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Development of Learning Devices Through Problem Based Learning Model to Improve Students Metacognition Skill at SMPN 17 Medan

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Abstract
This study aims to: 1) develop devices learning oriented problem-based learning models that meet the valid, practical, and effective criteria, 2) Improve students' metacognition skill by using development learning-oriented devices of problem-based learning models. This development study uses the Dick and Carey development model which completed in ten stages. The learning devices resulted from this study are: Implementation Learning Plan (RPP), Student Activity Sheet (LAS), Teacher Hand Book (BPG), Student Books (BS), and Metacognition Skill Test (TKM). Subjects in this study were students of class VII-1 and VII-2 in SMPN 17 Medan. The results showed that: 1) the development of learning devices meet the criteria of valid, practical, and effective review from each criteria, 2) There is an increase in student's metacognition skill of using development learning-oriented devices based on problem-based learning model.
Keywords: Development, Learning Device, Problem Based Learning Model, Dick and Carey Development Model, Metacognition Skill

1. Introduction

In study of mathematics, the ability to think and to solve the problem is one of the very important ability that must be owned by the students. The ability to solve problems will be a barometer for the student's success in learning mathematics. The main purpose of the students in learning mathematics are solving the problems (Kennedy *et al.* 2008; Musser *et al.* 2011). Students can also develop positive attitudes through learning to solve the problem. These attitudes are unyielding, determined and confident in unusual situations (Ontario Ministry of Education, 2006). These attitudes positively affects the ability of students in solving the problems (Pimta *et al.* 2009). Problem solving is central to the learning objectives of mathematics, and metacognition is seen as one of the five keys between components related to the achievement of problem-solving skill (Hoe *et al*. 2001). Metacognition skill becomes very important because it can train students' mathematical learning comprehension. Constructing mathematic understanding requires both cognitive and metacognitive elements, learners "construct mathematic knowledge" using metacognitive, and they guide, regulate, and evaluate their learning using metacognitive (TEAL 2011).

Metacognition has advantages in which one tries to reflect the way of thinking or contemplating the cognitive processes it does. Metacognition is also a process whereby a person thinks about thinking in order to build a problem-solving strategies. Jayapraba (2013) Said that "metacognition as thinking about thinking, metacognition is the skills where the thinking object is the process of thinking that happens to yourself". Students are said to have metacognition skills if in solving problems students are able to meet the following stages: (1) developing a plan of action, (2) organizing or monitoring settlement actions, and (3) evaluate the settlement action (NCREL 2007).

However, based on preliminary observations at SMPN 17 Medan, facts show that students' metacognition skills is still low. The low of students' metacognition skills is shown from the results of diagnostic tests in the form of story questions for prerequisite material given to 36 students. The test result shown only 6 students or 16,67% are able to make mathematical model with full completion of the steps and the correct answers with either category, 27 student or 75% were able to create a mathematical model with the completion of the steps was not complete and correct answer with enough categories, and 3 student or 8,33% cannot create a mathematical model altogether. Problems that occur so that the skill of students metacognition is low that teachers have difficulty in preparing the learning devices that can guide and train students to be accustomed to metacognition learning mathematics. Based on the results of interviews with teachers of mathematics at SMPN 17 Medan, so far metacognition skill does not become a focus in learning activities. On the other hand, researchers found that no teacher has a learning device that focused on training students' metacognition skills.

Haggarty dan Keynes (Muchayat 2011) That "in order to improve the teaching and learning of mathematics in the class, it is necessary to improve the understanding of teachers, students, materials used for learning and interaction between them". In the implementation of learning, the learning devices play an important role in the learning process. Sanjaya (2010) States that "through a mature and accurate planning process, the teacher is able to predict correctly the success that about to be achieved, in addition to the learning

process will be directed and organized, and the teacher can use the time as effectively as possible to achieve the success of the learning process". In order to achieve the learning objectives as the expected goals, it is necessary to select the appropriate model of learning, and development of learning devices need to be done in accordance with the learning model that is used. Learning model used should be able to make students active in learning activities, make learning meaningful, and able to train students to get used to metacognition in solving problems. Problem Based Learning model (PBL) is one solution, because according to Arends (2008), problem based learning model is a model of learning by learning approach the students on the issue of authentic and meaningful to students who serve as the foundation for investment and research students, so students can construct their own knowledge, to develop higher skills and inquiry, independent students, and increase the confidence of students. The development of problem-oriented learning-based learning devices can also improve students' thinking skills to higher level. As the results of the study Aufa, *et al* (2016) Shows that the development of learning devices based learning model based on aceh culture can improve students' mathematical communication skill.

Based on the problem that has been described, the purpose of this study are: 1) developed learning device oriented problem-based learning models that meet the criteria for a valid, practical, and effective, 2) describes the improvement of students' metacognition skill by using development learning device oriented problem-based learning model.

2. Literature

2.1. Metacognition Ability.

Metacognition refers to one's knowledge concerning one's own cognitive processes and products or anything related to them, e.g., the learning-relevant properties of information or data. … Metacognition refers, among other things, to the active monitoring and consequent regulation and orchestration of these processes in relation to the cognitive objects or data on which they bear, usually in the service of some concrete goal or objective (Flavell 1976). Metacognition is a thought process that involves controlling its own cognitive activity. Wellman (1985) stating metacognition is a form of cognition, a second or higher order thinking process which involves active control cognitive processes. It can be simply defined as thinking about thinking or as a "person's cognition about cognition". Simply put, metacognition is thinking about thinking (Jayapraba 2013). As is Schoenfeld (1992) stating "metacognition is thinking about our thinking and it comprises of the following three important aspects: knowledge about our own thought processes, control or self–regulation, and belief and intuition. Metacognition has advantages in which the student tries to reflect the way of thinking or contemplating the cognitive processes it does.

Metacognition skill according to Flavell (Jonnasen 2000) Is one's awareness of how one learns, the skill to judge the difficulty of a problem, the skill to observe the level of self-understanding, the skill to use information to achieve goals and the skill to assess self-learning progress. Uno (2007) states the skill of metacognition is a person's skills in managing and controlling the thinking process. The metacognition skill indicator is based on NCREL (2007) that is: (a) developing a plan of action, (b) organize or monitor actions and (c) evaluate the action. Next NCREL (TEAL 2010) provides guidance in the three components of metacognition, some of which are as follows:

When you develop a plan of action, ask yourself:
- What basic knowledge helped in this task?
- Why I am reading (part) bagian ini?
- How long do I complete this task?

When you set or monitor an action, ask yourself:
- How do I do it?
- Am I on the right track?
- What to do if I do not understand?

When you evaluate the action, ask yourself:
- How well do I do it?
- What did I learn?
- Do I get the results I expect?

In this study, metacognition questions are modified and used as assistance to build students' metacognition in solving the given problem.

2.2. Problem Based Learning Model

According Sinaga (2007) in philosophy, mathematics is the result of the construction of human thought. Therefore, the mathematical result of the reflection of human thinking and problem solving, then mathematics can be said to be the result of human ingenuity and effort. Problem Based Learning is a learning model that uses the problem as the starting point of learning. Problems that can be used as a means of learning are problems that

meet the real-world context, which is familiar with the daily life of the students. Eggen dan Kauchak (2012) mentions problem-based learning is a set of teaching models that using problems as a focus for developing problem-solving skills.

Whereas According to Dewey (Trianto 2011) learning based on the problem is the interaction between the stimulus and the response, that is the relationship between the two directions of learning and the environment. The environment provides input to students in the form of help and problems, while the brain's nervous system functions to interpret the aid effectively so that problems encountered can be investigated, assessed, analyzed and sought the solving well. Arends (2008) states that the problem-based learning model is a learning model where students work on authentic issues with the intent to develop their own knowledge, develop inquiry and higher-level thinking skills, develop self-reliance and self-confidence. Indicators of problem-based learning in this study refers to Arends (2012) said that the five phases of problem-based learning and required teacher behaviors for each phase is: (1) Orient Students to the Problem, (2) Organize Students for Study, (3) Assist Independent and Group Investigation, (4) Develop and Present Artifacts and Exhibits. (5) Analyze and Evaluate the Problem-Solving Process.

3. Research Methods

This type of study is Development Study. The development model used is the Dick and Carey development model which consists of ten development stages. Learning devices development in the form of Learning Implementation Plan (RPP), Teacher Hand Book (BPG), Student Book (BS), Student Activity Sheet (LAS) and studying instruments in the form of Metacognition Skills Test (TKM). Device development is done using the Dick and Carey development model (2009) which consists of 10 development stages. The overall development stage of the Dick and Carey model shown in Figure 1.

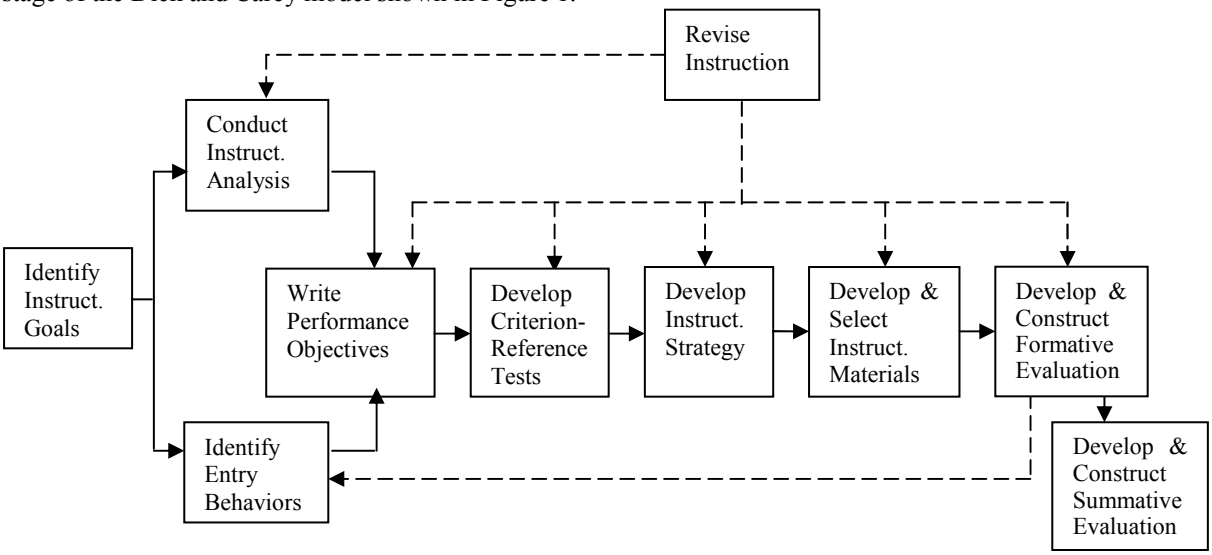

Figure 1. Dick and Carey Development Model

The instruments used in this study include instruments for assessing the quality of instructional devices covering aspects of prevalence, practicality and effectiveness. Instruments used in the form of observation sheets, questionnaires, and tests. For more details can be seen in Table 1 below:

Table 1. Research Instruments

Aspect	Instruments	The Observed Data	Respondent
The Validity of Learning Devices	Validation Sheet	Validity of RPP, LAS, BS, BPG, and TKM	Expert/Practitioners
The Practicality of Learning Devices	Validation Sheet	Practically of RPP, LAS, BS, and BPG	Expert/Practitioners
	Observation Sheet	Learning Devices Implementation	Observer
The Effectiveness of Learning Devices	Test	Metacognition Skill Test	Research Subject
	Observation Sheet	Students Activity	Observer
	Questionnaire	Student Response	Research Subject

Learning devices are said to be valid if they meet the criteria of content validity and construct validity. For content validity is done by 5 validators by assigning values 1 to 5 in each assessment column covering the following aspects: 1) format, 2) language, 3) content, and 4) illustrations. Furthermore the overall expert assessment is calculated on average to obtain the criteria of content validity assessment. The problem-based learning devices satisfies the expected content validity if the average validator's assessment of all learning

devices is valid with total value average ≥ 4. If not fulfilled, it is necessary to re-do the validation activities.

And so on until obtained learning devices that meet the validity of the contents. Furthermore, the validity of the construct to test the skill of metacognition. Before being used for field trials, the items on metacognition skill tests were tested outside the study subjects to measure the validity and reliability. To measure the validity of items can use the formula of *correlation product moment* and to calculate the reliability coefficient of test items used *Alpha-Cronbach* (Arikunto 2012). The practicality of the learning devices is reviewed based on the validator's assessment and the implementation of learning devices. The validator assessment criteria are met if the validation sheet of all validators states that learning devices can be used with revision or no revision.

Furthermore, the learning device implementation is reviewed based on the observer's assessment on the choice of scores of 1 to 5 in each aspect of the device implementation in the form of RPP, LAS, BPG and BS. The Implementation of learning device criteria are met if the percentage minimum average total score is ≥ 80% with good category (Arikunto 2012). The effectiveness of learning devices is reviewed based: 1) completeness in the classical student learning outcomes by testing the skill of metacognition, 2) student activity during the learning activities, and 3) students' responses to components and learning devices.

Completeness of student learning outcomes are based on the results of metacognition skill test in the form of essay test as much as 3 problems, and each problem is accompanied by metacognition questions. Effectiveness criteria based on completeness of student learning outcomes in classical fulfilled if ≥ 85% gain scores ≥ 2.18 on a scale of 4.

Student activity is reviewed based on the average observation assessment of all meetings on each aspect of the observed activity. Effectiveness criteria based on the student's activity is achieved if they meet the ideal time percentages specified tolerance (Sinaga 2007). The criteria of student activity based on the achievement of the ideal time tolerance set as follows.

Table 2. Percentage of Ideal Time and Student Activity Tolerance Limit

Student Activity Category	Ideal Time	PWI Tolerance Interval	Ideal Criteria
1. Pay attention / listen to teacher / friend explanations	25 % from WT	20 % ≤ PWI ≤ 30 %	Three of 1, 2, 3, 4, 5 are fulfilled and 3, 4 must be met
2. Reading student's books (BS) and student activity sheets (LAS)	15 % from WT	10 % ≤ PWI ≤ 20 %	
3. Take note of the teacher's explanations, notes from books, solve problems in the LAS, summarizes the work of the group	30 % from WT	25 % ≤ PWI ≤ 35 %	
4. Discuss, ask ideas, between students and friends or between students and teachers, and draw conclusions of a procedure or concept	30 % from WT	25 % ≤ PWI ≤ 35 %	
5. Perform behavior that is not relevant to learning	0 % from WT	0 % ≤ PWI ≤ 5 %	

Explanation:
PWI is the ideal time percentage
WT is the time available at each meeting.

Student responses are reviewed based on student responses to the given questionnaire. Criteria for effectiveness based on student responses classically fulfilled if ≥ 80% of the subjects gave a positive response (Sinaga 2007), that is on all aspects related to the device in question and the implementation of learning.

4. Result

4.1. Description of Learning Device Development Stage

Development of learning devices has been completed by using the Dick and Carey development model with the following details:

4.1.1. Identify Instructional Goals

Teaching objectives can be identified by first analyzing the instructional needs. The process of identifying instructional needs begins with identifying problems on the ground. Based on the diagnostic tests given, students' metacognition skill still low. Observations and interviews with teachers and students indicate that the cause is that students are not accustomed to metacognition in learning activities. This is also supported by the state of teachers who have not been able to develop learning devices that focus on developing students'

metacognition skills. Based on these findings, the main objective in this development devices is to develop and improve students' metacognition skill.

4.1.2. Conduct Instructional Analysis

Instructional analysis in this research as the process of elaborating general competence into sub competence, basic competence or special sub competence that is arranged logically and systematically. The activity is intended to identify the list of sub-competencies and establish relationships between one another to general competencies which in the 2013 curriculum are called competencies core. The material that will be taught are social arithmetic. So described the basic competence of the material, and developed indicators to achieve its success.

4.1.3. Identify Entry Behaviors

Cognitive development of research subjects at SMPN 17 Medan entered the formal operational stage because it is in the age range 12-13 years. This stage is characterized by a more logical, abstract, and idealistic way of thinking. The target subjects in class VII are students who are quite heterogeneous in terms of cognitive skills. Students are often confronted with cooperative learning with group discussions. However, students are rarely given the opportunity to solve problems in learning activities. Students are also never trained in metacognition skills in solving problems.

4.1.4. Write Performance Objectives

The writing of learning objectives is based on indicators to achieve basic competencies that have been prepared in the second development stage. The purpose of learning in this study is based on the achievement of basic competency indicator of social arithmetic material.

4.1.5. Develop Criterion-Reverence Test

At this stage a test of learning outcomes was developed to measure students' metacognition skills. The test is based on the learning objectives to be achieved. Based on these objectives, 3 essay tests were prepared and each problem was accompanied by metacognition questions.

4.1.6. Develop Instructional Strategy

The main components of an instructional strategy include instructional sequence activities, instructional outline outlines, and launch systems comprising instructional methods, media and instructional devices, as well as time allocations. The preparation of teaching strategies as a reference in the learning activities are prepared in the form of learning implementation plan (RPP) covering all these aspects. The lesson plan (RPP) is arranged in 3 sets for 3 meetings. The RPP covers all description of activities to be carried out at each meeting.

4.1.7. Develop and Select Instructional Materials

The main activities of this phase are the writing of the initial design of instructional materials that include the Teacher Handbook (BPG), Student Book (BS), and Student Activity Sheet (LAS). The learning materials are based on KI, KD, and indicators on social arithmetic materials, and adapted for the purpose of training and enhancing students' metacognition skills.

4.1.8. Develop and Construct Formative Evaluation

At this stage an evaluation of development learning devices have been completed. Formative evaluation is done with 2 stages, that is: 1) one-on-one evaluation by experts and practitioners, and 2) field trials. The goal is to see the weaknesses and improve the development devices. The result of one-on-one evaluation by experts and practitioners in the form of content validity assessment shows that all learning devices meet valid criteria, with average content validity of RPP = 4.52, LAS = 4.56, BPG = 4,43, and BS = 4 , 37. The entire item of metacognition skill test meets the valid and reliable criteria with the value of r_{11} = 0,908 (very high category). Field trials or trial I conducted to see the practicality and effectiveness of learning devices. In experiment I, the learning device has not fulfilled all the practical and effective criteria, so it must be revised to the learning device and done again the second trial.

4.1.9. Revise Instruction

Revisions were made based on the findings of device weaknesses in trial I. revisions were made to the lesson plans related to the allocation of learning time, as well as to taught the LAS and BS related materials. After the revision is completed, further field trials or II trials are conducted to review the practicality and effectiveness of learning tools, as well as improvement of students' metacognition skill between trials.

4.1.10. Design and Conduct Summative Evaluation

Summative evaluation in this study is not done. This is because summative evaluation is not part of the instructional design process (Dick, Carey and Carey 2009). Formative evaluation and summative evaluation cannot be coupled as two consecutive activities, but interspersed during the implementation period (Suparman 2014). So it takes a long time and cost a lot to do it.

4.2. Description of the Test Result I

The practicality criteria of learning device based on validator assessment are met, since all validators assess the developed learning device can be used with revision or no revision. Implementation of learning devices is met, in

terms of the average of all learning meetings get 81.46% percentage (good category). Based on these descriptions, the development learning devices meet the practical criteria.

The result of metacognition skill test showed that the total number of subjects who completed the score ≥ 2.18 reached 29 students from 36 students or 80.56%. So it does not meet the completeness criteria classical learning outcomes expected. Furthermore, the criteria of effectiveness based on student activity can be seen in the following table.

Table 3. Average Percentage of Ideal Time Student Activity Trial I

Meeting	Average Time of Student Activity for Each Category (in percent)				
	1	2	3	4	5
I (2 x 40')	23,96	15,63	33,33	22,92	4,17
II (2 x 40')	22,92	13,54	34,38	26,04	3,13
III (2 x 40')	20,83	15,63	34,38	21,88	7,29
Average	**22,57**	**14,93**	**34,03**	**23,61**	**4,86**
Interval Tolerance	20 % ≤ PWI ≤ 30 %	10 % ≤ PWI ≤ 20 %	25 % ≤ PWI ≤ 35 %	25 % ≤ PWI ≤ 35 %	0 % ≤ PWI ≤ 5 %
Criteria	Fulfilled	Fulfilled	Fulfilled	Fulfilled	Fulfilled

Based on the table above, all aspects of the activity was observed meet the criteria specified tolerances ideal time. Then the criteria of effectiveness based on student responses are also fulfilled, because students who give positive responses to components and implementation of learning reached ≥80% that is 89.81%.

Overall learning devices developed and practically valid criteria, but does not meet the criteria of effectiveness. This is because the aspect of completeness in the classical student learning outcomes have not been met. Thus the learning devices should be revised and subsequently conducted trials II.

4.3. Description of Trial Results II

The practicality criteria of learning devices based on the validator assessment are met in accordance with the description in the trial I. The implementation of learning devices in the second trial is also fulfilled, in view of the average of all learning meetings obtained a percentage of 85.14% (good category). Based on these descriptions, the learning devices developed meet the practical criteria.

The result of metacognition skill test showed that the total number of subjects who completed the score ≥ 2.18 reached 31 students from 36 students or 86.11%. So it does not meet the completeness criteria classical learning outcomes expected. Furthermore, the criteria of effectiveness based on student activity can be seen in the following table.

Table 4. Average Percentage of Ideal Time Student Activity Trial II

Meeting	Average Time of Student Activity for Each Category (in percent)				
	1	2	3	4	5
I (2 x 40')	23.96	15.63	34.38	23.96	2.08
II (2 x 40')	21.88	14.58	35.42	26.04	2.08
III (2 x 40')	16.67	15.63	33.33	31.25	3.13
Average	**20.83**	**15.28**	**34.38**	**27.08**	**2.43**
Interval Tolerance	20 % ≤ PWI ≤ 30 %	10 % ≤ PWI ≤ 20 %	25 % ≤ PWI ≤ 35 %	25 % ≤ PWI ≤ 35 %	0 % ≤ PWI ≤ 5 %
Criteria	Fulfilled	Fulfilled	Fulfilled	Fulfilled	Fulfilled

Based on the above table, the whole aspect of activity was observed meet criteria ideal time specified tolerance. Then the criteria of effectiveness based on student responses are also met, because students who give positive responses to the components and implementation of learning reached ≥80% of 92.04%. So overall learning device oriented problem-based learning model developed have valid criteria, practical and effective.

4.4. Improvement of Student Metacognition Skills

The improvement of students' metacognition skill was reviewed based on the increase of average score of metacognition skill test result from trial I to trial II. The average *post-test* result of the students on trial I was 2.25 while in trial II became 2.31. So there was an increase of 0.06 or 2.67%. Further improvement of students' metacognition skill is also reviewed based on the improvement of the mean value on each indicator of metacognition skill from trial I to trial II. In the indicator of developing action plan there is an increase of 0.07 or 2.98%, the indicator to monitor the settlement measures increased by 0.09 or 3.95%, and on the indicator to evaluate the settlement measures increased by 0.02 or 0.94 %. The above description shows that students' metacognition skill using learning-based learning-oriented learning devices developed increased from trial I to trial II.

5. Discussion

The result of the research shows that instructional device based on problem-based learning model developed meet the valid, practical, and effective criteria. These results indicate that the developed device has good device quality as it meets the valid, practical, and effective criteria (Nieveen 2007). Having produced a good quality learning device, the next goal is the application of development learning device able to improve students' metacognition skill. Metacognition is thinking about thinking (Aljaberi & Gheith 2015). Uno (2007) States "the ability of metacognition is a person's skill in managing and controlling the thinking process". Metacognition skills involve a person's knowledge and awareness of one's cognitive activity. Metacognition can be developed through problem solving. As is Hoe *et al* (2001) states "is one of the most important components involved in problem solving". In solving problems, metacognition skill can be seen through three basic elements. NCREL (2007) That "the three basic elements of metacognition are specifically in the face of the task, that is: i) developing a plan of action, ii) organized or monitor actions and iii) evaluate the action". In this study, metacognition skill in learning is trained by asking metacognition questions on each given problem.

Özcan & Erktin (2015) state "metacognitive questions can be incorporated into homework assignments to avoid the problems of implementing new methods in classrooms". The learning model used by the teacher affects the students' skill to solve the problem (Pimta *et al* 2009). Implementation of problem-based learning model is one of the solutions to familiarize students metacognition in solving problems. Arends (2008) which states that the problem-based learning model is a model of learning where students do authentic problems with the intent to compose their own knowledge, as well as develop self-reliance and self-confidence". Problem based learning emphasizes interaction among students. Vygotsky (Rusman 2011) Believes that "social interaction with other friends stimulates the formation of new ideas and enriches the intellectual development of students". In PBL teachers provide an active role in helping students. Bruner (Arends 2008) emphasized that "the importance of helping students to understand the structure of the key ideas or discipline. Thus the skill of metacognition of students will be more easily improved.

Based on the studied findings of the diagnostic test results, the overall skill of students metacognition is still low. This is because the teacher does not have a good learning device and appropriate in improve the students metacognition skills. Haggarty and Keynes (Muchayat, 2011) that "in order to improve the teaching and learning of mathematics in the classroom it is necessary to improve the understanding of teachers, students, materials used for learning and interaction between them". Therefore, in this studies, it is necessary to develop appropriate learning devices to train and improve students' metacognition skill and to achieve learning objectives. This is because there is no single learning resource that can meet all kinds of learning process objectives (Aufa *et al.* 2016).

Learning devices were developed using the Dick and Carey development model. The learning devices that are produced are the lesson plan (RPP), student activity sheet (LAS), teacher manual (BPG), student book (BS), and metacognition skill test (TKM). After the learning device has been developed, field trials are conducted. The results of trial I show that learning devices meet valid and practical criteria, but not yet effective. This is because the aspect of completeness in the classical student learning outcomes have not been met. Thus the learning device is done several revisions, especially in RPP which is the teacher guidance in the implementation of learning and LAS which is the student's guidance for group discussion in developing metacognition skill.

Furthermore, trial II is conducted, where the learning device developed has met the valid, practical and effective criteria. This is in line with the results of the study Aufa *et al* (2016) Which shows that the development of learning devices meets valid, practical, and effective criteria in two trials. The students' metacognition skill using learning-oriented model of problem-based learning model developed increased. The increase is based on the average grade increase of the student's TKM grade from trial I to trial II. As well as the increase in the average value of TKM students on each indicator of metacognition skill from trial I to trial II.

6. Conclusion

Based on the results of analysis and discussion in this study, presented several conclusions as follows:
1) The learning device-oriented problem-based learning model developed meets the valid criteria, reviewed from: a) Content validity and b) Construct validity. 2) The learning device-oriented problem-based learning model developed meets the practical criteria, reviewed from: a) Validator assessment of learning device and b) Learning device implementation. 3) The learning device-oriented problem-based learning model developed meets the valid effective criteria, reviewed from: a) completeness of student learning outcomes in classical b) activity of students in learning activities, and c) a positive response of students. 4) The metacognition skill of students using problem-based learning devices developed is increasing, in view of: a) the average of TKM student classical, and b) the average of TKM students on each indicator of the skill of a test metacognition I to trial II.

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