

**PRACTICALITY TEACHING MATERIAL BASED THE PROBLEM BASED LEARNING  
TO IMPROVE THE MATHEMATICAL CRITICAL THINKING ABILITY  
(Based on Academic Level Ability)**

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**ABSTRACT**

This research aims to produce teaching material based the problem based learning to the matter broad a flat plane and volume of turn to improve the critical thinking ability mathematical students reviewed based on the ability of academic ability students. The research is research of development by stage identified the potential of and problems , gather information , design products , do validation , do the revision , to pilot , and do the revision of the end .Subject research consisting of 52 students second semester course of study math education FKIP University Islamic of Riau (UIR). Research instruments composed of sheets chief praktikalitas on old teaching .Technique data analysis using analysis diskriptif kuantitatif .Based on the research done , obtained that overall and based on the level of the ability academic ( high , and , and low ) the teaching material based on the problem based learning to the matter size of the parcel of flat and volume objects turn , got assessment criteria very practical .This item can be concluded that , material dormitory researchers developed can be used by students good as a whole and based on the level of the ability academic ( high , and , and low ) .

**Key Words:** Practicality ,teaching material, problem based learning, broad a flat plane and volume of play

**A. INTRODUCTION**

Size of the parcel of flat and volume objects turn is one of the material dormitory discussed in lecture calculus 2 .Lecture calculus 2 is one of course is in courses of study math education FKIP University Islamic of Riau (UIR) , given on students second semester Based on information researchers get on research showed that researchers done before , with a title research “*profile of critical thinking ability in solving mathematical problems in calculus 2 course be reviewed based on the level of students' academic ability*” , information was obtained that: the research results show that profile think critically students at the ability academic high in general have the ability generalize is a good enough , most capable of to identify and justification the concept and with only a small part capable of analyze algorithm.While profile think critically a student on the level academic and the ability , on a common.

Based on the research done over , it can be argued that students overall has the ability to think critically still low on lecture calculus 2 , at the broad a flat plane and volume of play .Based on observation researchers for learning held , it can be researchers concluded that the above were caused by so far lecture process is still uses the talks , lecturers explain the material in front of the class , later given examples , and ending with the exercise .Style learning it this would directly impact the students themselves , the students have not been able to mengkontruksi own prescience , that will give rise to the understanding owned students were

Next , if examined from the media or source learn used by teachers was textbook who has written and published by some publisher .Media uses or source learn like this indirectly , will face students , because a language and discussion served in the textbook difficult to be understood by students .In addition , the use of textbook also , not in accordance with the demand learning , where students must be mengkontruksi prescience own.

Consequences that inflicted , there are still many a student who does not understand the teaching material that was delivered and lecturers have to menggulangi the teaching material , so that the time it takes be too much , and material which is to be taught any conclusive not in keeping with what is planned.

The lecturer is an educator who one whose competence must they owned is able to devise a means or media learning that can support learning in class .This tune with what is stated the curriculum of higher education ( 2014: 5 ) , a learning process that either has some good elements in some respects , namely: (1). the accomplishments of learning that clear; (2). the organization of University that healthy; (3). the management of pt transparent and accountable; ( 4 ) design learning the availability of pt documents in the form of a clear curriculum and according to needs pascakerja; (5) ability and skills of human resources academic and non-academic are reliable and professional; (6) the availability of infrastructure and facilities learn adequate.

Based on statement up there , then the researcher will expand teaching materials .That of teaching materials to be developed can help students mengkontruksi their knowledge own , then one of learning model that can be integrated into the teaching material was learning model based of a problem ( the problem based learning ) .The problem based learning is one of learning model that fall into constructivism learning model .According to Hamdunah ( 2015: 37 ) learning constructivism is learning that requires active participation , the ability independent study , develop knowledge itself is active .

According to Wina Sanjaya (2011:214) there are 3 main characteristics in the strategy problem-based learning, namely: (a) problem-based learning strategy is a series of learning activities, that is to say in the implementation of the strategy of problem-based learning, there are a number of activities to be done. Problem-based learning strategies did not expect students merely noted, listening, then memorize the subject matter, but through problem-based learning strategies of students actively think, communicate, find and manipulate data, and finally concluded; (b) learning activities are directed to resolve the problem, the problem-based learning strategy means putting problems as keywords from the learning process, without problems then there can be no learning process; (c) a problem-solving approach conducted using scientific thinking.

Based on the statement above , with that there were attempts constructs own their knowledge , hence it is hoped the capacity to think mathematically critical students increased .So that practicality in the use of teaching materials based learning a problem based on any material the size of the parcel flat and the volume of objects enormous researchers developed become a thing that must be considered .

## **B. RESEARCH METHOD**

The kind of research used researchers in this research is research development (research and development (R &D)). In this research products developed was the teaching material based on the problem based learning to the matter size of the parcel of flat and volume objects turn. The phase that used in this research was: (1) identified the potential of and trouble; (2) collect information; (3) design product; (4) do validation; (5) do revision; (6) to pilot, and (7) do the revision of the end (modification of Sugiyono (2011: 409) ). Research instruments composed of sheets chief practicality on old teaching. Technique data analysis using analysis descriptive qualitative.

Practicality is usefulness of level of teaching materials developed. To know usefulness the teaching material based on the problem based learning to the matter size of the parcel of flat and volume objects turn with to pilot the use of the teaching material based on the problem based learning to the matter size of the parcel of flat and volume objects rotary to improve the ability think critically student who is valid according to versed in the teaching process in class. Pilot the use of the teaching material based on the problem based learning to the matter size of the parcel of flat and volume objects rotary to improve the ability think critically student who is valid done with 52 students second semester course of study math education FKIP UIR being took a course called calculus 2

Chief practicality to the teaching material based on the problem based learning to the matter size of the parcel of flat and volume objects rotary to improve the ability think critically students arranged in the form of scale likert with a statement positive .Data response students analyzed by steps as follows:

- a) provide a score for each item answer , strongly agree ( 4 ) , agree ( 3 ) , not agree ( 2 ) , strongly disagree ( 1 )
- b) add up a score total obtained , good for every indicator , statement and based on the level of the ability academic student ( high , middle, and low )
- c) count the percentage value practicality with using formulas:

$$P = \frac{\sum f}{N} X 100\%, \quad \text{Anas Sudijono (2011: 43)}$$

Keterangan:

P : The percentage final score

$\sum f$  : The number of the score obtained

N : The maximum score

- d) The results obtained interpreted by using criteria as follows:

**Tabel 1**  
**Category of Material Teaching**

Nilai Persentase	Kategori
$81\% < P \leq 100\%$	Very Practice
$61\% < P \leq 81\%$	Practice
$41\% < P \leq 61\%$	Practical enough
$21\% < P \leq 41\%$	Less practical
$P \leq 21\%$	Not Practice

**Source :** (Riduwan, 2010: 41)

- e) next interviews were conducted with students , by means of choose some students who represents of any level academic ability students .Then interviews will be a qualitative analysis descriptive and will be appropriated the practicality were obtained

### C. FINDINGS AND DISCUSSION

After students learn by use of teaching materials based learning a problem based on any material the size of the parcel flat and the volume of objects rotary to improve the ability of mathematical think critically students , students given praktikalitas poll .Practicality poll consisting of 19 items a statement that is an interpretation of 11 the aspects that were developed .A

recapitulation poll praktikalitas the results obtained from 52 person and college students against of teaching materials based learning a problem based on any material the size of the parcel flat and the volume of objects rotary to improve the ability of mathematical think critically students presented in the table below.

**Table 2**

**Recapitulation Calculation Chief Practicality The Teaching Material Based on The Problem Based Learning Based on Level of The Ability Academic**

	Level of the Ability Academic			
	High	Medium	Low	Overall
<b>% Practicality</b>	86,40	84,47	84,77	84,84
<b>Criteria</b>	Very Practice	Very Practice	Very Practice	Very Practice

**Source :**The data processed researchers

Based on the data above , then it can be seen that both overall and based on the level of academic ability , students give an assessment within very practical criteria .This means that of teaching materials based learning a problem based on any material the size of the parcel flat and the volume of objects rotary to improve the ability of mathematical think critically student researchers that has been developed , either as a whole and based on the level of student academic ability very practical used by college students .

Next if seen based on an indicator measured in chief praktikalitas , so the results , students provide an assessment with the most little is in indicators ( about given in the teaching material based on the problem based learning to be understood and challenge ) , in terms as a whole and based on the level of the ability academic students .While for indicators that have value a high percentage of most are the items a statement ( interest on old teaching mathematics based the problem based learning). The following recapitulation the percentage chief praktikalitas the teaching material based on the problem based learning to the matter size of the parcel of flat and volume objects rotary to improve the ability think critically mathematical students in terms based on an indicator and levels of the ability academic students.

**Table 3**  
**Recapitulation Calculation Chief Practicality The Teaching Material Based On The Problem Based Learning Levels of The Ability Academic**

Praktikalitas Indicators	Level of the Ability Academic			Total
	High	Medium	Low	
Interest on material based math based learning problems	88,33	87,64	87,86	97,40
Criteria	Very Practice	Very Practice	Very Practice	Very Practice
About given in the teaching material based on the problem based learning to be understood and challenge	75	68,10	67,90	69,20
Criteria	Practice	Practice	Practice	Practice

Resource : The data processed researchers

Besides chief, practicality of teaching materials the problem based learning to the matter size of the parcel of flat and volume objects rotary to improve the ability think critically mathematical students obtained also based on interviews with students. Interviews were conducted with the purpose of get a lot more information about opinion konfrehensif students to the teaching material based on the problem based learning to the matter size of the parcel of flat and volume objects rotary to improve the ability think critically mathematical student who has been used in learning. The following will be displayed the results of interviews with students to practicality teaching materials.

**Table 4**  
**The Results Of Interviews With Students To The Teaching Material Based On The Problem Based Learning Based On The Level Of The Ability Academic Students**

Aspects interviewed	The results of data interviews with students based on the level of the ability academic		
	High	Medium	Low
Presentation of aspects	Of images used have associate with everyday life and interesting .The colors used have already drawn , instruction used easy to understand	Of images used have associate with everyday life and interesting .The colors used have already drawn , instruction used easy to understand	Of images used already associate with everyday life and interesting .The colors used had yanked , instruction used easy to understand

The contents of aspects	he questions and in whose exercise served there are still some that are still not yet it is understandable	The questions and in whose exercise served most not can be solved , because different from sample problem presented	The questions and in whose exercise served not can be solved because different from sample problem presented.
The Language of aspects	The language used easy to understand	The language used easy to understand	The language used easy to understand

From the table above , so can be concluded that college students are good as a whole and based on the level of the ability academic , think that the questions and training which are presented in teaching materials could not the completion of because different by example about presented.

#### D. CONCLUSION

Based on the results of research and discussion , it can be formulated the conclusion that of teaching materials based learning a problem based on any material the size of the parcel flat and the volume of objects turn very practical used by college students , either as a whole and will be reviewed based on the level of academic ability.

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