The Effect of Integrated Learning Model and Critical Thinking Skill of Science Learning Outcomes

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Abstract. This study aimed to determine the effect of integrated learning model and critical thinking skill toward science learning outcomes. The study was conducted in SDN Kemiri Muka 1 Depok in fifth grade school year 2014/2015 using cluster random sampling was done to 80 students. Retrieval of data obtained through tests and analysis by Variance (ANOVA) and two lines with the design treatment by level 2x2. The results showed that: (1) science learning outcomes students that given thematic integrated learning model is higher than in the group of students given fragmented learning model, (2) there is an interaction effect between critical thinking skills with integrated learning model, (3) for students who have high critical thinking skills, science learning outcomes students who given by thematic integrated learning model higher than fragmented learning model and (4) for students who have the ability to think critically low yield higher learning science fragmented model. The results of this study indicate that thematic learning model with critical thinking skills can improve science learning outcomes of students.

1. Introduction
Learning outcomes can be interpreted as what is expected in the students, ability, or perceived value can be completed in a part of learning [1]. The purpose of learning science in elementary school which is that students can have the ability to learn, responsible, understanding and interest in learning that will enable them to survive in people's social environment [2]. The problem that occurs is the result of learning science has not shown satisfactory results [3, 4]. The learning process that takes place is still oriented on a cognitive ability, which is currently learning 21st century learning skills demanded a lot of bias held by the students [5]. Hence the need for improvement in the learning process and learning outcomes achieved so science learning objectives can be obtained.

One of 21st century skill needs to be owned by the students is the ability to think critically [5]. Critical thinking skill is one of the internal factors that affect learning outcomes [6]. This capability can be developed and studied [5,7]. Gagne developed a category of learning outcomes based on the characteristics of the content, or content must be controlled by student [8]. Bloom and colleagues divides into several domains of learning outcomes or aspects of capabilities with a variety of characteristics, namely: (1) cognitive behaviour, that is the thought process or behavior including the work of the brain, (2) affective behaviour, that raised a person as a sign of his tendency to make choices or decisions to act in a particular environment, (3) psychomotor behaviour, raised by the human work [9]. Then body functions of Bloom's taxonomy of cognitive that revised by Anderson and...
Krathwohl define into two dimensions: the dimension of cognitive processes and dimensions of knowledge [10].

Learning model that can help to achieve the learning outcomes effectively is thematic integrated learning model. Thematic learning model is a model moved from integrated learning model. Thematic integrated model is a model by connecting multiple fields of study which is pedestrianized with a theme (webbed) [11]

There's a tendency for teachers to package student learning experience fragmented firmly among the other subjects, learning that separates the subjects expressly only will make learning difficult for students because such separation provide a learning experience that is artificial [12]. Lack of understanding of a topic has not been able to realize in the form of the ability to ask properly. Therefore packing learning experience will greatly affect the meaningfulness of the experience for them. The importance of the concept of self-sustainability and the environment is like a note in learning science in elementary school, encourage thematic integrative teaching model needs to be held in the elementary school.

One of the internal factors that affect learning outcomes is the ability to think critically. Critical thinking skills need to be developed. One reason is to prepare learners for life maturity. Thinking skills can be learned and improved through the process of learning science in school [13], because learning science develop curiosity and critical attitude towards the phenomena of nature.

Learning science should develop the realm of learning to a higher level so that students can develop skills. Since learning is only studying the realm of thinking low level (lower order thinking skills), the students' thinking skills just to remember and know. Learning science at school is based on the observation of researchers, yet maximize the realm of thought advanced (higher order thinking skills) in the form of analysis, synthesis and evaluation. Expected learning science paying attention to the realm of thought is primarily on critical thinking skills. Therefore, it is necessary to study the factors that affect student learning outcomes. In particular, study the effect of thematic integrative model of learning and critical thinking skills with the results of elementary school students to learn science.

This study aims to determine: 1) The difference in learning outcomes among students learning science by using thematic integrative learning model and student learning using learning model fragmented. 2) The effect of the interaction between the learning model and the critical thinking ability of students to learn science results. 3) The difference between the results of learning science students who have high critical thinking skills that are taught using an integrative model of thematic learning and using model fragmented. 4) The difference between the results of learning science students who have a lower critical thinking skills that are taught using an integrative model of thematic learning and using model fragmented.

2. Research methodology
The research was conducted on elementary school fifth grade students at SDN Kemiri Muka 1 Depok. The research conducted in the first half (odd) in the academic year 2014/2015, which took place in September -October 2014. This research used experimental methods, and variables in this study consists of: (1). The independent variables were integrated learning model, and (2). The dependent variable is the result of science learning outcome and variable attributes is critical thinking skill.

The population in this study were all students of class V The design of this study using experimental design by level 2 x 2. Sampling technique done by cluster random sampling. Choosing sample that this research did it by raffle the school that have minimum B accreditation which is define good school. Then raffle the homogen class that will be used as experimental class and control class. Each class selected by test into two group that high critical student and low critical thinking students.

Experimental class are given thematic learning model and class control by fragmented learning for 1 month that researcher already prepare the lesson plan before. After treatment finished then student do the test by instrument. The instrument used are: (1) The test instrument science student learning outcomes in the form of a multiple choice test, (2) critical thinking skills instrument is test description. Instrument reliability coefficient of 0.868 Science learning outcomes while reliability students' critical
thinking skills by 0.732. Data were analyzed using ANOVA two lanes and testing simple effect with Tuckey test. Testing was performed using Liliefors normality and homogeneity test with Bartlett's test.

3. Result and discussion
This section describe data that related to the description of the variables were: the dependent variable science learning outcomes, independent variables which consists of integrated learning model and critical thinking skills. Description of research data these three variables would otherwise form the size of centralization of data, among others: (1) mean, (2) median, (3) modus and (4) standard deviation and (5) varians.

| Data            | $A_1$ | $A_2$ | $A_1B_1$ | $A_2B_1$ | $A_2B_2$ |
|-----------------|-------|-------|----------|----------|----------|
| Mean            | 74,1  | 68,6  | 84,6     | 63,7     | 63,5     | 73,8     |
| Standar Deviation| 12,47 | 8,97  | 7,34     | 5,85     | 5,37     | 9,00     |
| Median          | 64,4  | 67,5  | 85,7     | 64,1     | 61,6     | 76,7     |
| Modus           | 68,5  | 67,8  | 80,9     | 66,5     | 60,2     | 75,1     |
| Varians         | 155,46| 80,43 | 53,87    | 34,22    | 28,87    | 80,96    |

Testing the hypothesis of this study was performed using two way Analysis of Variance (ANOVA 2x2). The results of the ANOVA was briefly can be seen from the following table:

| Sources            | df | SS    | MS    | F    | $F_{table}$ |
|--------------------|----|-------|-------|------|-------------|
| Factor A           | 1  | 332,75| 332,75| 6,72 | 4,08        |
| Factor B           | 1  | 300,57| 300,57| 6,07 |             |
| Interaction AB     | 1  | 2673,84| 2673,84| 54,04| 4,07        |
| Within Group (Err) | 40 | 1979,27| 49,48 |      |             |
| Total (Corrected)  | 43 |       |       |      |             |

Based on the results of testing the first hypothesis, it is known that the application of thematic learning model more effective in improving student learning outcomes. This is in line with that expressed by the results of data analysis using ANOVA two ways at significance level $\alpha = 0.05$, above, gives a value of $F = 6.72$ is greater than the $F_{table} = 4.08$. This means that $H_0$ is rejected, means that the average student science learning outcomes by thematic integrative learning model is higher than the average student by learning model fragmented. Since the average score science learning outcomes of student by thematic learning model integrative 74.14 higher than the average score of science learning outcomes of students who use the model of fragmented 68.64 it was concluded students science learning outcomes that used thematic integrative model is higher than using models fragmented.

Evidence of this strengthens the research hypothesis and reject $H_0$, could be reinforced by the results of relevant research [14]. Thematic integrative model creating students active, creative, effective, and critical thinking with extensive knowledge and insight, which in turn puts the student as well as the subject and object of study, because it involves students in learning [15].

The test results show that the second hypothesis is an integrated learning model gives different effect on the learning outcomes of science when applied to students who have the ability to think critically different. Model of integrated learning and critical thinking ability of students to the science learning outcomes effectiveness is at a different level. The students who have high critical thinking ability thematic integrative models are more effective than the fragmented models, contrast to the students who have low ability to think critically, thematic integrative models are less effective than fragmented model. Data results analysis using ANOVA two way at significance level $\alpha = 0.05$, mentioned above, gives a value of $F = 54.04 > F_{table} (F_t) = 4.07$, this means that $H_0$ is rejected.
means that there is a very significant interaction effect between integrated learning model with critical thinking ability of students to the science learning outcomes. Interaction is proved by the relevant research [16], based on the positive there is a direct influence on the variables critical thinking on science learning outcomes.

The graphic images provide information that students who have high critical thinking skills when given thematic learning model of integrative science learning outcomes higher than using model fragmented. While different from the critical thinking skills of students is low. Lower learning results when given a thematic learning model compared using model fragmented. Integrative model of thematic learning stimulate students to think more highly of having to connect the various concepts and knowledge which is pedestrianized with an interesting theme. Higher thinking skills is what is said Costa [6] that needs to be honed and developed further in learning.

Results of testing the third hypothesis showed that the group of students who have critical thinking skill height of more effectively using the Model Thematic Integrative than Model Fragmented in his research found that influence the ability of critical thinking of students in the subject of Physics of the results studying Physics. Children who have high critical thinking skills when stimulated by using integrative thematic learning will increase learning outcomes in accordance with the opinion of [10].

Results of the fourth hypothesis suggest that students who have low critical thinking skills, scores of learning outcomes by fragmented groups higher. The test results Tuckey on a group of students who have the ability to think critically low values obtained \( q = 4.76 \) is greater than \( q_{	ext{table}} (0.05) (4; 11) = 4.26 \). This means that there are differences in learning outcomes science group of students who were given a thematic model of integrative learning and student groups by learning models fragmented for group of students who have the ability to think critically low. It can be concluded that the group of students who have the ability to think critically low, the result of groups of students learn science by learning fragmented models than science learning outcomes groups of students by thematic integrative learning models.

The acceptance of the research hypothesis that the fourth line with the opinion [11] that characteristic children who have critical capabilities should be able to make critical decisions and creative, however, students ability to think critical low cannot make decisions complicated, let alone connect the various concepts and themes presented by the teacher through learning.

Then the students ability to think critically low belajarannya results would be lower if using an integrative model of thematic learning than those who studied with fragmented learning model. Because they are not skilled connecting the various concepts, and themes.
4. Conclusion
Based on the results, it can be resumed that integrated learning model can effectively critical thinking skill and both effect to science learning outcomes specially at elementary learner. This result can answer the question how to increase high-level thinking skills through a learning process especially science. Also raise important question for current assessment in process learning.

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