The ability of teacher using properties “bloker” through scientific approach in learning mathematics

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Abstract. The aims of this study to describe the ability of teachers to use teaching aids “figure tool Block Slide Factoring (Bloker) through the scientific approach in 2013 Curriculum. The data extracted in this study are related to the steps of using Block Slide Factoring (Bloker) through a scientific approach in Curriculum 2013. Source of data extracted by observation teacher activity related to the use of properties through a scientific approach in learning mathematics. Based on the results of observations, the researchers describe and disclose the steps for using Block Slide Factoring (Bloker) with a scientific approach in the 2013 Curriculum. Based on the analysis of the data showed that Block Slide Factoring (Bloker) could be operated correctly and adequately reach the stage of a mathematical formula or reach the stage properties are not used anymore, then describe and only use techniques.

1. Introduction

Mathematics is one of the lesson material that learned by students at each level of education from primary school education to upper secondary school. But, in fact students are still have difficulty learning mathematics, learning math specter is frightening for students. Muijs and Reynolds stated that "mathematics is commonly seen as one of the most difficult subjects by pupils and adults alike" [1].

One important feature of mathematics is to have abstract objects, so that most students consider mathematics to be difficult [2]. This abstract nature is one of the causes of the difficulty of a teacher teaching school mathematics. The object of mathematics is objects that are abstract in nature and cannot be observed with senses [3]. Because of this the mathematics is not easy to understand by most students. Moreover, junior high school students even though theoretically thinking level has entered abstract thinking level, or is experiencing a period of transition from the level of concrete thinking to abstract.

The difficulties of the mathematics that sensed by students must be quickly completed, so every students can solved the problem as good as possible. In order to concretize the abstract things, the teachers has needed to increase the performance in mathematical learning. Learning is good for students if they begin to represented of concepts, principles and rules that are formulated [4]. This is due to the first stages of the understanding conceptual concept depends on the concrete activities that are carried out when they formed representation of each concept.
Based on the result of observations have been conducted by researchers at SMP 5 Langsa, represented that the mathematical content that learned by the teacher was still abstract. Consequently, there is no visible mathematical activity carried out by students, nor is the interaction between students and students almost nothing. This phenomena has been confirmed by Faux [5], where the teachers also feel the same thing, "mathematics has always been a difficult subject, both for the teacher and the taught". Therefore, Mathematics is lesson material that difficult for the teacher and the student. This statement has been reinforced by Salasyah et al that in SMP Negeri 5 Langsa the teachers have been used properties in learning mathematics but they do not use until mathematical concepts or formulas level [6]. The one of alternative that solved the problem is using a properties that integrated through implementation of scientific approach in 2013 Curriculum.

The use of the properties make the mathematics learning more than attractive and enjoyable [7]. Shumway also confirms that "... a significant number of students have poor attitude toward mathematics" [8]. Learning activities using properties make student active and the increase activity of mentality, so student more excited in learning and students can also construct knowledge in cognitive level. Therefore learning of mathematics will be meaningful, interested and fun so that they are released from negative influence of mathematics.

Based on the 2013 curriculum, the implementation of learning should be using scientific approach which are consists of observing (questioning), questioning (questioning), associating (associating / reasoning), experimenting (trying), and networking (establishing cooperation / networking). The use of properties in mathematics learning through Scientific approach is learning that combine properties and Scientific approach where students can be getting knowledge directly from what they observe and what they do.

Based on the condition of the problem, research design learning using Sliding Block Teaching Factor through scientific approaches in learning mathematics. "Bloker " is a mathematical teaching tool which is it for factoring sliding blocks (Block Slide Factoring). The Bloker used to make learning mathematics more easier for students to do factoring and to find roots of quadratic equations. The problem that must be answered in this research is what is the ability of the teacher to use the properties "blocker" through a scientific approach in learning mathematics?.

2. Methods
The researcher revealed and explained then narrated with observational words to describe the ability of the teacher to use properties the "blocker" through a scientific approach. Thus this research is a descriptive study with a qualitative approach. The source data of this study is the mathematics teacher in SMP Negeri 5 Langsa, Aceh. The data extracted in this study is the ability of teachers to use the teaching aid "Bloker" through scientific approaches in learning mathematics. The technique used to data collection is observation. The observation indicator leads to aspects of the teacher's ability to use properties the "Bloker" teaching that integrated with the scientific approach. This research is the result of the collaboration of Samudra university lecturer team with five teachers in SMP 5 Langsa. The observer is one of the lecturers in University of Samudra and the mathematics teacher in SMP 5 Langsa is the subject of this research.

3. Result and Discussion
This observation uses an observation instrument consisting of several aspects of assessment about the use of mathematical properties that are integrated in learning with the scientific approach. Indicators of teacher activity related to the use of properties that are integrated in learning that are considered to be observed are based on what was said by Johar [9] that the use of properties should begin with activities that require students to observe. The researcher took some notes and fill in observation sheet based on a rubric specifically designed based on the indicators of scientific approach as stated in Kemdikbud. The indicators are observing (seeing, reading, listening), questioning (asking questions from factual to hypothetical), experiencing (determine the necessary data, source of data, and collecting data), associating (analyze the data, determine the relationship of data, summing up the
result of data analysis), and communicating (delivering the results in the form of verbal conceptualization). Based on the explanation above, researchers have made indicators of the use of properties integrated in mathematics learning with the *scientific approach*. Therefore indicators and result of observations of teacher activities are related to the use of properties in mathematics learning including:

**Table 1. Results Of Observation on Use Properties Bloker Integrated Mathematics Learning With Scientific Approach in 2013 Curriculum in SMP Negeri 5 Langsa**

| No. | Scientific Approach | Observed Aspects | G | M | P |
|-----|---------------------|------------------|---|---|---|
| a)  | observing           | The teacher asks students to observe problems related to properties | √ |   |   |
| b)  | observing           | The teacher introduces the properties | √ |   |   |
| c)  | observing           | The teacher manipulates (demonstrates) properties appropriately | √ |   |   |
| d)  | observing           | The teacher explains the use of properties appropriately | √ |   |   |
| e)  | questioning         | The teacher encourages students to ask questions related to things observed in the properties | √ |   |   |
| f)  | trying              | The teacher facilitates students to use properties related to problems they want to solved | √ |   |   |
| g)  | Associating/        | The teacher facilitates students for discussion, reasoning encourages students to reason up to the abstract stages or the stage where the properties are not used anymore | √ |   |   |
| h)  | Networking          | The teacher facilitates students to communicate with fellow students, corrects each other's use of properties with friends | √ |   |   |
| i)  | Networking          | The teacher facilitates students to communicate with checking, correct each others use of properties with friends | √ |   |   |

Then further, the results of observations on related aspects of the use of properties in mathematics learning with the 2013 Scientific approach Curriculum indicate that all indicators are observed (a), (b), (c), (d), (e), (f), (g), (h) and (i) the learning has been done right and well. At the essence learning activities and stages of observing. The teacher suggest students to observe the quadratic equation and its factors related to the contextual or realistic problem and also the Block Slide Factoring (Bloker). Then the teacher gives a multiplication example \((x + 1)\) with \((x + 2)\), the teacher explains procedurally to produce \(x^2 + 3x + 2\). Then the teacher asks how to find factoring from the quadrat Equation \(x^2 + 3x + 2 =0\), so that it produces the factors \((x + 1)(x + 2) = 0\) where \(x = -1\) dan \(x = -2\).

Based on the results of observations at this stage the teacher was seen to introduce Block Slide Factoring (Bloker) the purpose was to make it easier to find the factoring of the quadratic equation in question. In the futher indicator, the teacher manipulates Block Slide Factoring (Bloker) accompanied by an explanation, then responds to student questions related to the use of Block Slide Factoring (Bloker), facilitates students answering questions with the help of properties, and also facilitates students to discuss. Therefore at this stage what has been called the Question has occurred. Try, collecting information and then the last stage, namely Communicating where the teacher directs students to present the results of their respective groups' work. The results of group work are about problems or mathematical activities related to properties. Specifically in aspects (g), the teacher facilitates students for discussion, encourages students to reason until the abstract stages or the stage where the properties are not used anymore, they are well fulfilled. The teacher has used the Block
Slide Factoring (Bloker) until the abstract stage or the stage where the properties are not used anymore that means the teacher does not continue using the Block Slide Factoring (Bloker) until the abstract stage. The teacher was directing students do not to use properties anymore, just describe, and then use techniques only to factor quadratic equations.

The results of the study are relevance from several references that properties must be used till the stage of mathematical concepts or formulas. Johar confirm that if the use of properties is not well designed and is not accompanied by a good understanding of the material the properties are consequently a misconception [9]. properties are very important as a bridge from concrete to abstract [10]. Therefore language is very instrumental in helping students to bridge from concrete to abstract [10]. So, the teacher must be use properties that are integrated mathematics learning to the stage of the concept or formula or at the stage where the properties are not used anymore.

4. Conclusion
Based on the results of observations when using the Block Slide Factoring (Bloker), it was shown that the teachers had been able to use the properties accurate and correctly thus that students could be completed simple mathematics problems with support of the properties. In the futhermore stage the Block Slide Factoring (Bloker) are not used anymore, just describe it and thus only use the technique to factoring quadratic equations.

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