The Learning Tools development of Rectangular and Square Material Oriented toward the Learning Cooperative Setting and included Bruner Theory on Students.

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Abstract. The purpose of this study is to produce valid, practical, and effective mathematics learning tools on rectangular and square material which oriented toward cooperative setting learning and included Bruner's theory in VII grade students of State MTs of Bontotangnga, Bulukumba Regency, South Sulawesi. This type of research was a research and development that produced learning tools consisting of Lesson Plan (RPP), Handout (BS), and Student Worksheet (LKS). The subject in this research was 25 students of VII grade of State MTs of Bontotangnga Bulukumba regency, South Sulawesi in the academic year 2018/2019. The mathematics learning tools development, which used, refered to the Thiagarajan 4-D model. The learning development approach system carried out includes 4 stages such as, define, design, develop, and disseminate. The data collection instruments were the learning device’s validation sheets that aimed to obtain the experts and practioners validation data regarding the Lesson Plan (RPP), Handout (BS), and Student Worksheets (LKS). The student activity observation sheet aimed to obtain student activities data during the learning process by using cooperative setting learning tools which included Bruner's theory that have been developed. Meanwhile, the learning outcomes tests aimed to measure the cognitive aspects of students in the form of a description test. The data analysis technique used was validity, practicality and effectiveness data analysis. The results showed that: (1) Lesson Plan (RPP) and Student Worksheet (LKS) were categorized as very valid. Meanwhile, the Handout (BS) were categorized valid, (2) Practical, based on the observations, the learning device was well-implemented in the trial process, and (3) effective. Hence, this has fulfilled the three criteria such as, the effective student activity, the responses toward the positive learning, and mastery learning classically achieved.

Keywords: Development, learning tools, rectangular and square, cooperative, Bruner's theory

1. Introduction

Basically, the purpose of education is a continuous process to overcome the problems faced. Therefore, students must really be trained and accustomed to thinking independently. The education paradigm places more emphasis on students as human beings who have the potential to learn and develop as well as the ability to aware themselves, the ability to have an existence, the possession of conscience, the ability to be responsible and moral [1]. The truth of science is not limited to what is...
conveyed by the teacher. The teacher must change his role such the highest authority of scientific knowledge as a facilitator who guides students to find the knowledge by themselves. Human resource is the educational or training institution product. Therefore, schools as educational institution is required to improve the quality of human resource. One of ways is by improving the mathematics. Seeing the importance of mathematics and its role in facing the progress of science and technology and global competition, the improvement of the mathematics education quality in all types and levels of education must always be pursued. The efforts to improve the quality of mathematics education have been carried out by many governments. One of them is by improving the 1994 curriculum which is developing the 2004 curriculum and the Education Unit Level Curriculum (KTSP).

At KTSP explained that learning mathematics aims the students have the ability to include: (1) understanding mathematical concepts, explaining the interrelationships between concepts and applying concepts or algorithms widely, accurately, efficiently and precisely in problem solving, (2) using reasoning on patterns and properties, manipulating mathematics in making generalizations, compiling evidence or explaining mathematical ideas and statements, (3) solving problems include the ability to understand problems, design mathematical models, solve models and interpret the solutions obtained, 4) communicating ideas with symbols, diagram tables or Other media to clarify the problem, (5) have an attitude of appreciating the usefulness of mathematics in life, namely having curiosity, attention, and interest in learning mathematics, as well as being tenacious and confident in problem solving [2].

The reality in students of VII grade of State MTs of Bontotangga on the initial observation shows that mathematics learning is generally more centered on the teacher. The teacher is more dominant in learning activities, while students more often play a good listener and note taker. Students are less given the opportunity to construct their own knowledge or concepts learned. In learning, teachers tend to transfer their mathematical knowledge into students' minds. Students are often positioned as people who "know nothing" who only wait and absorb what is given by the teacher. So students become passive and less actively involved in learning activities. This may have something to do with the teacher's view that their main task is to complete learning material contained in the GBPP or in the Handout. Learning habits like this result in students lacking independence, not daring to express their own opinions and lacking persistent testing in solving mathematical problems. The knowledge possessed by students is also only limited to what is given by teacher. According to Suryono, the weaknesses of mathematics learning undertaken by teachers in schools today include: (1) the low ability of teachers to use varied learning methods, (2) the ability to teach teachers is limited to answering questions, (3) teachers are reluctant to change teaching methods which is already considered to be true and effective, (4) Teachers only use conventional learning methods without regard to the student's thinking aspects. [3]. Weak mastery of students towards mathematics causes low student learning outcomes. Efforts to improve school mathematics learning have also been carried out to improve the learning outcomes quality in schools, such as upgrading teachers, improving teacher education qualifications, curriculum renewal, research on difficulties and mistakes of students in learning mathematics, but the results have not been satisfactory.

This is sought to be changed, with these changes expected to improve student mastery of mathematics. To improve students' mastery of mathematics, there is a need for teaching and learning activities to encourage students to actively participate. With active students in learning activities, it is expected that learning outcomes and student retention can increase learning activities more meaningfully [4]. One of the materials taught in VII grade of State MTs of Bontotangga in the 2006 curriculum is the material "understanding the concepts and determining its size of rectangular and triangles" with one of the subjects being square and rectangular. From the observations result on teachers and students of MTs
Bontotangga State is still a difficult material for students for example there are still problems to solving question related to the circumference, square area and rectangle, even though this subject matter is one of the material that is closely related to the surrounding environment (daily life) and it is difficult to distinguish the forms of flat shape with one another such as rhombus with square and parallelogram with rectangles. The selection of rectangular and square material because the structure is often found in students 'daily lives, and is expected to be able to develop students' spatial abilities related to rectangular and square material. In everyday, we often deal with the measuring problem the area and circumference of the land and houses that we occupy. However, students often use the concept of broad and perimeter. Through this topic, students are also introduced to examples of problems using concrete objects which in their completion require mastery of concepts over rectangular and square subtopics. This subject matter is also a fundamental part in further learning mathematics, for example in geometry, especially in a flat shape while in preparing and formulating teaching plans there are still teachers who have not been able to compile and develop teaching plans properly due to the lack of understanding and appreciation of the curriculum so the teaching and learning process implemented is still far from expectations. Therefore, one of the efforts made is to plan and use mathematics learning tools using cooperative settings that involve Bruner's theory which can increase learning activities. Cooperative learning is a system in which there are interrelated elements. There are several elements constitute the main provisions in cooperative learning, namely: (a) positive interdependence, (b) face to face interaction, (c) individual accountability and (d) skills to establish relationships between personal or social skills that are intentionally taught (use of collaborare / socialskill) [5]. Through cooperative learning will give students opportunity to work together with fellow students on structured tasks. Through cooperative learning, a student will be a source of learning for other friends. Cooperative learning is structured in an effort to increase student participation, facilitate students in the leadership attitudes experience and make decisions in groups, and provide opportunities for students to interact and learn together with different backgrounds [6]. Jerome S. Bruner in his theory states that learning mathematics will be more successful if teaching process is directed to concepts and structures made in the subject being taught, besides the related relationships between concepts and structures. By getting to know the concepts and structures included in the material being discussed, the child will understand the material he has to master. This shows that material that has a certain pattern or structure will be easier for students to understand and remember [7]. Through his theory, Bruner revealed that in the learning process children should be given the opportunity to manipulate objects (props). Through the props the child will see firsthand how the regularity and pattern of structures contained in the object that is being watched. The order is linked by child to intuitive information that has been attached to him. By manipulating props students can learn through their activeness [8]. Learning is an active process that allows humans to discover new things beyond (exceeding) the information provided to them [9].

According to Bruner the learning process will take place optimally if the learning process begins with the enactive stage, and then if the first learning phase is deemed sufficient, students move on to second stage of learning activities, namely the learning stage using iconic representation mode, and subsequently, the learning activities are continued to the third stage that is the learning phase using symbolic representation mode. For example, in determining the square area formula, for the example stage students are given a square shape while not an example give other flat shapes such as triangles, circles, rectangles. In carrying out learning, the teacher really requires a number of teaching completeness in the devices learning form. Props help and facilitate teachers in carrying out teaching and learning activities, as well as providing a variety of learning experiences to students in order to
achieve the objectives so that it is necessary to develop props. Props include lesson plan, instructional media, teacher guides, student worksheets, formative tests and learning outcomes tests. The learning device is a set of learning resources that support the implementation of learning. The props in this study are the Lesson Plan (RPP), Student Worksheet (LKS), and Handout (BS). The learning kit is also equipped with an evaluation tool in the Learning Outcomes Test (THB) which can be used to measure student learning completeness.

To produce a good learning device, it is necessary to take a certain procedure, which refers to the learning system development model or refers to the learning device development model. According to Twelker that the development of learning systems is a systematic way of identifying, developing and evaluating a set of materials and strategies aimed at achieving certain goals [10]. Learning development models suggested by Thiagarajan et al are commonly called 4-D models (four-D models). This model consists of 4 stages of development, namely: (1) The definition stage aims to establish and define learning requirements. At this stage an objective analysis is carried out within the boundaries of the subject matter to be developed; (2) The design stage aims to design prototypes of learning devices. Activities carried out at this stage include preparation of tests, selection of instructional media, selection of formats, and initial design of learning tools; (3) The development stage aims to produce learning tools that have been designed based on feedback received from formative assessment and tools, subsequently revised. Activities carried out at this stage consist of expert validation and testing in classes that are writing subject; and (4) The dissemination stage aims to test the effectiveness devices in learning activities [11].

2. Method
This type of research is Research and Development. This development resulted in a learning tool consisting of a Lesson Plan (RPP), Handout, and Student Worksheets (LKS). The research subjects were students of VII grade of State MTs of Bontotangnga Bulukumba Regency, South Sulawesi, in the 2018/2019 academic year with 25 students. Development of mathematics learning tools used refers to the Thiagarajan 4-D model. This model is a learning system development approaches that carried out covering 4 stages, namely define, design, develop, and disseminate. The instruments used were (1) Learning device validation sheet, used to obtain data on the validation result of experts and practitioners regarding the Lesson Plan (RPP), Handout (BS), and Student Worksheet (LKS); (2) Observation Sheet, consisting of (a) Student Observation Sheet used to obtain data about student activities during the learning process by using cooperative setting learning tools that involve Bruner's theory that has been developed and (b) Observation Sheet Management of Mathematics Learning is used to observe the teachers ability to manage learning by using cooperative setting learning tools that involve Bruner's theory that has been developed; (3) Learning Outcomes Test aims to measure the cognitive aspects of students in description test. The data analysis technique used quantitative analysis to determine validity, practicality and effectiveness. Data obtained from the validation results are used to explain the validity and feasibility of using the learning tools that have been made. While trial data result in class are used to explain practicality and effectiveness. Analysis of the effectiveness in learning tools consists of student activities, student responses, and student learning outcomes or classical completeness.
3. Result and Discussion

3.1 Description of Development Results for Learning Devices.

Development of mathematics learning tools used refers to the Thiagarajan 4-D model. This model is a system of learning development approaches that is carried out covering 4 stages, namely define, design, develop, and disseminate. The stages in the Thiagarajan 4-D model are explained as follows:

3.1.1 Define Phase (define)
- Initial-final analysis

The reality in the field shown that there were still many students who had difficulty in understanding mathematics, one of which is rectangular and square material. In addition, the teacher learning method still uses conventional method that does not involve students in learning. The teacher still uses conventional learning patterns, such as, explaining the concept or procedure with a few questions and answers, giving question examples, and giving practice questions. This results do not allow the students accustomed to construct knowledge or method by themselves. Based on the developing theories today, it is highly recommended to do learning that can involve and activate students. One of mathematics learning approaches that emphasizes an active student and emphasizes the importance of using mathematics learning is through a cooperative setting that involves Bruner's theory. To carry out mathematics learning by the cooperative model and Bruner's theory, appropriate learning tools are needed. Therefore, it is necessary to develop a good learning tool. The learning tools developed in this study are: Lesson Plan (RPP), Handout (BS), Student worksheet (LKS) and Learning Outcomes Test (THB) for rectangular and square material in class VII MTs Bontotangnga which hopes to increase student learning outcomes, especially on the material.

- Student Analysis

The students' characteristics of VII grade of State MTs of Bontotangnga in the 2018/2019 academic year studied included cognitive development, academic ability, and background knowledge. The VII grade of State MTs of Bontotangnga students were around 11-12 years old. If it is linked to the Piaget's development theory, the intellectual development of students aged 11 years and over (junior high school students) is included in the formal operations stage. Piaget argued that children at this age are able to think abstractly and rationally. However, Piaget also suggested that at this age, a transition period occurs for children. Eventually, not all the children cognitive developments at this age are directly at the formal operations. There are still children at this age who find it difficult to grasp an abstract idea if it is not described in a concrete picture. Students at this age still need concrete objects in learning mathematics, including their daily experiences. Therefore, it is very appropriate if mathematics learning begins with concrete things instead of the abstract things. Hence, this study is expected to help students' understanding processes. In addition, the cooperative learning involving Bruner's theory is new for students. Based on the applied curriculum, students need to discuss the properties of rectangle and square and be able to determine the perimeter and area of rectangles and squares. Based on the observations of student knowledge related to the definition of rectangle and square, some students can only explain through its shape, therefore students are expected to be able to define rectangle and square based on their properties. In addition, students are expected to be able to determine the area and circumference of square lengths and squares, because they have memorized the formula for area and circumference, even some students have understood the concept of perimeter and square area of length and square. Therefore, for the material around and broad, instead of strengthening the concept, students are more directed to apply the formulas they already know to answer the questions given.
Concept Analysis
The material analysis aims to identify the main parts students that learned on the rectangular and square subjects for VII grade of state MTs of Bontotangnga by referring to the 2006 curriculum (Task Analysis). The results of the task analysis for the rectangular and square subjects in VII grade of state MTs of Bontotangnga are: (1) Finding the properties of the rectangle, (2) Writing the rectangular definition based on their properties, (3) Solving problems related to the properties rectangle, (4) Finding the properties of a square, (5) Writing a definition of a square based on its properties, (6) Solving problems related to the properties of a square, (7) Writing the circumference of a rectangle and square, (8) Finding rectangular and rectangular circumference formula, (9) Solving problems related to rectangular and rectangular circumference, (10) Writing the definition of rectangular and rectangular area, (11) Finding rectangular and rectangular area formula, (12) Solving problems relating to rectangular area and square.

3.1.2 Design Phase (Design).

Media selection
The learning media needed in the implementation of rectangular and rectangular learning at VII grade of MTs by cooperative learning involving Bruner's theory is a learning tool consisting of: RPP, BS, LKS and THB. Meanwhile, the required learning aids consist of: blackboard, markers, ruler / ruler, paper, chessboard, books, pins, eraser, notebooks and pencils / pens. (Format selection). The RPP format used is adapted to the 2006 curriculum RPP format which includes: competency standards, basic competencies, indicators, prerequisite materials, teaching materials, learning methods, learning activity steps consisting of introduction, core activities, and closing, learning resources and assessment. Handout, student activity sheets, and test results are expected to get students' interest and motivate them to learn.

Initial design
This stage is produced RPP initial design for 4 meetings, Handout, worksheets for each meeting, THB, scoring guidelines and answer keys. Broadly speaking, the results of the initial design are as follows: (1) The lesson plan (RPP) consists of 4 sets for 4 meetings; (2) Handout, is a student handbook that contains contextual problems in which students will learn it and it is equipped with questions for student practice. The Handout is arranged based on the applicable mathematics curriculum in accordance to the level of education. The Handout material can be adapted from several book references. The Handout design takes into account the learning model used in writing. Handout contain material / themes that students will learn. The material in Handout is formulated in the form of problems that will be solved by students or activities that are done in groups with the guidance of the teacher. This Handout strives to make it easy for students to find mathematical concepts and ideas; (3) Student Worksheets (LKS), designed by combining the steps of cooperative setting learning with discovery theory. Students follow instructions and find their own solutions. Student activity sheets, used in rectangular and square material with cooperative learning settings involving Bruner's theory, refer to and consider the purpose of preparing student activity sheets such solving mathematical problems. Furthermore, the teacher are guiding students to draw conclusions related to the concepts / principles used in solving these problems. In addition, they lure students to solve a problem in their own way, so students are more motivated to learn and trust more with the answers they get; and (4) The results of the preparation of learning outcomes tests (THB), used to measure the learning indicator achievement outcomes that have been set after students follow the learning process. In this activity, the design of the learning outcomes test, learning outcomes test items, alternative answers, and scoring
guidelines are carried out in this activity. The test compiled is a test in the form of a description / essay.

3.1.3 Developing Stage (develop)

- The Expert Validation Results

Some experts validations are focused on the format, content, illustrations, and language that covered all developed learning tools. The results of expert validation in the form of corrections, criticisms, and suggestions are used as a basis for making revisions and improvements for the learning tools. The expert assessment data of lesson plans, Handout, worksheets and learning outcome tests, can be seen in table 1.

| Devices                 | Indicators               | Assessment | Information |
|-------------------------|--------------------------|------------|-------------|
| RPP                     | 1. Basic Competence      | 4,00       | Very Valid  |
|                         | 2. BC Achievement Indicators | 3,25     | Valid       |
|                         | 3. Content and Learning Activities | 3,28     | Valid       |
|                         | 4. Language              | 3,83       | Very Valid  |
|                         | 5. Time                  | 3,75       | Very Valid  |
|                         | 6. Closing               | 4,00       | Very Valid  |
|                         | **Average**              | **3,69**   | **Very Valid** |
| Handout                 | 1. Format                | 3,30       | Valid       |
|                         | 2. Language              | 3,50       | Very Valid  |
|                         | 3. Illustration          | 3,33       | Valid       |
|                         | 4. Content               | 3,15       | Valid       |
|                         | **Average**              | **3,32**   | **Valid**   |
| Student Worksheet       | 1. Format                | 3,50       | Very Valid  |
|                         | 2. Bahasa                | 3,67       | Very Valid  |
|                         | 3. Isi                   | 3,67       | Very Valid  |
|                         | **Average**              | **3,61**   | **Very Valid** |
| Learning Outcomes Test  | 1. Validasi Isi          | 3,33       | Valid       |
|                         | 2. Bahasa                | 3,67       | Very Valid  |
|                         | **Average**              | **3,50**   | **Very Valid** |

Table 1 shows that the Learning Implementation Plan, Handout, Student Worksheets, and Learning Outcomes Tests in terms of the indicators are categorized valid, because every aspect for each type of device achieves an average value of more than 3, besides all of validator gives the conclusion that the device that has been developed is good and can be used with a little revision.

- Limited test

Before the trial, a limited test was first conducted on 7 students of VII.d grade of state MTs of Bontotangnga. The seven students were taken from a class that was not used for test classes in writing. (Simulation). Before conducting the trial, the researcher conducted a simulation of 1 meeting involving 10 students in VII.c and VII.d grade of state MTs of Bontotangnga. Researchers carry out simulations so that observers got a picture of how to implement learning in a cooperative setting involving Bruner theory in accordance to the learning tools developed by researchers. (Trial of learning devices). The revised Learning Kit and subsequent simulation results were tested in VII.e grade of Bontotangnga State MTs with 25 students. Learning tools tested include lesson plans, teacher books, worksheets and THB research instruments. Learning device testing aims to improve learning devices.
Practical Analysis
The purpose of the analysis of learning management data is to look at the practicality of cooperative learning model learning tools involving Bruner's theory. Based on the results of data analysis, it was found that all aspects of the teacher's ability to manage mathematics learning in cooperative settings involving Bruner's theory were categorized good with an average of 3.14. (Effectiveness Analysis). Learning tools are effective if they meet 3 criteria, namely (1) student activities, (2) student responses, and (3) completeness of learning outcomes.

Students' activity report
Based on the results of the study, it was found that during the cooperative learning mathematics activities involving Bruner theory, students were actively involved so that the dominance of teachers in learning could be reduced. In this process, students are expected to be able to develop cognitive aspects in accordance to the observation categories of student activities given. The average percentage of student activity during the mathematics learning process of cooperative settings involving Bruner's theory was obtained as follows: (a) The average of most time spent by students during the teaching and learning process was the active discussion with the peers, which was equal to 22.50% of overall time for one meeting. Thus the time spent actively discussing with the peers is at the ideal time interval that is set at 15% - 25% of the total time of one meeting; (b) The second highest average time spent by students during the teaching and learning process was asking questions to the teacher/friend, which was 14.06% of the total time of one meeting. Thus, the time used to ask questions to the teacher/friend is at the ideal ideal time interval, which is 7% - 17% of the total time of one meeting; (c) The third highest average time spent by students during the teaching and learning process was the time to know/see concrete objects related to the material, which was 17.81% of the total time of one meeting. Thus the time used to recognize/see objects in the ideal time interval is set, which is 13% - 23% of the total time of one meeting; (d) The fourth most average time spent by students during the teaching and learning process was the time used to listen/pay attention to the teacher's explanation, which was 13.75% of the total time of one meeting. Thus the time spent listening/paying attention to the teacher's explanation is at the ideal time interval used for the activity, which is 7% - 17% of the total time of one meeting; (e) The fifth highest average time spent by students during the teaching and learning process was the time used to answer/respond to teacher/peer questions, which was 12.19% of the total time of one meeting. Thus the time spent answering/responding to teacher/peer questions is at the ideal time interval used for the activity, which is 7% - 17% of the total time of one meeting; (f) The average amount of time spent by students during the teaching and learning process was the time to solve problems/answer with their own sentences, which was 11.56% of the total time of one meeting. Thus the time used to solve the problem/answer in its own sentence is at the ideal time interval used for the activity, which is 7% - 19% of the total time of one meeting; (g) The average of the seventh most time spent by students during the teaching and learning process was the time to read/understand problems in student worksheets and books, which was 7.50% of the total time of one meeting. Thus the time used to understand the problem in the worksheet and Handout is at the ideal time interval used for the activity, which is 1% - 11% of the total time of one meeting; (h) Meanwhile, the irrelevant learning activities were 4.38% of the total time of one meeting. Thus the time spent by students for irrelevant learning activities is the ideal time interval that has been set, which is 0% - 5% of the total time of one meeting. In general, the results of analysis of student activity data indicate that it has been achieved as expected based on the predetermined criteria.
Student Respond Results
The instrument used to obtain student response data was a questionnaire. This questionnaire was given to 25 students after participating in the mathematics learning process which implementing a cooperative learning model of mathematics including Bruner's theory to be filled according to their feelings and opinions on the learning tools and learning activities that had been carried out. Based on the results of data analysis, it showed that the average score of 3.8 was the positive category. Thus, it can be justified that student responses are fulfilled based on the predetermined criteria.

Learning Outcomes Test
The results of descriptive analysis of student learning outcomes tests after learning using learning tools with a cooperative learning model of mathematics that includes Bruner's theory can be seen in Table 2.

Table 2. The percentage Score of Mathematics Learning Outcomes for VII.e grade Students of State MTs of Bontotangnga Bulumkumba Regency.

| Score  | Category | Frequency | Percentage (%) |
|--------|----------|-----------|----------------|
| 0 – 54 | Very Low | 0         | 0              |
| 55 – 64| Low      | 3         | 12             |
| 65 – 74| Medium   | 4         | 4              |
| 75 – 84| High     | 52        |                |
| 85 – 100| Very High| 32        |                |
| Sum    |          | 25        | 100            |

Table 2 shows that from 25 students who took the learning outcomes test, 12% of students were in the low category, 4% were in the medium category, 52% of students were in the high category and 32% of students were in the highest category. This shows that students gain a varied understanding of the material presented by using cooperative learning mathematics learning tools that involve Bruner's theory. However, from these data, it can be seen that student understanding tends to be high or very high. If student learning outcomes are analyzed, then the percentage of students' mastery learning after applying learning by using cooperative learning mathematics tools that involve Bruner theory can be seen in Table 3.

Table 3. Mathematical Learning Completeness

| Score       | Category | Frequency | Percentage (%) |
|-------------|----------|-----------|----------------|
| 0,00 – 64,00| Incomplete| 3         | 12             |
| 65,00 – 100,00| Complete| 22        | 88             |

Table 3 shows that from 25 students, there were 3 students in the incomplete category with a percentage of 12% and 22 students in the complete category with a percentage of 88%. Thus, the mastery of student learning tests has met the classical completeness standards. From the three effectiveness criteria which include student activities, student responses, and mastery of learning outcomes, it can be concluded that in trials, the learning tools have been effective.

Dessiminating Stage
The Data obtained at the final developing stage is then disseminated in a limited way to the mathematics teacher at MTs Bontotangnga Bulukumba district. From the results of the dissemination obtained several suggestions from the participants, such as: (1) Mathematical learning tools in a cooperative setting involving Bruner's theory need to be improved by students' cognitive development on student worksheets in which many examples are needed by linking the surrounding environment; and (2) The cooperative model and the Bruner Theory for students are very well applied because students are very motivated and new method for students. Therefore, it is expected that mathematics
learning in a cooperative setting involving Bruner's theory can provide many examples in student activity sheets and Handout.

4. Conclusion

Based on the results of research and testing of mathematics learning tools, it can be concluded that: 1) the process of developing learning tools using the 4-D model of Thiagarajan, are define, design, develop, develop, and disseminate. ) The results of the development of learning tools are obtained valid, practical and effective. Lesson Plan (RPP), Student Worksheet (LKS), and Learning Outcomes Test (THB) are categorized as very valid while for Handout (BS) are categorized valid. Practical, based on the observations by the observers that learning devices are implemented well when testing and effective, because it has fulfilled the three criteria such as, effective student activity, responses to positive learning, and classical learning completeness are achieved.

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