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# THE DEVELOPMENT OF LEARNING DEVICE BASED CONTEXTUAL TEACHING LEARNING (CTL) ASSISTED AUTOGRAPH TO IMPROVE THE ABILITY OF PROBLEM SOLVING MATHEMATICS CLASS X SMA NEGERI 1 TELUKDALAM

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**Abstract**

This research study aims to describe: 1) Validity learning devices CTL based with autograph aid; 2) practicality learning devices CTL with autograph aid; 3) effectiveness learning devices CTL with autograph aid; 4) increase problem solving skills by problem based learning model developed. This research is a research development (research and development). The development of CTL based learning used 4-D model which include define, design, develop, and disseminate. The results of the defining phase is used to design a learning instruments. Then this draft is validated and teste in classroom to see its practically and effectiveness. The tes is done in class X SMA Negeri 1 Telukdalam. This research used students in class XIA1 and XIA2. From this development obtained that; (1) learning instruments developed is valid criteria with the average validity total of lesson plan = 4.506, Student's Book = 4.687, worksheet = 4.412. Test problem-solving abilities in valid categories with reliability of 0.87; 2) Learning intruments satisfy practice criteria based on (a) assessment of teachers' ability to implement excellent category learning; (b) assessment of students' ability to follow excellent category learning; 3) learning instruments is effective based on the results of student's mathematical problem-solving skills tests meet the classical completeness, the achievement of the ideal percentage of time, and the results of questionnaire responses of students, 4) the increasing of problem solving skills of student's from first to second test was 0.37 points with the classical learning completeness increase by 37,5%.

**Keywords:** Learning Tool, CTL approach, software autograph, 4-D Model Development, Mathematical Problem Solving Ability Students

## 1. Introduction

Learning in schools is formal, intentional, planned, with the help of teachers and other educators to achieve the learning objectives. Development of learning tools is important for educators to make learning more effective, efficient, and competence achievable. Development of mathematics learning tool an innovation to improve the quality of learning received by students so that mathematics is not just understand and understand but able to solve problems related to daily activities and able to grow creativity to take advantage of learning mathematics itself. The results of observations and interviews conducted by researchers in SMA Negeri 1 Telukdalam, that during the learning done teachers tend to transfer knowledge through definitions and exercises. Learning is done by giving materials and questions on the board by the teacher, followed by the tasks and problems that must be solved by the students.

Then the researcher gives problem solving problem to know student's learning ability. The problem as a preliminary observation to determine the problem-solving ability of students of class X-IPA3 SMA Negeri 1 Telukdalam held on August 22, 2016 on the material application of rank and the form of the root (the material taught by mathematics teacher at that time still arrived at the rank material rank and the form of the root), as follows:

Problem 1:

Mr. Totonafo Nehe have many square-shaped land with an area of 3600 $m^2$ and he wanted to build a square-shaped boarding room on the land, where the width of the planned boarding room a tenth of the width of the ground. Determine the width of each boarding room and how many boarding rooms can be built on Totonafo Nehe's land?

One example of the problem solving by students are:

 

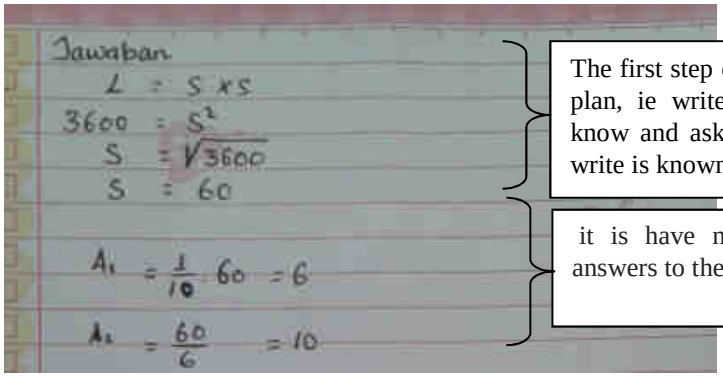


Figure 1. Answer Question Number 1

Problem 2:

Given A and B are the end points of a tunnel like the picture on the side seen from the right vertex C. If the distance CB = 30 m and CA = 4 m, then the length of the tunnel is ... meters.

Figure 2. Tunnel

One example of the problem solving by students are:

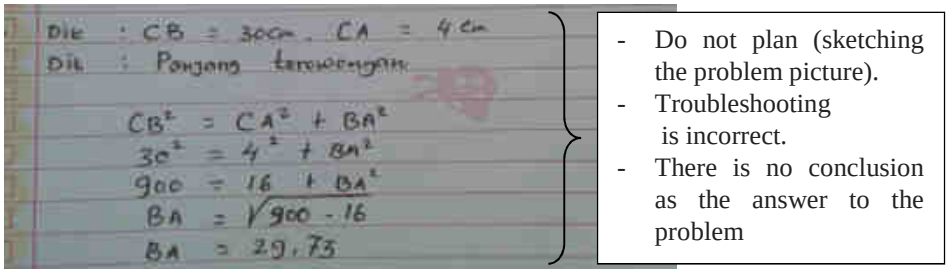


Figure 3. Answer Question Number 2

Problem 3:

Given a rectangular piece of paper. Fold the paper in the middle so that the fold line divides the paper field into two equal fields. Fold it again in the same way the paper folds earlier. Do this folding constantly. Find a pattern that states the relationship of many folds with the many areas of paper formed.

One example of the problem solving by students are

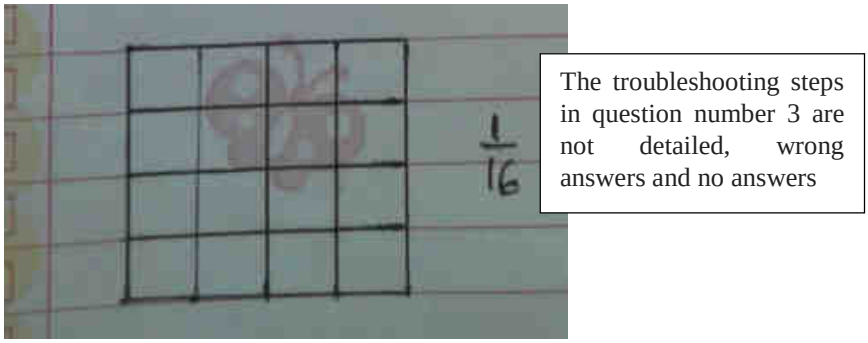


Figure 4. Answer of Question Number 3

The result of an overall assessment of the ability to solve problems by students of class X in the appendix 1, in which 40 students there are 6 students (15%) in the excellent category, meaning that students are able to solve the problem very well, 4 students (10%) in Good category, meaning the students are able to solve the problem well, 7 students (17.5%) in sufficient category means that students are enough to solve the problem correctly, and 18 students (45%) in the category of less able to solve the problem, and there are 5 Students (12.5%) have not been able to solve the problem or are far from expectations. Can be summarized in Table 1 below.

Table 1. Observation Value in X-IPA3 Class SMA Negeri 1 Telukdalam to Know Student Problem Solving Ability

| No | Many Students | Percentage (%) | Value | Category |
|---|---|---|---|---|
| 1 | 6 | 15 | 80-100 | Very good |
| 2 | 4 | 10 | 66-79 | Good |
| 3 | 7 | 17.5 | 56-65 | Enough |
| 4 | 18 | 45 | 40-55 | Less |
| 5 | 5 | 12.5 | 30-39 | Failed |
| Amount | **40** | | | |

Based on the answers of three questions the question shows that students' math problem solving ability is still low. Where students can not do the questions correctly and can not answer questions or students answer questions with routine procedures. Students need to understand the mathematical relationship with everyday life as well as other subjects by using learning tools that are more easily understood.

When viewed from the percentage of students' observation capability of 30 people (75%) students from 40 students in the category of less good or it can be concluded that the problem solving ability of students is still low. Judging from the syllabus, lesson plans should be made of teachers and developed according to the needs of students in the school, but investigators found syllabus and lesson plans that are plagiarize and the source of the Internet without developed by the teacher concerned, as well as the textbooks that teachers use the books provided school.

Based on the facts, ranging from a monotonous learning process, the Lesson Plans is not based on or based on the use of a particular approach / model. Student Worksheet should be available and distributed to each student to understand the material summary and solve problems designed to familiarize students with mathematical problems, assessment sheets that each teacher should make and develop as a teacher's readiness to evaluate student learning outcomes. But through observation conducted by the researcher, the students do not have students' books, Student Worksheet or teacher assessment sheets and problem solving ability of students are still very low.

To answer all the problems above the active role of the teacher is needed. Teachers are not only required to have the knowledge of teaching skills with the complexity of the role in accordance with the duties and functions it carries but also must be creative. To create the learning as required in the Curriculum 2013 teachers need to prepare and plan the lessons to be implemented. Because the students' learning activities can take place very much depends on the planning and preparation of teachers. It can be concluded that the results of the above observations indicate that students' problem solving skills are low and instructional equipment is less complete and not developed at all. For that reason researchers need to study it through research. As stated by Akker den Van J., et al. (1999:95) that: Development of research aims at making both practical and scientific contributions. In the search for innovative 'solutions' for educational problems, interaction with practitioners is essential.

Planning a learning process is a must to be prepared by the teacher and develop the learning plan. The teacher must be able to plan the lesson, where learning planning becomes the solution for the problem or the students' learning difficulties. Each teacher in the educational unit is obliged to develop a complete and systematic learning tool so that learning takes place interactively, inspiration, fun, challenging, motivate learners to actively participate. As noted by Anthony Glenda and Walshaw Margaret (2009:150) that: Effective teachers pay

attention to the different needs that result from different home environments, different languages, and different capabilities and perspectives. The positive attitude develops that raises students' comfort level, enlarges Reviews their knowledge base, and Gives them greater confidence in their capacity to learn and make sense of mathematics. Teachers plan and develop learning tools for the purpose so that students are able to learn with the appropriate learning approach so as to empower the ability that is in itself, with the development of learning tools can foster positive attitude and enlarge the greater confidence in student self-capacity to learn matematika. In the curriculum in 2013 one of the approaches recommended in the implementation of interactive learning activities one of which is the approach Contextual teaching learning (CTL).

According to Alwasilah Chaedar A. (2014:19) that the nature of CTL is summarized in three words: meaning, meaningful, meaningless. CTL acts as a facilitator to help students discover the meaning of learning. When students are able to work and experience directly, not just know it so that math can be applied in real life everyday then the learning is meaningful for the students themselves. Then when a teacher is able to direct and guide students with contextual learning and learning implications for the construction of student knowledge it can be felt meaningful learning through CTL that empowers students' abilities. The material presented has a meaning with different qualities. Then Alwasilah Chaedar A. (2014:20) suggests that the meaning of quality is a contextual meaning that is by connecting teaching materials with personal and social environment.

As expressed by Nurdin Syafruddin (2016:200) that CTL is a learning strategy that emphasizes the full process of student involvement in order to find the material learned and relate it to real life situations that encourage students to apply it in real life. Hull Dan (1999:1) argues that: Contextual learning theory, learning occursonly when students (learners) process new information or knowledge in such a way that it makes sense to them in their own frames of reference (their own inner worlds of memory, experience, and response).

Learning occurs only when students (learners) process new information or knowledge in such a way that it makes sense for their own thinking (memory of their inner world, experience, and response). Forwarded Sanjaya (Nurdin Syafruddin, 2016:201) learning in CTL is a problem-solving process, a process of self-experience that develops gradually from simple to complex.Johnson (2014:310) suggests CTL is a teaching-learning concept that will help teachers connect the content of lesson problems with the real world, as well as motivate students to make connections between knowledge and application in their lives. Komara Endang (2015:66) suggests CTL is a learning approach that emphasizes the process of full student involvement to find the material learned and relate it to real life situations that encourage students to apply it in their lives. Effective teaching and learning activities need to have a clear and clear way of thinking about what is learned. With many problems that arise there needs to be updates in the classroom that direct the learning so that students are always active and can encourage to improve students' math learning ability. Approach that can improve student ability one of them with CTL approach. From some expert opinions above can be concluded CTL is a learning approach that can improve students' ability, which emphasizes the process of full student involvement to be able to find the material learned and relate it to real life situations. This is supported by the statement of Michael L. Crawford (2001:2-3) argues that the strategy Contextual Teaching Learning (CTL) is Relating, experiencing, applying, cooperating, transferring.

In connection with the implementation of Curriculum 2013, mathematics learning in Senior High School (SMA) also changed with the integration of ICT in learning. The use of ICT media aims to reduce the learning difficulties caused by abstract object of study in mathematics. One software that can be developed into a medium of learning mathematics is autograph. According to Tarmizi, et al. (2008:186) argues autograph is software that is used to teach calculus, algebra and geometry, has two dimensions and three dimensions for topics such as transformation, conic sections, vector, tilt and derivatives. Behzadi Hassan Mohammad (2013:3) argues autograph is software that is developed in the UK (1990) with the efforts of some teachers, designed software includes two-dimensional and three-dimensional geometry, trigonometry, statistics and probability, is designed for high school students who do not understand Math and solve problems without the need for calculations. It helps students in learning abstract objects of geometry and algebra. Besides this, the autograph is easy to use and can be obtained free of charge. Due to these advantages, the use of autographs is expected to reduce the learning difficulties experienced by students. But what happens in the field is not in accordance with the expected competencies.

In this study used a computer with software media autograph. In the classroom use of mathematical software allows students to visualisasikan, can create learning math fun and exciting so as to facilitate students' understanding of the mathematical concepts that have implications for mathematical problem solving and further understand the phenomenon of mathematics in real life. This will affect the process and the efficiency of learning to the student learning outcomes. The teacher creates a pleasant learning environment that

is designed and developed in the learning tools such as syllabus, lesson plans, instructional media, student books, student activity sheets, student assessment sheets so that students are able to build their knowledge through contextual problems or daily experience problems.

According to the NCTM (2000:2) students must learn mathematics with understanding, actively building new knowledge from experience and prior knowledge. The process of learning in the classroom should be started from the real problems that have been experienced or can be thought of the students, followed by exploration activities, then the students will learn mathematics informally. In general the problem can be called the gap between expectations with reality, the gap between what is wanted and what happens or the facts. Problems are subjective to everyone, meaning that a question is a problem for a person, but not a problem for others. Likewise a question is a problem at one time but not become a problem the next when the problem can be known how to solve it. Problems can be viewed as a "problem" is a very relative thing. A problem is considered a problem for students, but for other students it may be a routine thing.

There are many interpretations about the problem. Polya (Florida Department of Education, 2010:2) defines the problem as an attempt to find a way out of a problem to achieve an objective that can not be achieved immediately. According to Hasratuddin (2015:61) if a problem is given to a child and the child immediately knows how to solve it correctly, then the problem can not be said as a problem for the child. Followed by Hudojo (2005:128) one of the requirements of a problem for students that question can not be answered with routine procedures that have been in the know students.

Next Cooney et. al (Hudojo, 2005:130) suggests that teaching students to solve problems allows students to be more analytical in making decisions in life. According Eysenck (Novotna J. et.al, 2014:2) also suggests that students' performance in problem solving improves if they repeatedly meet the same type of problem or if they can take advantage of their previous experience.Therefore, with reference to the opinions above, then the problem solving can be seen from various senses that is as an effort to find a way out that is done in achieving the goal. Also requires readiness, creativity, knowledge and abilities and applications in everyday life.

When students study mathematics with concrete problems related to the everyday problems, where students are encouraged to solve problems while imagining the problem again relating to the student's own experience or can be exemplified the problem in accordance with the material taught then the great hope that students Able to experience the experience so much easier to solve the math problem. Polya onwards (Florida Department of Education, 2010:1) points out that one of the first tasks of the teacher does not give the impression that mathematical problems have little relation to one another, and nothing to do with anything else. Teachers should encourage students to imagine a problem in which they can take advantage of problem-solving procedures, or apply the results obtained. The troubleshooting procedure by Polya (Florida Department of Education, 2010:1), namely: 1) understanding the problem, 2) devising a plan to solve the problem, 3) mplementing the plan, 4) reflectingon the problem.

In order for problem solving abilities to be realized the required lesson plan prepared by the teacher. The process of learning activities in the classroom can not be separated from syllabus and lesson plan. The syllabus and lesson plan prepared by the teacher include learning activities that are designed and developed to achieve the learning objectives. Firstly the syllabus is developed and then elaborated syllabus elements into the lesson plan which is planned, designed by the teacher of mathematics.Nurdin Syafrudin (2016: 94) argues that the lesson plan is a short-term plan to estimate or project what is done in the lesson.

To implement syllabus and lesson plan, media or tools are needed and teaching materials in the form of Student Activity Sheets can help optimize the teacher plan in teaching. Student Activity Sheets is usually purchased by teachers, teachers should be able to make their own Student Activity Sheets in accordance with the material and designed as possible. So that Student Activity Sheets can be more interesting and more contextual with school situation or condition of social culture of learners (Prastowo Andi, 2011: 203) Nurdin Syafruddin (2016: 111) states that Student Activity Sheets as a support to increase student activity in the learning process can optimize learning outcomes. Trianto (2011: 222) describes that Student Activity Sheets is a student guide that is used to conduct investigation or problem solving activities. From some of the above opinions can be concluded that Student Activity Sheets is used to direct the learning process of students, in the presence of Student Activity Sheets can provide wider opportunities in the construction process of student knowledge.

## 2. Research Methods

This type of research is development research. The developed are learning device on material of function and the

quadratic equation-based approach *Contextual Teaching Learning* (CTL) assisted *autograph* to improve students' problem-solving skills

### *2.1. Learning Device Development*

Development model used to develop the learning device is a 4-D model of Thiagarajan, Semmel Semmel and consists of four stages of development that *define, design, develop, disseminate.*

The stages of developing the learning tools are detailed as follows:

- Stage definition. The purpose of the defining stage is to define and define the terms of learning. Through the analysis of determined objectives and material constraints for instructional devices. The phases in this stage are early analysis, student analysis, concept analysis, task analysis, and the formulation of learning objectives.
- Stage Design.The design steps undertaken in this study include the preparation of tests, media selection, format selection and initial design.
- Stage Development. Because aim from stage of development is to produce a final draft is good, then *the first draft* will be validated to experts and tested in the field. Furthermore, *the first draft* will be revised based on input from experts and the data obtained from field trials. Following this Detailed measures undertaken on stage this.
  a. Validation / ratings Expert
     In this step *the first draft* done is evaluated by experts in the field. The experts referred to in this case are the competent validators who include lecturers of mathematics education UNIMED, high school mathematics teachers and experts relating to the language aspects. In general, expert validation includes:
     1) Learning device format: whether the format of the learning device is clear, attractive, and suitable for the wearer.
     2) Illustration of learning tools: illustrations are clear, easy to understand, and clarify concepts.
     3) Language: whether the sentence on the learning device uses the language in accordance with the Indonesian language rules and whether the sentence on the learning tool does not lead to multiple interpretations.
     4) The content of the learning device: whether the content of the learning device matches the material as well as the objectives measured.

     Based on input from experts, materials and instructional plans that have been drafted revised to make learning tools valid and effective. Learning device produced in this phase is called *the draft II.*

  b. Field Trial. Field trials are conducted to obtain direct input to the learning tools that have been developed so as to produce a final device. Learning tools are tested in schools to see the effectiveness of learning tools that have been designed. Validated learning tools were piloted to trial class I 6 meetings. The first test result is used as a reference for the revision of the learning device for the next trial until the conclusion is reached that the effective criteria have been met. At each stage of the experiment will be recorded all the activities that arise, including: how the ability to solve student learning problems, how students' responses during learning, how students' active activities in learning and how to improve the ability of students' mathematical problem solving skills of the first trial and the next trial . At the end of the field trial will obtain the final device *(Draft Final)* ready to spread on a wider scale.
  c. Phase Deployment. The development of learning tools reaches the final stage if it has obtained a positive assessment of the experts and through development tests. The learning devices are then packaged, deployed, and defined for a wider scale. The dissemination in this study was done limited to teachers or MGMP team of SMA Negeri 1 Telukdalam.

## 3. Research Result

To know the improvement of problem solving mathematics problem of student perindikator, can be summarized in table 2 below:

 

Table 2. Results Average Analysis Improving Ability Problem Solving Mathematics Student Perindikator At Trial I

| No | Indicator | Tests I | | Gain | Category |
|---|---|---|---|---|---|
| | | Pretes | Post-tests | | |
| 1 | Understanding the Problem | 2.23 | 2.7 | 0.265 | Low |
| 2 | Planning a Settlement | 2.46 | 3.4 | 0.610 | Medium |
| 3 | Solve the problem | 0.9 | 2.6 | 0.548 | Medium |
| 4 | Check again | 0.29 | 1,2 | 0.245 | Low |
| Average | | | | 0.333 | |

Table 3. Results of Average Analysis of Improving Student Problem Solving Ability of Student Mathematics Indicator II

| | Indicator | Tests II | | Gain | Category |
|---|---|---|---|---|---|
| | | Pretes | Post-tests | | |
| 1 | Understanding the Problem | 3.53 | 3.74 | 0.446 | Medium |
| 2 | Planning a Settlement | 3.41 | 3.83 | 0.711 | High |
| 3 | Solve the problem | 2.12 | 3.11 | 0.526 | Medium |
| 4 | Check again | 0.8 | 2.19 | 0.434 | Medium |
| Average | | | | 0.423 | |

From table 3 it is found that students' ability to understand the problem with medium category, plan the completion of high category, solve the problem with medium category, and lastly re-examine the medium category. It can be concluded that students' mathematical problem solving ability of CTL-based assisted autograph increased overall with an average increase of trials I to II trial of 0.37.

## 4. Discussion

To answer the formulation of research problems and how the research objectives are achieved, the following will be presented a discussion of research findings in the form of development of learning devices based on CTL assisted autograph.

### *4.1. The development of CTL-based learning tools aided autograph*

Mathematics learning tools developed in this study is a CTL-based device-assisted autograph. The Association with the Center for Student Success / RP Group and the Academic Senate (2009:10) suggests that CTL implications for learning centered on issues closely related to contextual learning that involves students to be active so that learning becomes more effective and relevant. This approach also often asks students to work in teams, direct their own learning and develop creativity through the real world of students.

Based on research conducted by Khotimah RP & Masduki (2016:1) said that CTL can improve students' math problem solving skills. The same thing is also known to occur in this study, that assisted CTL autograph can improve students' math problem solving skills. According Meanwhile, Ton Mooij (2004:114-115) in contextual learning theory, three types of contextual conditions (differentiation of learning procedures and materials, design of integrating ICT support, and improvement of development and learning progress) are related to the four learning diagnostic aspects, Instructional, managerial. Integration of CTL learning approach with ICT (software autograph) can improve student learning outcomes. The development of mathematical tools based CTL assisted autographs in the study performed in accordance with the procedure development model 4D Thiagarajan, Semmel and Semmel consists of 4 stages of development: stage definition (define), planning (design), development (develop), and the spread (disseminate). Previous research

that developed the device using the 4D development model was also carried out by Munawaroh & SS Nanik (2015:90) by developing a learning model with CTL approach to improve students problem solving skills, they said that the model they developed was designed appropriately to be implemented in Class VIII junior high school based on feedback obtained from experts. Overall, their research can be concluded that this development stage can be implemented in mathematics learning and help teachers to develop learning tools to apply to students. The four 4D stages are interrelated and are always associated with revisions. All stages of development of this device always follow the 4D development stage.

In addition, Krisnandari Ekowati Ch., et al, research. (2015:1) says that CTL can increase student activity in groups that can be seen from their cohesiveness to solve mathematical problems well. In this study the device developed based on CTL assisted autograph has fulfilled the practical requirements where the students follow the learning well and the teacher can carry out the learning well. The end result of the development of this tool is a mathematical device based on contextual teaching learning valid, practical and effective. From the results of II trials in class XIA3, it is known that the mathematical devices developed have met the practical and effective requirements. With the application of autocarrel-based CTL-assisted CTL tools, students complete the classical ability to solve problems, the percentage of ideal time of student activity has been in accordance with established, the ability of teachers to manage learning is very good and the number of students who give positive responses to the components and learning activities are in accordance with Requirements that have been established from the indicators of effectiveness.

### *4.2. Mathematical Problem Solving Abilities*

One of the goals gained from the development of mathematics learning tools in this research is to improve students' math problem solving skills. Problem solving is very important in mathematics. NCTM (2000:52) says that solving problems other than as a goal of learning mathematics is also a major tool in learning mathematics. Meanwhile, According to Schoenfeld (SP Yeea, JD Bostic, 2014:2) problem solving requires making sense of the problem situation and the Means Necessary for making decisions, the which directs an individual's understanding. In addition, Liljedahl Peter, et al. (2016:1) says mathematical problem solving has long been viewed as an important aspect of mathematics, mathematics teaching, and mathematics learning. In this study, automotive assisted CTL was used in learning through mathematical tools to improve the ability to solve mathematical problems. This is also supported by the research of Surya, E., Putri, FA, & Mukhtar (2017:85) who said students' math problem solving skills can be improved through contextual learning. The level of mathematical problem solving ability in this study was measured based on test result tested to students in class XIA1 (trial I) and class XIA3 (trial 2) obtained by mean of perindicator 0,333 and 0,432. The average increase in student problem-solving ability from trial I to trial II is 0.37 points with a 38.5% classical completeness learning improvement. Based on the test results are known to increase the ability to solve the problem of mathematics students using mathematical learning tools based on CTL assisted autograph.

## 5. Conclusion

Learning tools developed have valid criteria to obtain a valid criterion validated to five people validator to validate the contents of selanjutknya do field validation device to obtain a valid items and reliab el. The value of total average validation Lesson Plan of 4, 506, the average total validation Student Book (BS) of 4, 687, the total average validation Student Activity Sheets of 4.120. The total average value to wholly within a value of 4 Va 5 so it can be declared valid criteria. As for the pre-test and post-test problem solving ability by 5 items is valid according to experts with the record needs a little revision.

In trial I, it was obtained the validity and reliability of problem solving and connection test. To pre-test and post-test showed that 5 problem solving valid by testing the 5 questions to be used in trial II. As for the criteria developed effective learning device that meets the criteria effectively. Judging from the criteria (1) Achievement of mathematical problem solving ability of students that are 21 those students who complete (52.5%) in the pre-test and 36 were completed (90%) in the post-test, (2) an active activity of students during activities meet the criteria of an ideal time specified tolerance, (3) positive student response against components component learning device and learning activities developed with an total average of 89.325%.

Strengthening students' mathematical problem solving abilities gained from the increase in average total and average increase for each indicator of students' mathematical problem solvingability in trial I, trials II and from trial I to trial II. (a) In trials I increase in the average total value of mathematical problem solving ability of students is 0.33. While improvement of problem solving for each indicator that is for indicator to understand

problem equal to 0,26, indicator plan problem solving 0,61; indicators solve problems and idikator 0.54 m emeriksa back responses, the increase was 0.24, (b) In test 2 the increase in the mean value of total students' math problem solving abilities was 0.43. While the improvement of problem solving for each indicator that is for indicators understand the problem is 0.44; The indicator for planing of problem solving is 0.711; The indicator solves the problem of 0.53 and the indicator re-examining the answer obtained by the increase is 0.43.

Active activity of students during activities meet the criteria specified tolerances ideal time. At trial I all activities of students already at an ideal time interval specified tolerances so that this criteria is reached. While on trial II all activities of students already at an ideal time interval specified tolerances so that this criteria is reached. Positive student response against components of learning tools and learning activities. In trials I total average positive response of students on test I by 88.13%, whereas in trial II total average positive response of students on test II at 89.32% so that this criteria is reached. The process of student answers to trials II if the review of the suitability of the answers to the indicators, as well as steps to resolve the students' mistakes made in resolving the problem in general is better than in trials I.

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