

## REASONING ANALYSIS OF JUNIOR HIGH SCHOOL STUDENTS AROUND THE SETTLEMENT OF INDIGENOUS BADUY IN RESPONSE ENVIRONMENTAL ISSUES

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### ABSTRACT

*The study was motivated by the fact that the environmental conditions in Indonesia is increasingly decreasing carrying capacity due to human behavior. This study aims to look at reasoning of student of secondary school on environmental issues and see if there are differences in reasoning in children who live in the context of environmental conditions are different. The observed differences in environmental conditions herein are based on the distance of the respective area of research to one source culture that still holds strong traditions, the Baduy tribe. The study was conducted using a survey method. A number (n = 197) class VIII derived from the four schools of four districts in the surrounding indigenous settlements Baduy, Lebak, Banten province involved as research samples. Problems of Biology and Earth Trends in International Mathematics and Science Study (TIMSS), 1999, 2003, 2007 and 2011, published by the International Association for the Evaluation of Educational Achievement, perceptual reasoning student questionnaires and structured interviews are used as instruments. In answering a question related to the environment, students are given a statement referring to reveal how decision-making and the level of students' beliefs that are integrated in the answer sheets on each of the items. Additionally seen empirical results achievement, confidence level of students in solving and reasoning conceptions of students. The results showed that the students' knowledge and reasoning related to environmental issues is still low and further the presence of students from the lower settlement Baduy tribe also students' knowledge and reasoning.*

**Keywords:** Reasoning, Environmental Issues, Baduy, Seminar

### INTRODUCTION

Informal environmental education in Indonesian society has been going on since the time of our ancestors in the form of customs. The rules in the act on the environment in the community is often associated with myths believed by the inhabitants. Violation of the rules can be sanctioned customary moral sanction and expulsion of the local environment. Along with modernization and globalization are less precise lately, there are rules of life which is a form of informal environmental education in the community in part has begun to fade and slowly disappear (Malihah, 2006). On the other hand, formal education materials related to the environment also tends to be far from the everyday life of students, so a lot of teaching materials into abstract due to limited media teaching and

innovation shortage of teachers in teaching (Ramli, 2013).

Seeing the cultural phenomenon that is fading in indigenous communities, and to know how big the role of culture in shaping the reasoning of students who were around indigenous territories against environmental problems in the vicinity, the writer interested to do a study on indigenous peoples around the settlements. The indigenous peoples are the authors selected as a source of informal environmental education is indigenous Baduy tribe in the village of Kanekes, Leuwidamar subdistrict, Lebak, Banten Province. Baduy community is one of the many indigenous peoples in the Republic of Indonesia which have special rules in his daily life in interacting with nature. Sutendy (2010) states that there are some custom rules are quite striking from the community Baduy tribe

among others, the rules human processing and forest, river water utilization, as well as their granary to survive.

The need for in-depth study on the formation of reasoning on students' views of the educational process that happened informally and formally in the context of environmental problems due to the importance of protecting the environment are for the survival of living beings and has already become a fixed price that is people who have to play a lot in engagement between mortal and environment. Reasoning is good for the environment is assumed to be able to create an attitude of creation and also a good solution to the environmental problems.

Viewed characteristics used TIMSS assessment frameworks, the authors are interested in using it to review the reasoning junior high school students related to environmental problems. The author chose the junior high school students as subjects were observed for junior high school students belong to a group cognitive development of early adolescence. According Akitson and Sturges (2003) were included into early adolescence are children at the age of 11 years and above. In early adolescence development occurred very rapidly compared to other stages. The characteristics of early adolescence stages, among others: have a strong curiosity, interest to interact with peers, and have the ability to self-reflection.

Gain knowledge and reasoning ability of junior high school students related to environmental issues are very important to do, because the existence of the environment is closely related to the preservation of living creatures. Junior high school students is the successor generation who will stand up and take policy to environmental problems that occur. Knowing how reasoning formed from the junior high school students in an informal and formal learning in response to environmental issues is expected to steer the policies that will be made in

both the formal and informal education in order to create a generation that is more concerned with the environment. For that more in-depth study on "Reasoning junior high school students in response to environmental issues" need to be done.

## METHOD

### 2.1 Theory

Reasoning is derived from a person's ability to think, which covers the basic thinking skills (basic thinking) and high-level thinking skills (Higher-order thinking Skills), while the high-level thinking skills include critical thinking (critical thinking) and creative thinking (creative thinking). Keraf in Sadiq (2004) explains that the reasoning is a thought process that tried to link the facts or evidence are known to lead to a conclusion. Reasoning is a thinking process in drawing a conclusion in the form of knowledge (Suriasumantri, 2005). In essence reasoning is an activity, a process, or an activity thought to draw conclusions or make a new statement which was based on some statements whose truth has been proven or assumed previously. Sullivan (Dawud, 2008) suggests that the activity of thinking embodied in three simple act of understanding the reasoning, namely, preparation of affirmation, and formulating conclusions. Acts of formulating conclusions based reasoning is a follow truth that has been known previously to acquire new knowledge.

The living environment is the venue for life. In the environment there are ecosystems, in the order of elements of the environment is a whole and complete unit interacts to balance, stability, and environmental and productivity. According to Law No. 32 of 2009 on the Protection and Management of the Environment, the environment is a unity with all things space, power state, and living creatures, including humans and their behavior, affecting the continuity of our lives and welfare of

human beings and other living creatures. Campbell, et al., (2004) states that the environment includes abiotic components (factors nonliving chemical and physical), such as temperature, light, water and nutrients. Furthermore, an important effect on the organism is a component of biotic (living) that all the other organisms that are part of an individual. Other organisms can compete with an individual to get food and other resources, eat it or change the physical environment into a chemical.

In Indonesia, the milestone of environmental problems began with the convening of the Seminar on Environment Management and Development by the University of Padjadjaran Bandung on 15-18 May 1972. The most important factor in environmental issues is the size of the population (the population growth rate). In Talha (2008) with rapid population growth poses a challenge that is being addressed by the development and industrialization. However, in addition to accelerating industrialization supply all the needs of human life also has a negative impact on humans as a result of environmental pollution. There are a number of environmental problems that are in some areas the distribution of local, national, and global namely:

1. Local Environmental Issues.
2. National Environmental Problems.
3. Global Environmental Problems.

One's awareness to preserve the environment will have a major impact when everyone is in a region that participates participated and reminding each other. Tirri & Nokelainen, (2011) suggest that the level of awareness in preserving the environment a person will be different from other people. For that, there needs to be an effort so that these people become accustomed to be sensitive to the environment around it.

Environmental education in Indonesia does not only happen in formal education in schools, but also in the

neighborhood. Indonesia is a country rich in traditions and culture, environmental preservation efforts have been done long ago by the ancestors of Indonesia. In some areas that still adhere to customs, there are various policies that adhered to its citizens and will be penalized if violated customary. Environmental education for students is tantamount to entrust this environment into the hands of students who will be the successor of life. Learning the right will produce successful students.

Baduy village is one of the traditional villages in Indonesia are still preserving the environment with customs regulations still firmly held by the society. Baduy communities residing on indigenous lands in rural areas between hills and mountains Kendeng. Baduy area in the village of Kanekes, Leuwidamar subdistrict, Lebak, Banten Province. In everyday society Baduy is divided into two parts, Baduy Dalam and Baduy Luar. Baduy Dalam in the duty to be imprisoned (seclusion from the outside world to maintain and preserve the culture of the ancestors of indigenous villages Baduy) and baduy Luar just helping the "tapanya" Baduy Dalam community (Senoaji, 2010).

Population growth is rapidly increasing in Baduy. It is allow Baduy Luar communities to look for arable fields outside Baduy territory by way of rent or for the results. Relationships are built up as a business lease between Indigenous communities and residents outside Baduy can impact changes in behavior and lifestyle of Baduy Luar Community, going acculturation of Baduy community and the outside community.

## 2.2 Method

This research was conducted in Baduy's village and surrounding areas in the district of Lebak, Banten province. Kab. Lebak is composed of 28 districts, but the research will be done in just four

districts, namely District Leuwidamar which houses the Baduy village settled, District Bojongmanik, District Gunung Kencana, and District Banjarsari. The election of three other districts in addition to the District Leuwidamar is due to outside influences that are still a little on the lives of people in the three districts.

The research was conducted which is on 11 to 16 April 2016 to the four schools. The study began by doing research proposal development, drafting instruments, test instruments carried at SMP 1 Pandeglang and SMP Gunung kencana. The population which is the subject of this research is class VIII SMP 4 Leuwidamar by the number of students 50 people, SMP 1 Bojongmanik by the number of students 65 people, SMP 3 Gunung Kencana by the number of students 55 and SMP 1 Banjarsari by the number of students 27 people in the academic year 2015 -2016. Mechanical determination of the number of samples taken from a population of eighth grade students of junior high school in the Lebak District Banten Province is determined by using the technique of Multiple stratified cluster random sampling.

Aspects to be considered in sampling include the location of the school (the area closest to the settlement Baduy and farthest). Determination of the various aspects of this intended to get samples that have heterogeneous characteristics and represent all the areas around settlements Baduy.

### 2.3 Instrument

Disclosure of the various data needed in the research requires the instrument. Fraenkel, et al. (2012) explains that the instrument covers the entire process to obtain the required data in the investigation. In this study, the type of instrument used, namely:

1. The questions related to Biology and Environmental Earth Released in TIMSS 1999, 2003, 2007, 2011, published by the

IEA. The questions related to Biology and Environmental Earth Released in TIMSS 1999, 2003, 2007, 2011 is intended to determine the level of student achievement in resolving such questions.

2. Questionnaire conception of reasoning students. Giving questionnaire aims to uncover students' reasoning relating to the settlement of issues related to Earth Sciences and the Environment in the TIMSS Released in 1999, 2003, 2007, 2011. Aspects focused on thinking deductive reasoning, error analysis, constructing support, and decision-making.

3. Disclosure of the noble values Baduy community by means of a structured interview. These aspects are discussed in the interview on local wisdom Baduy tribe in interacting with the physical environment in where they live.

### 2.4 Data Analysis

The data was collected using an instrument and then analyzed. Data analysis, namely:

1. Junior high school students Knowledge related of materials Environmental issues, measured using TIMSS questions. Scores of students divided the acquisition of a maximum score will be the value of students' knowledge of issues related to Earth Sciences and the Environment in the TIMSS Released in 1999, 2003, 2007, 2011.

2. Questionnaires were given to students in the form of a statement of positive and negative statements. The statements presented on a questionnaire developed by Marzano, et al. (1994). The data obtained from the results of the questionnaire are tabulated and calculated the percentage of each statement. The percentage is calculated using the formula: Percentage = (number of students

- answering / Sum of all students) x 100%
3. The percentage obtained from their respective responses to each question and then presented in the form of a bar chart and described.
  1. The results of interviews with indigenous people Baduy will be a source of information on local wisdom and thrive in the area. This information will be linked to information obtained from students.

**RESULT AND DISCUSSION**

**3.1 Students Confidence level In Biology Problem Solving TIMSS**

In the students' answer sheets are directional statements about how decisions are made and the choice of confidence level of students in solving problems of Biology TIMSS tested. The confidence level of students in completing each items is presented in the form of a histogram in Figure 3.1

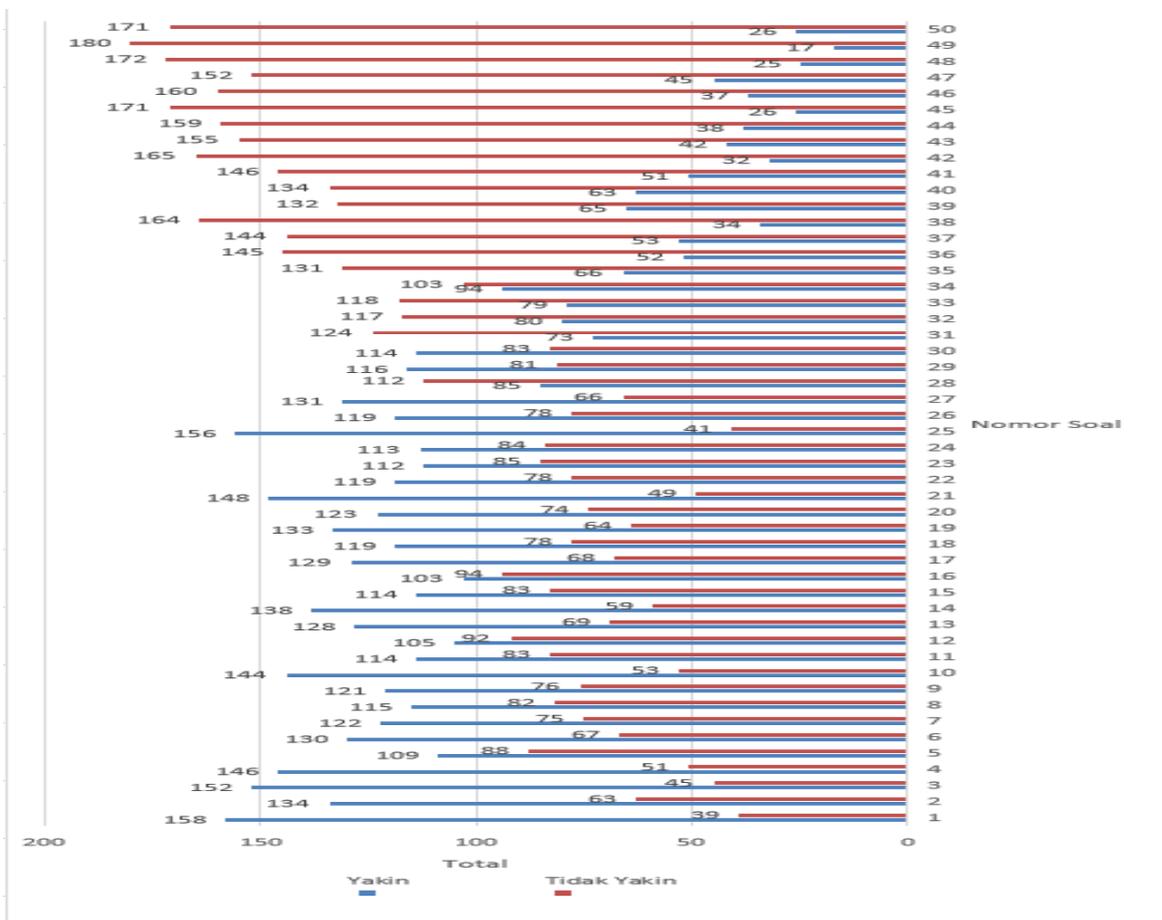


Figure 3.1 The confidence level of students in completing each items

Figure 3.1 Shows that for a matter of numbers 1-30 with the kind of multiple choice questions the students tend to feel comfortable with the answers. But for about 31-50 numbers by type of essay students tend feel uncomfortable with the answers. In question number 1 (the material about the state of a mountain terlihat no prevailing wind direction and

the average air temperature at various heights on both sides of the mountain) shows the highest total level of confidence compared to all the questions that were tested. In question number 49 (materials about environmental factors that influence changes in the population) the tendency of students are not sure of the answers given. The balance between

confidence and uncertainty of students in solving problems seen in numbers 16 and 34, each of which discusses the chemical elements found in plants as well as animals died and about a community. Based on the form about being tested, multiple choice questions have a tendency to higher confidence levels. In the essay questions the level of students' beliefs vary, but they tend to unsure.

**3.2 The Student conception of Problem-Solving when answered Questions of TIMSS Released in 1999, 2003, 2007, 2011.**

Questionnaires were given to students to obtain a picture of the students' conceptions in resolving the problems of biology and earth science in TIMSS. The aspects in this regard include deductive reasoning, error analysis, constructing support and decision making. The responses given by the students helps to uncover students' decision-making and the process of reasoning in solving problems of biology and earth science in TIMSS.

Each reasoning being tested has a different emphasis. Deductive reasoning emphasized the conceptions students understand the intent of questions based on the information and keywords that exist on the question. Once you

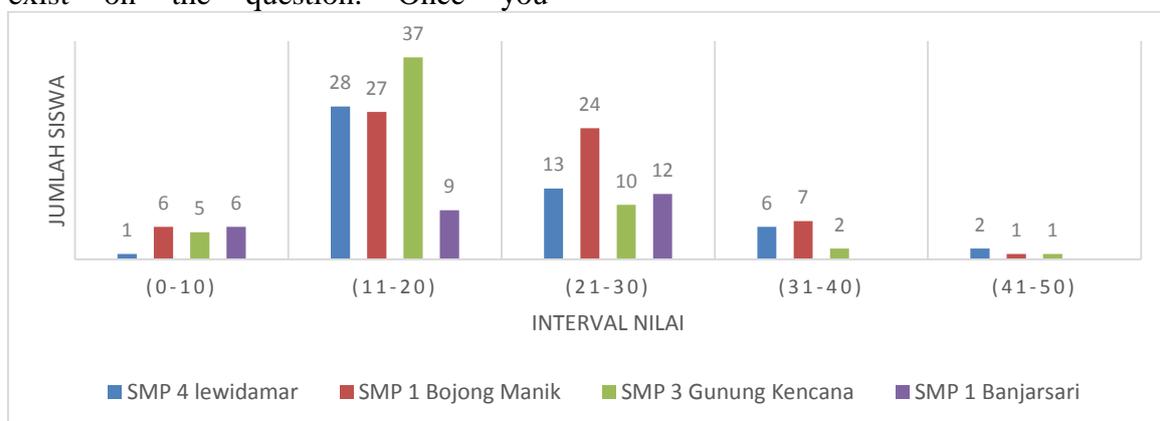
understand the overall question, students can define keywords that exist on these questions to determine the material regarding to to settle the question.

Similarly, writing errors may occur even if the student response has been cautious in determining the answer to the question that was tested. Errors that occur can be minimized by re-evaluation of the responses.

In constructed-response questions, students were asked to narrate the answers of the questions tested. Some questions also require students to provide explanations to the answers given by the students of each school. Student decision-making is part of a complex thought process. Decision making is emphasized at the thought of some alternative options possible answers, the analysis of alternative answers, and concordance between answers and questions that tested.

**3.3 An Overview of Student Achievement**

Result of performance class VIII SMPN 4 Leuwidamar, Bojong Manik SMP 1, SMP 3 Gunung Kencana, and SMP 1 Banjarsari in resolving questions of TIMSS 1999, 2003, 2007 and 2011 are presented in Figure 3.2



**Figure 3.2 Distribution of Value Achievement Student Class VIII**

In Figure 3.2 shows that the entire number of students have scores below 50 at 100%. The value of the highest and

lowest achievement in sequence, namely 47.3 and 0 of the maximum value of 100. The grouping levels of performance

achievements derived from the distribution of these values. Class interval values are divided into three categories namely the achievement of high performance, moderate and low. Students with a score of <30 categorized into the low achievement, students with grades between 31-51 categorized in medium and student achievement with values > 51 are categorized in high performance but in this study is not obtained by students with high category because no gain value > 51. Thus the number of students with low category amounted to 178 students and the number of students with moderate category is 19 students.

For each school level low achievement in SMP 4 Leuwidamar number of 42 students and the achievements were a number of 8 students in the achievement of a high number of students 0 with a total student 50 students. Low levels of achievement in SMP 1 Bojongmanik number of 57 students and the achievements were a number of 8 students in the achievement of a high number of students 0 with a total student 65 students. Low levels of achievement in SMP 3 Gunung kencana

number of 52 students and currently number 3 student achievement and high performance 0 of students with the total number students 55 students. Low levels of achievement in SMP 1 Banjarsari number of 27 students and the achievements were a number 0 of students and achievements 0 high number of students to total students 27 students.

In this study, the tendency of a low level of confidence students answer can be affected by various difficulties experienced by students. The results showed that the students it is difficult to search for keywords in a matter, a matter of connecting with the material they have learned, and explain the arguments of the answer. Student difficulties in finding keywords resulted in some students do not look for this keyword.

Cognitive domains tested in biology and earth science questions in TIMSS include knowing, applying and reasoning. All this emphasis cognitive domains respectively. The tendency of decision making is used and the level of confidence of students in solving the problem presented in Figure 3.3

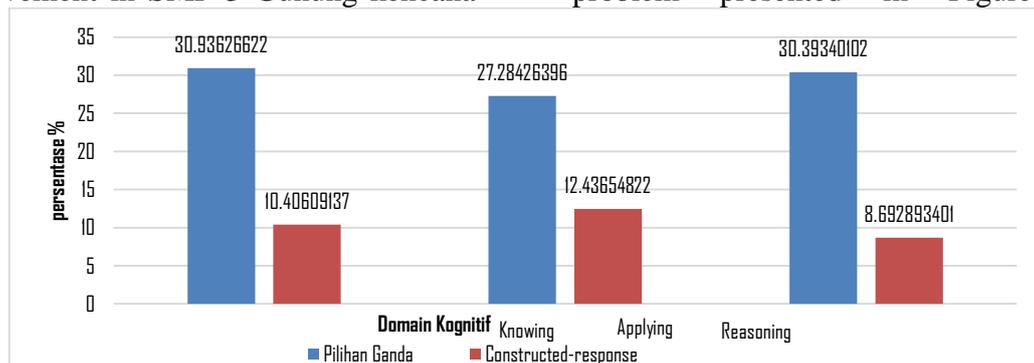


Figure 3.3 Achievement In the Cognitive Domain

Based on Figure 3.3 class VIII student achievement in completing the questions kind of knowing that the highest when compared with the question of applying and reasoning. This suggests that there is potential to develop students' thinking skills. This is due to the questions with this cognitive domain asks the students to be able to recall concepts

students know, apply these concepts to compare, connect, find solutions, analyzing, predicting, making inferences, generalize, and evaluate. As well as influenced by the ability of reasoning from its insights.

Based on the survey results revealed the location of the school (within the settlements Baduy) showed

differences in student achievement in completing the questions biology and earth science in TIMSS. Figure 3.4 shows

the percentage of student achievement based on the location of the school.

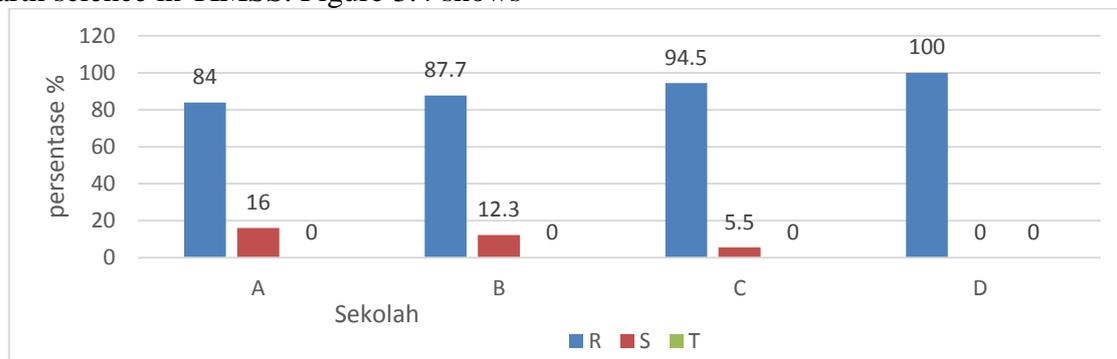


Figure 3.4 Location Based Student Achievement School

Figure 3.4 shows that the radius variation of schools to Baduy's villages showed that all sample schools included in the category of low achievement (R). The highest percentage of low school achievement is the school of origin D (SMP 1 Banjarsari) with a radius of 4 (away) of 100%. And for the achievement of medium (S) throughout the sample schools including each of the A, B, and C of 16%, 12.3% and 5.5% of the original school except D (SMP 1 Banjarsari) with a radius of 4 (away) of 0%. The further away school from the Baduy 's Villages got smaller value of the achievements were obtained. Low levels of student achievement can be caused by low motivation of these students in the learning process that takes place. However, based on the results of this study showed that the closer the location of the school with the higher settlements Baduy tribe achievement of their students. Baduy's influence them on habits, knowledge and behavior of students. It is based on the behavior of the Baduy tribe that upholds the goodness of nature which is a positive thing that affect students in the school. In addition to the facilities and infrastructure that have not been optimized and coupled with students' motivation is lacking resulting in student achievement to be very low.

The students confidence in answering this question is also influenced by the student familiarity to something. When students find a statement that seemed more familiar the students lead the process of reasoning does on the statement. Effect of Baduy tribe in this case perceived influence in the reasoning process of the students. Moreover, the area of origin of the data questionnaire students encountered several students who are close to the region of origin Baduy settlements but attend schools with greater distances from settlements Baduy tribe still has a fairly high performance as well as students who attend school in a location close to the settlement Baduy.

**CONCLUSION**

Based on the research that has been done shows the tendency of decision-making based on a confidence level, reasoning concepts students, student achievement category, form matter, the location of the school, and about the cognitive domain. Results indicate a link between the decision-making of the student in completing the questions biology and earth science in TIMSS Released in 1999, 2003, 2007, 2011 with a confidence level, the cognitive domain of the question, student achievement, about the shape and

location of the school. The results showed that each of these aspects are related to each other.

Generally, the perception of the students were good enough reasoning. Students have been trying to understand the problem through existing detailed information on the matter, determine the related materials based on keywords that exist on the matter, conduct error analysis, the confidence explanations shown, and able to think of some alternatif answers might be used. But students do not have confidence that the material selected to answer the question is appropriate.

Based on the results of research conducted that the achievements of eighth grade students at SMP 4 Leuwidamar, SMP 1 Bojong Manik, SMP 3 Gunung Kencana and SMP 1 Banjarsari in solving problems of Biology and Earth-related Environment in TIMSS Released in 1999, 2003, 2007, 2011 is still very low. This is evident from the large number of students in the low achievement category because none of the students who fall into the category of high performance. The low level of class VIII student achievement is seen very clearly in the questions that require students to use the skills to interpret charts, graphs, and designing experiments. The achievement of students in completing multiple choice questions is higher than the questions constructed-response, although still very low.

Based on the results obtained can be recommended several things related to the learning process an assessment is carried out as teachers and other researchers, namely:

1. The results showed students have low achievement in resolving questions that require students to design experiments. To improve these skills, teachers can train students to design their own experiments in the learning activities that take place. In this case the teacher

becomes a facilitator and guidance for students in the process of experimental design.

2. Students are seen difficulties in completing the questions that comes with graphics and pictures. To improve students' ability to resolve these questions, the teacher should be to train students with the communication skills to present the data and the pictures in the learning process or when the assessment is done.

3. Difficulties experienced by students in answering the questions constructed-response is to provide an explanation for the answer in writing or written arguments. The complexity of constructed-response questions have resulted in lack of confidence of students to answer. More teachers should train students in working on these kinds of questions, so that students can provide written arguments and can remove all know about the students' understanding of the material.

4. The results of student achievement in completing the questions shows that the achievement of reasoning (19.5%) were among the knowing (27.2%) and applying (17.4%). This means that the students sampled in this study had a pretty good potential in resolving the questions reasoning. Teachers can better maximize this potential by directing inquiry learning and provide questions that trains reasoning ability and students' higher-order thinking.

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