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Development of Based Learning Devices Contextual Teaching and Learning Models to Improve Communication Capabilities Student Mathematics

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Abstract
This study aims to: (1) produce quality Contextual Teaching and Learning (CTL) model-based learning tools (valid, practical, and effective) for class X students of SMA Negeri 1 Singkil, (2) Analyze the improvement of students' mathematical communication skills after being taught using model-based learning. Contextual Teaching and Learning (CTL) in class X SMA Negeri 1 Singkil, (3) analyzing the achievement of student self-efficacy after using learning tools based on the CTL model in class X SMA Negeri 1 Singkil. The type of research used is development research using a 4-D development model. From the results of trial I and trial II obtained: (1) The validity of the learning device according to the expert team is valid; The learning tools meet the practical criteria, namely a) the response of the expert team to the learning tools can be used with minor revisions b) the observer's assessment on the Observation sheet on the implementation of the learning tools which is stated in the very good category; Learning devices meet the effective criteria, namely a) classical student learning completeness has been achieved in the second trial, namely 94.44% b) The formulated learning objectives have been achieved, c) students gave a positive response to learning tools, d) Time allocation does not exceed learning normal; (2) Mathematical communication ability using the developed learning tools increased, in terms of the N-Gain Score. Mathematical communication ability test increased by 0.5 with moderate criteria, in Test II increased by 0.6 with moderate criteria;
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1. Introduction

Mathematics as one of the disciplines that has an important role in the world of education, especially in the development of science and technology, both as a tool in the application of other sciences and in the development of mathematics itself. Given the importance of mathematics in science and technology, it is only natural that mathematics as a subject must be mastered and understood well by students at school. According to Moch. Masykur, et al (2016: 43) argues that mathematics is more precisely used than "exact science". Because, by mastering mathematics, people will be able to learn to organize their thoughts and at the same time learn to increase their intelligence.

Abdurrahman (2012: 204) states that mathematics needs to be taught to students because: (1) It is always used in all aspects of life, (2) All fields of study require appropriate mathematical skills, (3) It is a means of strong, concise, and clear communication. , (4) Can be used to present information in various ways, (5) Improve logical thinking skills, thoroughness and financial awareness, (6) Give satisfaction to future problem solving efforts. According to Cornelius (2003) suggests: "Five reasons for the need to learn mathematics because mathematics is (1) a clear and logical means of thinking, (2) suggestions for solving problems of everyday life, (3) a means of recognizing patterns of relationships and generalizing experiences, (4) a means to develop creativity, and (5) means to raise awareness of cultural developments". The quote emphasizes that learning mathematics is expected to develop the ability to think, reason, communicate ideas and be able to develop creative activities and mathematical communication. This shows that mathematics has benefits in developing students' abilities so that it needs to be learned

The objectives of learning mathematics formulated by the National Council of Teachers of Mathematics (NCTM, 2000) are: (1) learning to communicate (mathematical communication); (2) learn to reason (mathematical reasoning); (3) learning to solve problems (mathematical problem solving); (4) learn to link ideas (mathematical connections); (5) the formation of positive attitudes toward mathematics (positive attitudes toward mathematics). From the objectives of learning mathematics above, it can be seen that one aspect that is emphasized in the KTSP and NCTM curriculum is to improve students' mathematical communication skills. Because of the importance of the role of mathematics in human life, the government is always trying to improve the quality of mathematics education. This can be seen from various government efforts such as improving the curriculum, procuring textbooks, increasing teacher competence and various other efforts aimed at producing intelligent and quality human resources.

The low mathematical communication skills of students are also supported by the results of the international survey The Trend International Mathematics and Science Study (TIMSS). From the results of the TIMSS international survey in 2011, Indonesia is ranked 38th out of 63 in learning mathematics. Aspects assessed in mathematics are knowledge of facts, procedures, concepts, application of knowledge and understanding of concepts. According to reports on the results of international studies 47%. When compared to other countries, Indonesia's ability to translate questions into the language of mathematical ideas, diagrams or graphs is still below the average (TIMSS, 2011).

In addition, communication skills are also very important in the activities and use of mathematics that students learn. However, the reality is that students' mathematical communication skills are still not satisfactory. As Sri (2018) said that "low mathematical communication skills will make it difficult for students to digest the questions given, while students who have good communication skills will easily take a step to solve a problem. The same thing was stated by Saragih (2007) which states that: "Communication skills in learning mathematics need to be considered, this is because mathematical communication can organize and consolidate students' mathematical thinking both orally and in writing. If students have communication skills, of course, it will bring students to a deep mathematical understanding of the mathematical concepts being studied.

The reality in the field is that students' mathematical communication skills are still very low. From the results of interviews conducted by researchers on students of SMA Negeri 1 Singkil stated that: "The low mathematical communication skills of students in mathematics subjects, this occurs because the level of concentration of students is not optimal, which may be due to the learning model used so far is not suitable or not. motivates students, this causes most students to be less able to solve problems related to the material

The answer process made by students is still not as expected. Students should first state an idea or situation in the form of a correct mathematical model by making steps 1, 2, 3 making an example, step 4 eliminating equations 1 and 3 so that equation 4 is obtained and so on. In addition, students cannot provide an explanation of the conclusions they have obtained in written form. So the student's answer shows that the student's communication ability is still low.

From the results of 35 students' answers related to the mathematical communication skills above, only 8 students (21.05%) were able to answer the questions correctly according to the questions given, while 27 students (78.95%) had not been able to complete the question correctly. Based on the analysis of the results of the students' answers, there are several indicators of mathematical communication skills that students do not have, including: students cannot formulate ideas or situations in the form of correct mathematical models and students cannot provide explanations about the conclusions they get in written form. The same thing was also obtained in other studies regarding the low mathematical communication skills of students. The learning process has not fully taught students optimally and tends to only present monotonous direct learning to students. Halim (2017:6) states "teachers only explain lessons and students only listen to learning". This of course causes students to be less active in learning and student responses to learning are also very low because the approach applied by the teacher is less attractive and students play a passive role in learning. This causes students to become bored easily in the learning process because the learning carried out tends to be conventional.

To achieve the above objectives, it is necessary to have an appropriate learning model and is expected to be able to solve these problems. According to Istarani (2012: 18) states that: "the learning model is the whole series of presentation of teaching materials which includes all aspects before and after learning by the teacher as well as all related facilities that are used directly or indirectly in the teaching and learning process". The learning model is expected to make students able to construct knowledge, to make students independent in learning, to increase student interaction, to train students to communicate their ideas and to increase students' knowledge of solving problems. Based on the above, the learning model is expected to make students able to construct knowledge, can make students independent in learning, can increase student interaction, can train students to communicate their ideas and can increase students' knowledge of solving problems. This is supported by Nur (2008) which states that, Problem-based learning is designed primarily to help students: (1) develop thinking, communication, problem solving, and intellectual skills; (2) learning adult roles by experiencing those roles through real or simulated situations; and (3) become independent and autonomous students (Nur, 2008).

The Contextual Teaching and Learning (CTL) model is a learning model that can be used by teachers in achieving learning objectives. According to Rusman (2012: 190) contextual learning (CTL) is a learning concept that can help teachers relate the material they teach to students' real world situations. This model has characteristics commonly known as the seven principles of CTL learning. According to Rusman (2012: 193), there are seven principles of contextual learning that must be developed by teachers, namely: (1) Constructivism; (2) Inquiries; (3) Questioning; (4) Learning Community; (5) Modeling; (6) Reflection; (7) Authentic Assessment.

Learning tools are learning resources that need to be considered in the teaching and learning process. According to Brata (2011: 91) that "learning tools are one form of preparation made by the teacher before carrying out the learning process. Therefore, the learning device must be prepared by the teacher before carrying out learning activities. This is supported by Trianto (2014:251) the success of a teacher in carrying out learning depends on his insight, knowledge, understanding, and level of creativity in managing learning tools. Then according to Latief (2009: 18) states that "learning tools are a collection of learning resources arranged in such a way where students and teachers carry out learning activities which include lesson plans, teaching materials, student activity sheets, learning media, tests to measure learning outcomes and so on.

Learning devices are arranged to facilitate the learning process in order to achieve the competencies that must be mastered by students. Prastowo (2014:138) argues that: "In general, all the materials that are systematically arranged, show the complete figure of the competencies that will be mastered by students and used in the learning process with the aim of planning and studying the implementation of learning. The development of learning tools uses a 4-D model consisting of Define, Design, Develop, and disseminate. The 4-D model was chosen because this development model is the basis for developing learning tools (not a learning system), the stages of implementation are divided in detail and systematically so that researchers know what to do first for each stage (Ishaq Madeamin, 2010: 23). These weaknesses indicate that the learning tools have not met the valid, practical, and effective criteria. Therefore, it is natural that students' mathematical communication skills are still low. By developing learning tools that meet the above criteria, it is hoped that this will be a solution to improve students' mathematical communication skills. Good learning tools have valid, practical, and effective criteria.

According to Nieveen (2007:26) there are criteria in determining the quality of learning device development results, namely: (1) validity (valid); (2) practically (practically) and (3) effectiveness (effective). So it can be stated that a quality learning device is one that meets these three aspects. Validity is obtained from device validation by experts and colleagues containing content, construct and language validation. Furthermore, practicality means that teaching materials can be applied by the teacher as planned and easily understood by students. While the effectiveness is seen from the results of authentic assessments which include an assessment of the learning process and learning outcomes.

Learning activities will make students only remember and memorize. Students will be more likely to memorize formulas in textbooks without knowing the concepts and applications of these formulas, and will have difficulty when students are faced with a challenge or problem in mathematics. The number of formulas that will be memorized in the textbook will cause students to tend to be bored in learning mathematics which results in low mathematics learning outcomes.

According to Marsigit (2011:9) teachers have three main functions, namely as facilitators, teaching resources and monitoring student activities. The development of learning tools is carried out so that learning becomes effective, efficient, and does not deviate from the competencies to be achieved. Teachers should develop learning tools according to the conditions and needs of students. RPP not only contains teacher activities, but also contains student activities during the learning process. Activities in lesson plans facilitate students to connect mathematical concepts in communicating them. LAS contains activities that contain the stages that must be done by students in finding concepts.

Based on the description that has been stated above, the author needs to conduct a research entitled "Development of Learning Devices Based on Contextual Teaching and Learning Models to Improve Mathematical Communication Ability and Self-Efficacy of Students of SMA Negeri 1 Singkil"

2. Research methods

Types of research

This research is a development research that is used to produce certain products and test the effectiveness of these products. To develop and validate the product, it is combined using the Thiagarajan 4D development model, which consists of four stages of development, namely: define, design, develop, and disseminate**.**

Research Subjects and Objects

The subjects in this study were students of class X SMA Negeri 1 Singkil in the academic year 2021/2022. While the object in this study is a learning device through a contextual teaching and learning (CTL) model on the three-variable linear equation system material developed in this study is limited to the Learning Implementation Plan, Student Activity Sheet ,Student Book . , Teacher's Handbook , Mathematical Communication Ability Test, and Self-efficacy questionnaire

Data analysis

Data Analysis of Learning Device Validity

This validation is based on the opinion of five experts and practitioners in the field of education. Based on the expert opinion, the average value for each aspect will be calculated so that the average value for the total aspect is obtained.

Data Analysis Practicality of Learning Devices

Practical criteria by looking at opinions or responses from experts who state that learning tools using problem-based learning models can be used with little or no revision. The way to give an opinion about the practicality of this learning device is to provide a learning device assessment scale along with a learning device validation sheet according to the problem-based learning model.

Implementation of learning devices, provided observation sheets (observations) during the learning takes place. The implementation of the learning activity steps is observed by an observer who has been directed previously so that he can operate the learning implementation observation sheet correctly. The observation sheet on the implementation of learning devices is made in the form of choices with a score of 1 to 5, with the provisions of a score of 5 (very good), a score of 4 (good), a score of 3 (good enough), a score of 2 (not good), and a score of 1 (not good).

Data on the effectiveness of the learning tools developed were analyzed from: (1) data on student learning mastery, (2) achievement of learning objectives, and (3) student responses.

For the effectiveness of learning tools related to mathematical communication skills, it is determined based on the achievement of classical student learning mastery. Minimum completeness is analyzed by considering that students can be said to be complete if the individual student scores reach a score of 80. This 80 is the value of Minimum Completeness Criteria (KKM) for class X at SMA Negeri 1 Singkil. Furthermore, a lesson is said to have been completed classically, that is, at least 85% of students who take the test have achieved a score of 80. Percentage of Classical Completeness (PKK) 85%.

Data Collection Instruments and Techniques

Learning Tool Validation Instruments

The learning device validation instrument is a learning device validation sheet that is used to obtain data about the quality of learning tools based on the assessment of experts. Validation sheets for lesson plans, teacher books ,student books ,and student activity sheets. This validation sheet contains the components assessed including: format, language, illustrations, and content.

Mathematical Communication Ability Test Instruments

The test instrument for mathematical communication skills is in the form of a structured description test.Student Response Instrument. The instrument for student responses is a student response questionnaire which is an opinion or student response to the components and learning tools developed. The technique used to obtain student response data is carried out by distributing questionnaires to students. Student responses in this study were students' opinions on interest, feeling happy, current, interest, and ease of understanding learning material through learning tools developed through the Contextual Teaching and Learning learning model.

Learning Media Development Procedure

Define Stage

The purpose of the definition stage is to determine and define learning needs by analyzing the objectives and limitations of the material. The activities carried out at this stage are early-late analysis, student analysis, concept analysis, task analysis, and specification of learning objectives.

Design Phase

The basis of the preparation of the test is the analysis of the concepts described in the specification of learning objectives. The test in question is a test of students' mathematical communication skills. To design a test of students' mathematical communication skills, a grid of questions is made based on indicators of students' mathematical ability and their scoring reference.

Media selection activities are carried out to determine the right media for the presentation of Derivative material. The media selection process is adjusted to the results of concept analysis and task analysis. From the results of the concept analysis, students are expected to be able to understand the system of linear equations of three variables. Thus, the suitable media are visual media, namely books and LKPD.

The selection of formats for lesson plans, Teacher's Book , Student's Book , and is adjusted to the principle. Characteristics and learning steps of the CTL model. The choice of learning format is also adjusted to the 2013 Curriculum. The lesson plans includes KI, KD, learning indicators, learning objectives, learning materials, learning activities, models, learning methods, learning resources, assessments, which consist of on the instrument, answer key, and scoring guidelines. The activities carried out in this step are writing the initial design of learning tools which include Teacher's Books, Student Books, and tests of students' mathematical communication skills. This initial draft is referred to as draft 1.

Development Stage

The following details the steps taken at the development stage, namely:

Validation/Expert assessment

In this activity an evaluation is carried out by experts in their fields. Expert validation is a technique to get suggestions for improvement as well as an assessment of the learning tools that have been produced at the design stage. The learning tools in question are all materials that have been developed at the design stage.

Trial of Research Instruments

The research instrument used in this study was a test of students' mathematical communication skills. Before using the research instrument, the research instrument was first tested in a class outside the sample. Furthermore, validity and reliability tests were carried out. The purpose of this stage is to produce a good research instrument, in the sense that it is valid and feasible to use during field trials.

Field Trial

Field trials were conducted to obtain direct input on the learning tools that have been developed so as to produce the final tools. The learning tools were tested in schools to see the practicality and effectiveness of the learning tools that have been designed to improve students' mathematical communication skills.

Stage of Dissemination

This activity was carried out in a limited manner in a discussion forum for mathematics subject teachers at SMA Negeri 1 Singkil. The result of this stage is to recommend to all mathematics subject teachers at SMA Negeri 1 Singkil to use this device as an alternative learning material for the Three Variable Linear Equation System.

3. Research result

Validation of Learning Tools by Using Learning Tools Contextual teaching and learning by Using Developed Learning Tools

The research instrument used in this study was a test of mathematical communication skills. Before using the research instrument, the research instrument was first tested on a class outside the sample, then the validity and reliability were tested. The goal is to produce a good research instrument, in the sense that it is valid and usable. The results of the validity and reliability test of the instrument are described as follows:

The validity of the questions was analyzed using the product moment person correlation formula, namely by correlating the score of the item with the total score. The test results of the students' mathematical communication ability test instruments are presented in Table 1. below.

Table 1. Validity of Mathematical Communication Ability Question Items

No	r_{xy}	t_{hitung}	t_{tabel}	Interpretasi
1	0,88	7,97	2.101	Valid
2	0.87	7,52	2.101	Valid
3	0,81	5,93	2.101	Valid
4	0,80	5,71	2.101	Valid

In Table 1. above, is a test of students' mathematical communication test research instruments for four essay questions with a significant level of 5%, dk = 28, obtained ttable = 2.101. If referring to the test criteria is tcount > ttable, then the communication ability test can be used or is valid. Thus, based on calculations performed manually and excel, it is concluded that the communication ability test can be used or is valid. The results of expert and practitioner assessments on the practicality of CTL tools can be seen in Table 2. below: Practicality of Learning Tools by Using Learning Tools contextual teaching and learning using Developed Learning Tools.

Table 2. Learning Tool Validation Results

Validator	Perangkat Pembelajaran				
	RPP	LKPD	BS	BG	TKPMM
Validator 1	RK	RK	RK	RK	RK
Validator 2	RK	RK	RK	RK	RK
Validator 3	RK	TR	TR	TR	RK
Validator 4	RK	TR	TR	TR	TR
Validator 5	RK	TR	TR	TR	TR

Information:
RK : Learning tools can be used with “minor revisions”
TR : Learning tools can be used “without revision”

In Table 2., it can be seen that experts and practitioners state that contextual teaching and learning tools can be used with little revision and no revision. So, according to the practical criteria, the contextual teaching and learning tools have met the practical criteria according to experts.

Furthermore, the practicality of the device will be tested in the field. The implementation of learning tools through CTL was measured by using the CTL implementation observation sheet. The results of the data analysis on observing the implementation of the CTL device were concluded that the achievement of the level of implementation of the learning tools in the first trial was included in the high category, which means that the

CTL device was said to be practical or applicable.

Effectiveness of Learning Devices by Using Problem Based Learning Tools by Using Developed

CTL tools will be feasible to use if they can have a positive impact or significant influence on learning. Thus, the CTL tool developed must meet the effectiveness criteria, namely: (1) classical student learning completeness, namely at least 85% of students who take part in learning are able to achieve a score of 80; (2) the achievement of learning objectives of at least 75%; (3) at least 80% of the subjects studied gave a positive response to the components of the developed CTL device; and (4) the learning time is at least the same as ordinary learning. In the first trial, all of these things have not been fulfilled, so the second trial is carried out again with a description of the effectiveness of the learning device.

The results of students' mathematical communication skills in the pretest trial II were 59.55% while the classical mastery of students' mathematical communication skills in the posttest trial II was 84.20%. mathematical communication skills are able to achieve a score of 80. Thus, the results of the posttest of mathematical communication skills meet classical completeness because they obtain a percentage of completeness of 84.20%. So it can be concluded that in the second trial the application of learning tools through CTL devices has met the criteria for achieving classical completeness.

The results of mathematical communication skills in the second trial show that the achievement of learning objectives in indicator 1 is obtained by 92.71%, in indicator 2 it is obtained by 82.81%, in the question of indicator 3 obtained by 78.47%, in accordance with the criteria for achieving learning objectives , it is said that the learning objectives are achieved with the criteria of 75% of the maximum score for each item, thus the achievement of learning objectives in the second trial, namely the posttest results of mathematical communication skills have been achieved for all indicators. Thus, the post-test results in the second field trial have met the criteria for achieving learning objectives.

The results of the achievement of learning time in the second trial were six meetings. When compared with ordinary learning that has been carried out so far, there is no difference between the achievement of learning time using CTL learning tools in the first trial and the achievement of ordinary learning time.

Thus, it is known that the achievement of learning time using CTL learning tools in the second trial is the same as the usual learning time that has been carried out so far, namely six meetings with basic competencies: (1) explaining the properties of a three-variable linear equation system and determining the nature of the equation. linear; (2) Solve contextual problems related to a system of linear equations with three variables. This is in accordance with the learning time criteria, namely the achievement of the minimum learning time is the same as ordinary learning, thus the achievement of the second trial learning time has been achieved. Based on the results of the second trial data analysis, it is known that the learning tools developed have been effective.

Improving Students' Communication Skills

The analysis of increasing students' mathematical communication skills in the first trial will be seen through the N-Gain from the results of the pretest and posttest of students' mathematical communication skills in the first trial. The results of the N-Gain calculation on mathematical communication skills can be seen in the following table:

Table 3. Summary of N-Gain Results of Mathematical Communication Ability Trial I

N-Gain	**Total Student**	**Interpretation**
g > 07	3	High
0,3 < g ≤ 0,7	33	Medium
g ≤ 0,3	0	Low
Averange	**0,5**	**Currently**

Based on the table above, it can be seen that 3 students got N-Gain scores in the range > 0.7 or experienced an increase in mathematical communication skills in the "High" category. For students who experienced an increase in mathematical communication skills in the "Medium" category or got an N-Gain score of 0.3 < g 0.7 totaled 33 people and 0 people who got an N-Gain score g 0.3 or experienced an increase in communication skills mathematics with the category "Low". So, the average gain in the first trial is 0.5 if it is interpreted into the classification described in Chapter III, then the total increase in mathematical communication skills in the first trial obtained is in the "medium" category. The value of the N-Gain indicator of students' mathematical communication skills is 0.48; 0.47; 0.50. the indicator that experienced the highest increase was the third indicator with an N-Gain value of 0.50 namely Representation (Can explain ideas, solving strategies, or answers obtained through writing, either in the form of images, graphics, or algebra.)

The analysis of increasing students' mathematical communication skills in the second trial will be seen through the N-Gain from the results of the pretest and posttest of students' mathematical communication skills in the second trial. The results of the summary of N-Gain mathematical communication skills can be seen in Table

4. below:

Table 4. Summary of N-Gain Results of Experimental Mathematical Communication Ability II

N-Gain	Total Student	Interpretation
g > 07	12	High
0,3 < g ≤ 0,7	24	Medium
g ≤ 0,3	0	Low
Averange	**0,6**	**Currently**

Based on table 4.22 above, it can be seen that 12 students got an N-Gain score in the range > 0.7 or experienced an increase in mathematical communication skills in the "High" category. For students who experienced an increase in mathematical communication skills in the "Medium" category or got an N-Gain score of 0.3 < g 0.7 totaled 24 people and 0 people who got an N-Gain score g 0.3 or experienced an increase in communication skills mathematics with the category "Low".

So, the average gain in the second trial was 0.6 if it was interpreted into the classification described in Chapter III, then the total increase in mathematical communication skills in the second trial was in the "medium" category. The value of the N-Gain indicator of students' mathematical communication skills is 0.66; 0.51; 0.64 the indicator that experienced the highest increase was the first indicator with an N-Gain value of 0.66, namely Drawing (can present written mathematical questions in the form of pictures or descriptions of the given contextual problems.)

4. Discussion

Development of Learning Tools with Valid, Practical, and Effective Contextual Teaching and Learning Models.

Based on the results of the validation of the developed contextual teaching and learning tools, it was found that the components in the Learning Implementation lesson plans were declared valid with good categories. Furthermore, the results of the validation of the Teacher's Book, Student's Book , Student Activity Sheet and mathematical communication tests are also valid with good and understandable categories. This shows that the contextual teaching and learning tools developed, both lesson plans, teacher books, student books, and test instruments have met the valid criteria.

Second, the contextual teaching and learning tools developed have met construct validity. That is, in the development of problem-based learning tools, it is in accordance with the concepts and indicators of students' mathematical communication skills and mathematical students' self-efficacy which is then combined with contextual teaching and learning. The learning tools developed are arranged to complement each other between lesson plans, teacher books, student books, and which are adapted to contextuality

Teaching and learning to measure students' mathematical communication skills and self-efficacy. The fulfillment of the good validity aspect above is in line with the opinion of Rahman and Amri (2013:207) which states that the validity aspect refers to the extent to which the design of the developed device is based on content validity and construct validity. Akbar (2013:152) added that high validity was obtained through a validation test of the developed learning device.

The results of the research and opinions above are supported by development research conducted by Sinaga (2007) where, based on the results of expert validation and revisions that have been carried out, it is found that the development of learning models and tools carried out on lesson plans, teacher books, student books and worksheets is valid. both in terms of content and construct validity and can be applied. Furthermore, the same thing was revealed through the results of Frisnoiry's (2013) research based on the results of the development of learning tools that had met valid criteria both in terms of content validity and construct validity. Fulfillment of these aspects, through expert validation and field trials of the developed learning tools.

Based on the results of trial I, trial II, and distribution results, the CTL tools developed have met the practical category in terms of the expert/practitioner's assessment which states that the developed learning tools can be used with little or no revision and the implementation of learning is in good criteria. .

Based on the results of expert assessments, the components of the learning tools developed in the form of lesson plans, Student Books Teacher's Books Student Activity Sheets , and students' mathematical communication ability tests are practical/can be used with minor revisions. .

Based on the results of observations of the implementation of assisted CTL devices, in the first trial, the level of implementation of learning with P = 4.38 in the second trial the level of implementation of learning with P = 4.31, and in the results of the spread of the level of implementation of learning with P = 4.69 was in the very high category with a minimum range (4<P≤5) and the instrument is said to be good if it has a reliability coefficient of 0.75 or 75%. This aspect of the second practicality assessment is described as follows. The practical criteria in terms of the implementation of the learning tools in this study have also met the practical criteria. In experiments I and II, the implementation of the learning tools has met the set criteria, namely having reached the very high category and for the reliability of the contextual teaching and learning learning instrument

instruments in the implementation of experiments I and II have also reached the specified category, namely the instrument can be said to be good because it has achieve a reliability coefficient of 0.75 or 75%. Indeed, in the first trial, some students were still not familiar with the use of CTL learning tools that demanded student activity, but in the next trial the students became more accustomed and happy. Thus, it can be concluded that the CTL tool developed is practical in terms of the implementation of learning tools.

Based on the results of the posttest analysis of the second trial and the results of the distribution, it was found that mathematical communication skills had met the classical completeness criteria. This is because the learning materials and contextual problems that exist in student books and LKPD are developed according to the characteristics of students so that the learning process is more meaningful and students can communicate well.

Based on the results of the analysis of the achievement of learning objectives in the first trial, it was found that the achievement of the posttest learning objectives of mathematical communication skills in the first trial was only achieved in item 1, while the achievement of the posttest learning objectives of mathematical communication skills in the second trial Based on the results of the data analysis of the results of the first trial, the second trial, and the distribution results, it was found that the average percentage of student responses in each trial was positive, meaning that overall students felt helped and happy with the contextual teaching and learning tools developed. The student responses given in each trial have reached the predetermined criteria, namely 80%.

Based on the achievement of the learning time carried out during the first trial, the second trial, and the results of the distribution, the length of time for learning using the CTL device is the same as the usual learning time carried out so far, which is six meetings. Thus the learning time used is in accordance with the criteria for achieving learning time, namely the achievement of the learning time used does not exceed the usual learning time, so it can be concluded that the achievement of the learning time of trial I, trial II, and distribution results have been achieved and meet the criteria effectiveness. had been achieved for each item, as well as the distribution results.

Increasing Mathematical Communication Skills by Using Contextual Teaching And Learning Learning Tools by Using Developed

One of the objectives obtained from the development of learning tools in this study is to improve students' mathematical communication skills. The improvement of students' mathematical communication skills can be seen through the mathematical communication ability test based on the results of the pretest and posttest. Based on the results of the pretest and posttest, it can be concluded that students' mathematical communication skills using contextual teaching and learning tools have increased. The increase in students' mathematical communication skills can be seen from the average results of the pretest and posttest mathematical communication skills obtained by students in the distribution results. The mean score of the students' pretest was 58.56% and increased to 80% on the posttest.

The improvement of mathematical communication skills above is influenced by the characteristics of contextual teaching and learning combined with developed learning tools. Among them: first, the learning tools developed contain authentic problems related to students' daily lives, are clear, easy to understand and useful. Second, the activities designed in the student book support the process of rediscovering a concept built by the students themselves. Third, contextual teaching and learning is collaborative learning, meaning that in solving problems or tasks students must interact with the environment, fellow friends or teachers both in small groups and large groups. This is in accordance with Vygotsky's theory (Rusman, 2011:244) which stated that social interaction with friends spurred the formation of new ideas and enriched the intellectual development of students.

This is supported by the research of Sonda, Alimuddin, and Asdar (2016) which states that the learning effectiveness criteria in terms of N-gain scores are in the medium category and classical student completeness is more than 80%. With the application of the learning model developed by the teacher in the early stages of learning and as long as they complete the task, the more active students will be in handling their learning tasks which will result in more effective learning that is carried out and has an impact on classical student learning completeness. Based on the results of the study, and the results of previous studies above, it can be concluded that the learning model based on contextual teaching and learning that was developed has met the effectiveness indicators in terms of the students' mathematical communication ability test learning completeness.

Then, the results of research According to Hasratuddin (2018: 242) stated that the indicators of learning effectiveness were based on the achievement of mastery learning if > 80% of students had completed, the time used in learning was efficient or did not exceed ordinary learning, and student responses to positive learning.

Based on the description and results of previous studies above, it shows that learning with the contextual teaching and learning model is significantly better in increasing students' mathematical communication skills. So it can be concluded that contextual teaching and learning tools have a positive impact on improving students' communication skills.

5. Conclusion

The learning tools based on the Contextual Learning Model to improve students' mathematical communication skills and self-efficacy have met the valid, practical and effective criteria, namely: Validity with an average RPP validity of 4.29, an average validity of student activity sheets of 4, 38, the average validity of the teacher's book is 4.19, the average validity of the student's book is 4.26, with a valid category. Practicality is seen from 1) The response of the expert team or validator stating that the learning device can be used with minor revisions. 2) The implementation of learning tools obtained an average of 4.38 with a very good category. Effectiveness in terms of 1) Classical completeness reached 94.44% had met the criteria for completeness, namely 85% of students achieved KKM. 2) Achieved learning objectives, namely at least 75% of the formulated learning objectives have been achieved by students 3) as many as 93.06% students gave positive responses, so that student responses have been achieved (4) Time allocation does not exceed ordinary learning. From the four indicators of effectiveness in the second field trial, it was concluded that the learning tools were already effective.

Mathematical communication skills using learning tools based on the contextual learning model (CTL) that have been developed are seen from the N-gain value, in the first trial it increased by 0.5 and in the second trial it increased by 0.6, meaning that in both trials it increased with the "medium" category.

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