [20]. [18] explain that the results of the lesson study activities carried out showed that student activity increased and students' perceptions of teachers, on the implementation of learning and on mathematics subjects were good. Learning is more student-centered. The teacher acts more as a facilitator [21].

From the results of a review of the implementation of mathematics learning with LSLC in schools, it is known that most of the studies have a positive impact on learning mathematics. Most of the reviews explain *collaborative learning* that arise during learning with the LSLC. [10]in their research results state that the process of *collaboration* and *caring* during the learning process[17].In *collaborative learning* or learning process *collaboration*, students are encouraged to work together with group mates, while *caring community*, students are trained to care for each other in group activities [13]. [19] also mention the emergence of the process of *collaborative* during his study with LSLC in his research [19].

Apart from the emergence of the process *collaborative* In learning, LSLC also helps students easily understand concepts and solve mathematical problems, including the concept of multiplication and division of integers [17], finding concepts in number pattern material [9], and solving statistical problems using very good [13]. Another important finding is that students are seen to be more active during the teaching and learning process because students are given the opportunity to discuss, ask questions, and have opinions in groups through group discussions [9], as well as students' perceptions of teachers, on the implementation of learning and on subject math is getting better. Learning is also more student-cantered and the teacher acts more as a facilitator [21].

In relation to the mathematical process, learning with LSLC also has a positive impact with the emergence of indicators of mathematical processes such as mathematical reasoning [9], mathematical connections [13], critical thinking skills[21] and HOTS [20].

4. CONCLUSION

Based on the review and discussion in the previous explanation, it can be concluded that the implementation of LSLC in learning mathematics in schools has a good impact on learning mathematics itself. Collaborative learning appears in learning, mathematical concepts are easily understood by students, and indicators of mathematical processes appear in learning. Students are also more active because learning is cantered on students, while the teacher only serves as a facilitator.

Most of the findings explain the effectiveness of implementing LSLC in learning mathematics in schools. Research on the implementation of LSLC in learning mathematics in schools should be increased in order to reduce problems in learning mathematics.

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