The Development of Learning Device of Lesson Study for Learning Community Using Google Classroom and Quizizz Media and Their Effect on Students' Creative Thinking Skills

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Abstract- Google classroom and quizizz are ways to optimize learning in virtual classes in the online era. The process and results of developing LSLC-based mathematics learning device using google classroom and quizizz media and their effect on students' creative thinking skills on the material for the system of linear equations with three-variables in class X of Mathematics and Natural Sciences. The method used in this research was a combination research method or a mixed method between development research (research and development) using 4-D models (four-D models) and experimental research. Results of LSLC-based learning device using google classroom and quizizz media In improving students' creative thinking skills, they met the criteria for the quality and feasibility of developing learning device that have been determined, namely meeting the criteria for validity, effectiveness and practicality. The validity of the lesson plans, worksheets and learning outcomes tests were categorized as very valid and the learning outcomes tests were tested for validity and reliability statistically and showed valid and reliable data. Practicality met the good criteria. The effectiveness was in good criteria, for the completeness analysis, there were 86% of students completed the development class and the results of student response questionnaires which reached 84% of students who gave positive responses. Creative thinking skills of students who were taught using LSLC-based learning device using google classroom and quizizz media were better when compared to the creative thinking skills of students who were taught using google classroom and quizizz media

Index Terms- Lesson Study for Learning Community, google classroom, quizizz, creative thinking

I. INTRODUCTION

Learning during the Covid-19 pandemic requires teachers and schools to continue to do innovation. During the current pandemic, teachers and schools need innovative and creative learning designs that do not only give assignments and work independently to students, which will make students less enthusiastic about learning. Virtual class is starting to be used as an alternative for learning because this learning is no longer bound by space and time, seeing conditions in the field which are increasing the number of virus spreads. Various activities have been dominated by technology products, especially learning that is done through technology or called online. Technological capabilities are very much needed [1]. Highly sophisticated technological products indicate that the rapid development of science and technology cannot be avoided, but must be faced and mastered. One of the virtual classes used is Google Classroom [2]

Google Classroom is one of the educational features provided by Google Apps for Education (GAFE) which was released to the public on August 12, 2014, Google Classroom is an application that allows the creation of classrooms in cyberspace. Google Classroom can be a means of distributing assignments and even assessing submitted assignments. According to Septantingtyas [3] the google classroom application makes learning more fun and comfortable in learning so that the impact of learning is no longer a burden and is brave to continue exploring, experimenting with the knowledge he has learned. Google classroom-based learning provides a lot of convenience and fluency in the teaching and learning process for educators and students, the google classroom application can also increase the intensity of interactive communication with students outside of officially scheduled study hours.

In addition to Google Classroom, there is Quizizz which is a web tool for creating interactive quiz games for use in classroom learning. Quizizz can provide data and statistics about student performance results directly. Quizizz can not only be done when learning in class, but also can be made questions for homework, so that it can be played anytime and anywhere by students as long as it does not exceed the predetermined time limit. With this

quizizz, students will feel challenged, because there is a score obtained by answering quickly and accurately, the speed will have its own score. In addition, there will be competition, because quizizz immediately creates live rankings between quizizz participants.

There are many problems or difficulties in implementing online learning. They are the implementation of group activities, and assessment of affective, as well as psychomotor. Likewise, the application of lesson study for learning community (LSLC). One of the efforts made is that learning is still carried out in groups in integrated Google Classroom with Zoom breakouts. Learning in groups can make students help each other, and ask each other questions so that the learning process in groups will lead to mutual respect, dare to have an opinion and issue an opinion [4]. Thus, collaborative learning, learning community, caring community, and jumping task as the main elements of LSLC can be realized in this online learning.
One of the challenging high school mathematics topics to be developed online using Google Classroom and Quizizz is the System of Linear Equations with Three-Variables (SPLTV). SPLTV is a subject that is taught to class X high school students, with the aim that students are expected to be able to solve a problem with mathematical modeling that is useful in everyday life [5]. Students to be able to understand SPLTV material are required to understand a problem, terms and symbols that exist in learning.

SPLDV which is often made in contextual problems for students can also be used as an alternative task to find out students' creative thinking processes. According to Kusdiantari [6] the thing that the teacher must do to find out the students' creative thinking process, they can give assignments that are more contextual in learning mathematics, so students can do it according to their thoughts. According to [7] and [8] creative thinking is a thinking process which characterized by fluency, flexibility, originality, and elaboration and redefinition. Fluency aspect refers to the students' ability in solving problem fluently and correctly, flexibility refers to the students' ability in solving problem by using various ways and strategies. Novelty aspect refers to the students' ability with a new way or using different strategy from different students. Creativity has been described in many ways but a common theme is that a personal activity intent on producing something new and unpredictable [9]. According to Gardner, the creative individual is defined as "a person who solves a problem in a particular environment, or puts out products and is considered both new and acceptable by experts who buy these products." Increasing the creativity of individuals are in control of teachers [10].

The research problems proposed in this research were: (1) How the development process of the LSLC-based learning device by using google classroom and quizziz media? (2) How is the result of the development process of LSLC-based learning device by using google classroom and quizziz media? (3) Is there any significant different in the implementation of LSLC-based learning device by using google classroom and quizziz media on students' creative thinking skills?

II. RESEARCH ELABORATIONS

The method used in this research was a combination or mixed method includes research and development (R&D) and experimental research. The process and result of the development process of LSLC-based learning device by using google classroom and quizziz media and its effect on the students' creative thinking skills in the material of system of linear equations with three-variables in class X of Mathematics and Natural Sciences of SMA Negeri 1 Panji can be explained as follows.

1) The development process of mathematics learning device used 4-D model proposed by Thiagarajan covered some steps: define, design, develop, and disseminate. The development process of the learning device included validation and practicality and effectiveness tests.
2) The effectiveness test was conducted by using Mann-Whitney test because the data were not distributed normally. The criteria of decision making in Mann-Whitney test was if Asymp.Sig <0.05, then the hypothesis was accepted (the development of learning device LSLC-based by using Google Classroom media had an effect on SMA Negeri 1 Panji students' creative thinking skills) and if the Asymp.Sig value> 0.05, then the hypothesis was rejected.

III. RESULTS OR FINDING

The process of developing LSLC-based mathematics learning device in system of linear equations with three-variables by using Google Classroom X SMA media refers to the 4-D model. The development model by Thiagarajan covered some stages of define, design, develop, and disseminate.

The Define stage was the initial stage consisting of five main steps, namely front-end analysis, learner analysis, concept analysis, task analysis, and specifying the instructional objectives. In the front-end analysis, it was known that student-centered learning was still not optimally applied during the pandemic. Learning device such as worksheets that can stimulate students to be more active and creative had also not been developed by teachers. Therefore, the researcher developed learning device based on lesson study for the learning community by using google classroom which aimed at encouraging students to be active and stimulating them to think creatively. Each instrument developed in this study emphasized students' creative thinking abilities by giving problem-based questions for 3 meetings within each question given in the students' worksheet.

The Design stage aimed at designing LSLC-based learning device by using google classroom media to produce an initial design (prototype). Moreover, it also aimed at investigating the learning device' effect on students' creative thinking skills on the material of system of linear equations with three-variables. This initial design was a prototype of the learning device that were ready to be tested. It consisted of a Lesson Plan, Student Worksheets, and Learning Outcomes Test. The lesson plan was made for three meetings in which each meeting was 2×30 minutes. The first meeting discussed the variable system of system of linear equations with three-variables, the second

meeting discussed the elimination solution method, and the third meeting discussed the substitution and combination solution methods. The contents of this students' worksheet were activities that played a role to encourage students to improve their mathematical reasoning skills through problem solving activities. The activities emphasized collaboratively. The learning outcomes test contained two questions with indicators of understanding system of linear equations with three-variables, while the scoring rubric oriented to students' creative thinking abilities. It aimed to measure students' creative thinking skills after participating LSLC-based learning using google classroom media.

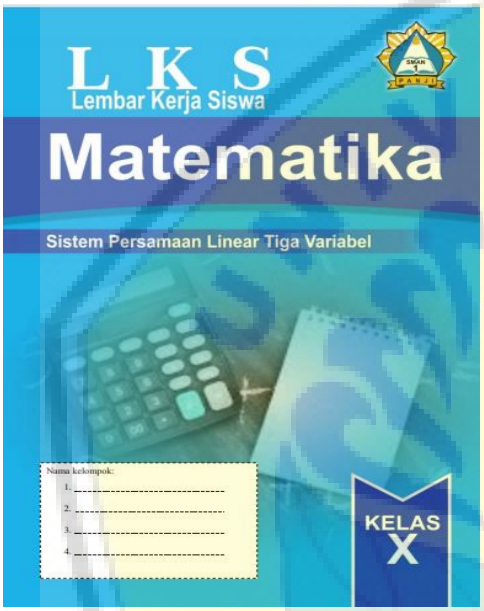

Figure 1. Worksheet Cover and Answer Key

The development stage aimed at producing Draft 2 of the learning device that had been revised based on the expert feedback and data obtained from the try-out. The activities in this stage covered the validation by experts followed by revision and field try-out. The results of the assessment of lesson plan, students' worksheet, and learning outcomes test by each validator can be seen in Figure 2.

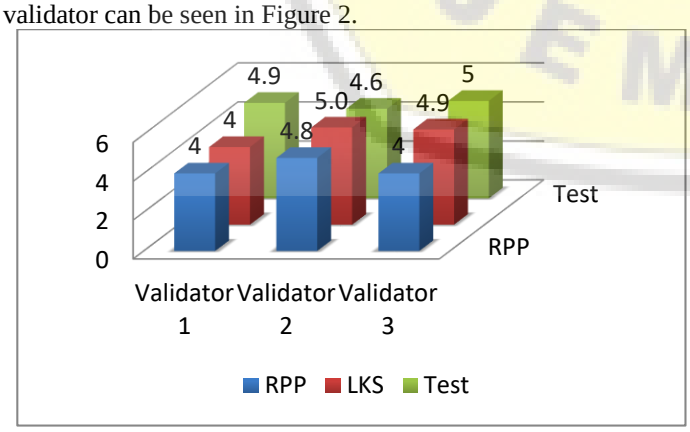

Figure 2. Bar Diagram of lesson plan, students' worksheet, and learning outcomes test. Validation Results

From Figure 2 above, the average of validity coefficient and its interpretation can be seen in Table 1.

Table 1. Validity Coefficient and its Interpretation

No	Learning device	Validity Coefficient	Interpretation
1	Lesson Plan	4,5	Very Valid
2	Students' Worksheet	4,7	Very Valid
3	Learning Outcomes test	4,6	Very Valid

Based on the validity coefficient, the learning device developed were categorized as very valid. Apart from being validated by a validator, the questions on the test were also tested for statistical validity and reliability. Testing the validity and reliability of the instrument was carried out as a condition for conducting data analysis and hypothesis testing.

The effectiveness criteria were seen from the level of students' mastery toward the material from the students' completeness and students' responses on the questionnaires. Students were claimed to be complete if they got a minimum score of 75, in line with the minimum completeness criteria for mathematics lesson at SMA Negeri 1 Panji. Based on Figure 3, as many as 86% of students were claimed complete in learning mathematics using the learning device that had been developed, therefore the completeness score had been fulfilled properly in the experimental class.

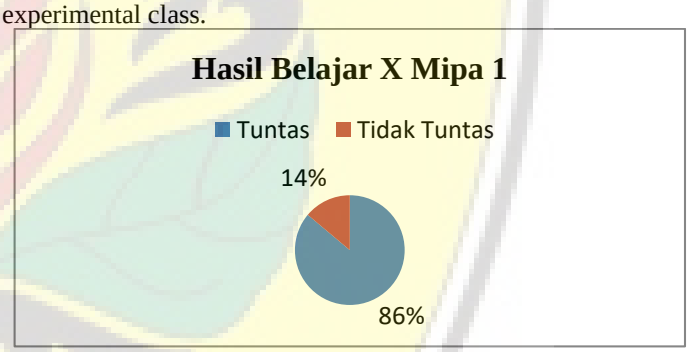

Figure 3. Learning Outcomes Test Results of Students in the Experimental Class

Based on the results of 36 students' responses presented in Figure 4, the learning instrument was considered as effective because students who gave a positive response were 84% (≥80%) and some were of very good category. It can be concluded that, in general, students gave a positive response and the learning device developed were categorized as effective.

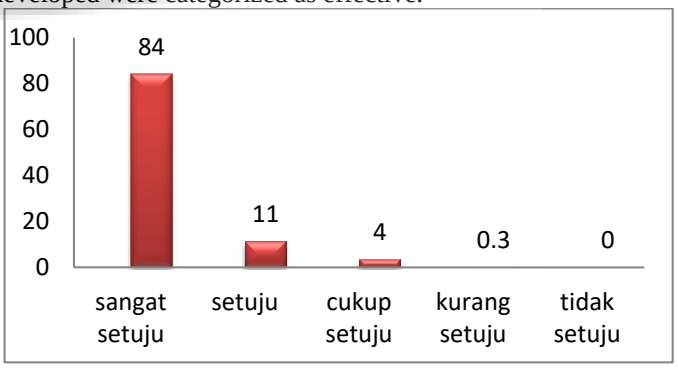

Figure 4. Bar Diagram of Students' Responses Data Recap

After the learning device were declared valid, practical, and effective, it was distributed to students who were the subjects of this research. Along with the process of distributing these instruments, an experimental research was also carried out. The control class was given the usual treatment using a quipper.

The learning implementation was carried out in three meetings with one post-test. The learning activities were conducted through collaboration between one student and another student. Therefore, the teacher formed groups based on the test scores of the previous material consisting of four students in each group. There were nine study groups at small groups. In this research, it was made into one large group consisting of 35 to 37 students and nine small groups consisting of four students who discussed with each other. The student collaboration process was still carried out even though it was carried out online. The following is the picture of student collaboration in Google Classroom.

The collaboration that is carried out in small groups is a discussion in solving problems that exist in student worksheets. In this discussion, students are not only solving problems, but they are also sharing related materials to be studied together online. The small group's function is only for discussing with their group friends which consists of four students like the usual discussions, but the difference is that they discuss only through chat by sending photos of answers, materials, and distribution of tasks in terms of the LSLC. In contrast to her research [11] whose research is carried out face-to-face, so that in collaborative learning the student activities are seen directly by observers. However, in the current full-online-based research, it cannot be monitored directly. So, the observer can only follow the progress of students through activities in Google Classroom.

Lesson study for the learning community-based learning assumes that every student is accepted and cared for in any circumstances, both beliefs and shortcomings. At the assessment stage, questions are presented with a jumping task model that has indicators of creative thinking, activities that take place collaboratively in groups and care for each other. The learning session in the control class is carried out by providing material and uploading assignments on the Quipper as what usually the teacher does.

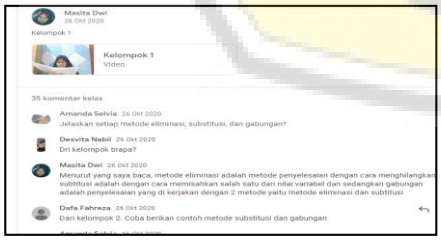

Figure 5a. Students Discussing in Large Groups

Figure 5b. Students Discussing in Small Groups

In the last meeting, post-test activities are implemented to determine the level of students' creative thinking skills after participating in learning activities. The data on the assessment results of creative thinking skills which are based on the results of the post-test and observations of students' creative thinking activities in the experimental class and control class are presented in the Table

Table 2. Categories of Students' Creative Thinking

Category	Experiment Class		Control Class	
	The Number of Students	%	The Number of Students	%
Very Creative	0	0	0	0
Creative	4	11	0	0
Creative Enough	17	49	2	5
Less Creative	5	14	0	0
Not Creative	9	26	35	95

To see the effect of the learning device developed in this research, the Mann Whitney test was used because the data were not normally distributed, so nonparametric statistical analysis was used. The results of the analysis can be seen in Table 3. Based on the "Test Statistics" output, it is known that the Asymp Sig (2-tailed) is 0.000, it is smaller than 0.05, so it can be concluded that the development of learning device based on lesson study for learning community using google classroom media has effect on the creative thinking skills of SMA Negeri 1 Panji students. This is in line with previous research which also uses Google Classroom to improve students' creative thinking skills [12]-[15].

Table 3. *Wann Whitney* Analysis Results

Test Statistics[a]

	Hasil Berpikir Kreatif
Mann-Whitney U	217.500
Wilcoxon W	920.500
Z	-4.916
Asymp. Sig. (2-tailed)	.000

Test Statistics[a]

	Hasil Berpikir Kreatif
Mann-Whitney U	217.500
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Z	-4.916
Asymp. Sig. (2-tailed)	.000

a. Grouping Variable: Kelas

IV. CONCLUSIONS

Based on the process and the results of developing LSLC-based mathematical learning device using google classroom and quizizz media along with their effect on students' creative thinking skills on the material of system of linear equations with three variables in class X of Mathematics and Natural Sciences can be concluded as follows:

a. The learning tools developed are lesson plans (RPP), worksheets (LKS), and THB using a 4-D model. The lesson plans and worksheets were made for 3 meetings with LSLC-based activities to improve students' mathematical reasoning skills through problem solving. The learning outcomes test (THB) contains 2 questions with indicators of understanding linear equations of three variables, while the scoring guidelines are oriented to students' creative thinking abilities..
b. The results of LSLC-based learning device using google classroom and quizizz media in improving students' creative thinking skills comply the quality and feasibility criteria for developing learning device that have been set meet the criteria of validity, effectiveness, and practicality.
    1. The validity of the Lesson Plan (RPP) is 4.5 which is categorized as very valid, the student worksheet (LKS) is 4.7 which mean it is categorized as very valid, while the learning outcome test is 4.6 which is also categorized as very valid. In addition, the learning outcome test is not only tested through validators but also tested for validity and statistical reliability and it shows valid and reliable data.
    2. Practically is said to be practical from the activity observer data is in the teacher's criteria obtained a score of 3.8 and it meets the good criteria.
    3. Effectiveness is said to be practical from the analysis of student activities that are in good criteria, 86% of students complete the analysis of completeness in the development class and the results of student response questionnaires that reach 84% of students who give positive responses.
c. The creative thinking skills of students who are taught using LSLC-based learning device using google classroom and quizizz media is better than the creative thinking skills of students who are taught using google classroom and quizizz media.

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The preferred spelling of the word “acknowledgment” in American English is without an “e” after the “g.” Use the singular heading even if you have many acknowledgments.

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