Students' Attitude towards Natural Science

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ABSTRACT

The purpose of research was to investigate students' attitudes towards natural science in Muaro Jambi, Indonesia. The attitude of the students studied was represented by three indicators, namely the attitude towards the investigation in the Natural Sciences, the adoption of a scientific attitude, and a career interest in the science field. The research was a survey research. The instruments in this study were attitude questionnaires and interview sheets. Data analysis techniques for attitude questionnaires used descriptive statistics while for analyzing interview data using the Miles and Huberman model.The study found students' good attitudes towards natural science subjects.

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1. INTRODUCTION

Education is an activity that has the purpose of preparing students to be people who have a positive contribution to the community. Indonesia has several levels of education, namely elementary school, junior high school, high school, and college. Every level of education has different levels of difficulty [1]. At the junior high school level, students are expected to be able to use thinking skills to solve problems in everyday life, one of them is in Science/Science. Junior High School Curriculum focuses on students in studying events in everyday life so as to provide students with direct experience. Through science has actually provided provisions for solving the problems of everyday life, given that science is a science that seeks answers to questions of what, why, and how symptoms of nature relating to the composition of structure and nature, changes and dynamics of nature. Activities developed in teaching science must aim to encourage students to be more sensitive to the lives around them [2].

Essentially science lessons are products, processes, attitudes and technology. Attitude is a reaction to a situation or object that is positive or negative. Attitudes are defined as individual beliefs and feelings towards an object [3]. Whereas according to Kind in [4] Attitude can be defined as the feelings that a person has about an object, based on his or her knowledge and belief about that object. The above opinion states that attitude is an important component that must be possessed by students in natural science subjects. This is in line with the opinion of George in [5] that one of the main factors in learning science is the attitude of students themselves.

Simpson [6] said that attitudes towards science are defined as determiner of special emotions as "liking or disliking science". Attitudes toward science are considered important because they can affect the performance of students and can improve student learning achievement [7]. The importance of attitudes in natural science learning can be seen in the actions of students who show positive attitudes and negative attitudes. A positive attitude is indicated by students tend to be more diligent in learning so that they get

satisfying results, whereas a negative attitude is characterized by students being less diligent in learning so that they get unsatisfactory results. The attitudes of students towards Natural Sciences measured in this study are represented by three indicators adopted from TOSRA [8], namely: 1) attitudes towards investigations in science, adoption of scientific attitudes, and 3) interests in a career in science.

The nature of science learning is to teach students to be involved in the investigation. Investigations in science can help improve the attitudes and skills of students. Investigations in the science are not only limited to scientific activities but also develop when conducting experiments. Practicum is a learning strategy that can develop students' thinking skills and abilities. Practicum of science at junior high school investigates measurements such as calipers, rometers screws and so on. Investigations are carried out by discussing such discussions as related to activities and direct observations designed to trigger students' curiosity, investigative science skills, observation, data recording, data analysis, and conclusion drawing [9]. From the results of these investigations, there will be a learning desire of students so that they can improve students' critical thinking skills towards science subjects. At present students are expected to be individuals who question, wonder reasons, and research, recognize conflicts and contradictions, make good observations and make correct conclusions from these observations, think scientifically, criticize, produce, be aware of ways to achieve knowledge, b reative, make decisions, be responsible, express themselves, not memorize information, but realize ways to reach, use, share, and produce knowledge, and have scientific processes and critical thinking skills [10].

The investi on is a scientific method that is carried out system which aims to create a scientific attitude of students. Scientific attitude is an attitude that must be possessed by students in carrying out the research process. Scientific attitudes and science are two elements th annot be separated. Science shapes students' scientific attitudes s as curiosity, critical thinking, open thinking, the desire to solve problems, can respond to actions and build a sensitive attitude towards the environment. The scientific a tude of students must be developed so that students have the ability to understand about science in life. Scientific attitude plays a major role in science education and lives of students pursuing science education [11].

Students' interest in a career in the science field is marked by students quickly completing all tasks related to science. This is in line with the statement [12] that success can be interpre as how much good the students are in completing all their tasks without wasting time. Interest in a career in the science field "in the world of education as the base of a career where one must prepare and play le in his education to suit the career that a student wants to achieve. The average age of rental of junior high school students is in the age range of 12-14 years. Students in adolescence have developmental tasks to reach maturity in career selection. Furthermore, interest in a career in the field of Natural Sciences is a desire that should be invested in students. Just as a teacher chooses to make a career as an educator, he thinks he can make a difference in the lives of future generations.

2. RESEARCH METHOD

2.1. Research design

This study w survey research. Survey research design is a step in quantitative research where researchers survey the sample or the entire population of people to describe the attitudes, opinions, behavior, and characteristics of a p lation [13]. The research objective is to find out the characteristics of the sample or population taken and to find out the characteristics of the attitudes of students towards natural science subjects in Muaro Jambi.

The research sample used two sampling techniques namely total sampling and purposive sampling technique. Total sampling is the entire population which includes as a research sample. Total sampling was used when questionnaire data collection with a sample of 2815 dents in Muaro Jambi with details of 1255 male students and 1560 female students. Whereas in purposive sampling, the researcher selects the cases that will be included in the sample based on their assessment of their typicality [14].

2.2. Instruments and procedures

This research instrument is in the form of questionnaires and interviews. This questionnaire is in the form of attitudes of junior high school students towards science subjects with 3 indicators containing 24 items of attitude statements. Table 1 presents a questionnaire indicator of student attitudes toward natural science subjects.

Table 1. Questionnaire indicators measurement of attitudes

Variable	Indicator	Statement		Total
		Positive (+)	Negative (-)	
Attitudes towards science subjects	Attitude towards science investigation	3, 17, 36, 46	10, 24, 31, 41, 50	9
	Adoption of a scientific attitude	4, 11, 25, 37	18, 32, 42	7
	Career interest in science	14, 28, 40, 49, 54	7, 21, 35, 45, 52	10

This attitude questionnaire uses a Likert scale measurement. Likert scale assessments are Strongly Agree (SS), Agree (S), Disagree (TS), Neutral (N), and Strongly Disagree (STS). For statements that are positive (+), the measurement starts from the values 1, 2, 3, 4, and 5 on the Very Agree (SS) scale. While for statements that are negative (-) the measurement starts from the value of 5,4,3,2,1 on the Very Disagree (STS) scale. Interviews used in this study are types of interviews that are not standard or unstructured. Non-standard or unstructured interviews are open situations that contrast with closed or standard structured interviews [15]. So it is concluded that unstructured interviews are more open and flexible.

2.3. Data analysis

This study employed two types of data analyzes. Questionnaire data analysis using descriptive statistics that is calculating the mean, mode, median and standard deviation. Whereas for the analysis of interview data students use the Miles and Huberman model.

3. RESULTS AND DICUSSION

Hilgard, Atkinson & Atkinson in [16] argued that an attitude is an emotional reaction towards a person or thing. It is a personal response to an object, developed through experience which can be characterized as favourable or unfavourable. So it can be interpreted that attitude is an assessment or reaction to an object, person or other aspects that include a sense of liking and dislike and pleasant or unpleasant. So far, people have assumed that attitudes toward science are reactions to accepting or rejecting and pleasant or unpleasant reactions to the science. This is in line according to Yara in [17] Attitude towards science denotes interest or feeling towards studying science. It is the students" disposition towards liking or disliking science". Though attitude can not only be seen from likes or dislikes, but can be measured through attitude assessment indicators. In this study, attitudes were measured using 3 indicators developed by [18].

3.1. Attitude towards investigation in natural sciences

Indicators of attitudes towards investigations in the Natural Sciences are guidelines for students to use experimental tools, analyze experimental data when experimenting. By experimenting students are able to improve the ability to think critically in learning and to criticize the results of data analysis. The importance of the attitude indicator of the science investigation is that it can improve the attitude of students in conducting various experiments in the science and building scientific knowledge. Therefore, two different modes of scientific inquiry - experimental and historical - can be distinguished and need to be considered in teaching about how scientific knowledge is built [19]. In addition, the knowledge of a scientist is also needed to improve students' critical thinking skills, but cognitive scientists have several contributions to make.

They have developed some very general insights into how we think and how we learn, and this can be brought into critical thinking [20]. This is related to statements [21] when students read about ideas related to science, progress, problems or problems they must be able to build a relationship between their knowledge of science and the content of reading so that they can understand the text and analyse it critically while learning about science. And when combining aspects of HOS in science teaching can improve critical thinking skills such as statements [22] "In this context, we argue that combining HOS aspects in science teaching can improve critical thinking skills if mediated pedagogically. Treat neglected aspects. Such an approach will challenge learners to investigate the nature of knowledge: (i) by stimulating critical reflection on knowledge and experience acquired inside and outside the classroom, (ii) by promoting awareness of subjective and ideological bias and (iii) by developing the ability to analyse evidence stated in the rational argument".

The results of descriptive statistical analysis of attitude indicators on investigations in the Natural Sciences in Table 2. Based on the table, as many as 11 students categorized as not very good of 0%, 236 students categorized as not good of 8%, 1409 students categorized quite good of 50%, 998 students categorized as good of 35%, and 161 students are categorized very well of 6%. So it can be concluded that students tend to have a fairly good attitude on indicators of attitude towards investigations in science. This is because students like to find out why something happened by experimenting rather than being told, but

students also assume that conducting experiments is not as good as getting information from the teacher. Furthermore in the learning process students are quite enthusiastic about conducting experiments, and the teacher not only guides also facilitates the learning process of science in the classroom.

Table 2. Descriptive attitude statistics on investigations in natural sciences

No	Flow	Classification of Attitudes	Total	Percent	Standard Deviation	Mean	Modus	Median	Min	Max
1	12-18.2	Very bad	11	0%	4.15	29.73	30	30	12	43
2	18.3-24.4	Bad	236	8%						
3	24.5-30.6	Pretty good	1409	50%						
4	30.7-36.8	Good	998	35%						
5	36.9-43	Very good	161	6%						

The above data is supported by the results of the interview:

Question : Do you like to experiment? Explain?
Answer 1 : Yes, I like to experiment because by experimenting I will increase my knowledge and curiosity, and one can improve my scientific attitude in learning science.
Question 2 : Can experiment provide knowledge and skills in your learning?
Answer 2 : depending on conditions, sometimes it can provide knowledge and abilities. But sometimes it doesn't.

3.2. Adoption of scientific attitudes

Adoption indicators of scientific attitudes are students willing to accept new thoughts or not in accordance with their previous thoughts. This indicator can also be interpreted as students like to use a new method in conducting investigations in the field of science. The importance of indicators of adoption of scientific attitudes is that students will accept new thoughts or not in accordance with their previous thoughts. Meanwhile, according to [23] the adoption of scientific attitudes is used to see someone's willingness to assess and revise opinions based on experiments and empirical data.

The results of descriptive statistical analysis of adoption indicators of scientific attitudes can be seen in Table 3. Based on the Table 3, 56 students are categorized as not very good with a percentage of 2%, 359 students are categorized as not good with a percentage of 13%, 1428 students are categorized as quite good with a percentage of 51%, 811 students categorized as good with a percentage of 29%, and 161 students are categorized very well with a percentage of 6%. In this indicator, the attitude is quite good. This is because students will accept new thoughts that are not in accordance with their previous thoughts and students like to use new methods to investigate science. In line with the statement [24] states a more positive attitude towards science is related to a positive attitude about the usefulness of science.

Table 3. Descriptive statistics of adoption of scientific attitudes

No	Flow	Classification of Attitudes	Total	Percent	Standard Deviation	Mean	Modus	Median	Min	Max
1	13-17.4	Very bad	56	2%	3.49	25.11	26	25	13	35
2	17.5-21.8	Bad	359	13%						
3	21.9-26.2	Pretty good	1428	51%						
4	26.3-30.6	Good	811	29%						
5	30.7-35	Very good	161	6%						

The above data is supported by the results of the interview:

Question: Do you want to accept thoughts that are new or not in accordance with your previous thoughts?
Answer: yes I want to accept new thoughts because it makes my insight broader.

3.3. Career interest in natural sciences

Indicators of interest in a career in the field of science are defined as students wanting to become a science scientist after graduating from school and considering work as a science scientist is something fun and interesting. The importance of an indicator of interest in a career in the science field is the first step to achieving employment that matches the knowledge and abilities of students in the science field. That is why it is important that students are expected to have a career interest in the science field to support the lives of students in the future after completing their education. This is in line with the statement [25] that the attitude

of students towards science affects the future of learners and students' careers. Therefore, one's career development varies from person to person and between one period and another period in his life.

The results of descriptive statistical analysis of indicators of career interest in the science field can be seen in Table 4. Based on the table, as many as 15 students categorized as very bad of 1%, 205 students categorized as not good of 7%, 1115 students categorized as good enough of 40%, 1162 students categorized as good of 41%, and 318 students are categorized very well of 11%. So it can be concluded that students tend to have a good attitude on indicators of interest in a career in science. This is because students consider a career as a science teacher is something fun.

Table 4. Descriptive statistics of career interest in natural sciences

No	Flow	Classification of Attitudes	Total	Percent	Standard Deviation	Mean	Modus	Median	Min	Max
1	12-19.6	Very bad	15	1%						
2	19.7-27.2	Bad	205	7%						
3	27.3-34.8	Pretty good	1115	40%	5.78	35.08	36	35	12	50
4	34.9-42.4	Good	1162	41%						
5	42.5-50	Very good	318	11%						

The above data is supported by the results of the interview below:

Question 1 : *Are you interested in a career in the field of science? Explain?*
Answer 1 : *No, I am not interested in a career in the science field because I am not interested in a career in science.*
Question 2 : *If you are growing up, do you want to become a teacher or become a scientist in the science field? Explain?*
Answer 2 : *yes I want to be a teacher or become a scientist in the science field because the science and science teacher teaches students to learn about nature and the environment.*

3.4. Obstacles

Based on the results data on each of these indicators there are several obstacles that exist in each indicator with a total sample of 2815 junior high school students in Muaro Jambi. The constraints are highlighted in Table 5.

Table 5. Obstacles to indicators' attitudes towards science subjects

No	Indicator	Total	Percent
1	Attitude towards SCIENCE investigation	247	8%
2	Adoption of a scientific attitude	415	15%
3	Career interest in science	220	8%

In this study found constraints on the attitude indicators of students, namely: attitude indicators towards investigations in science with the number of students 247 and the percentage of 8%, indicators of adoption of scientific attitudes with the number of students 415 and a percentage of 15%, and indicators of career interest in the science field with the number of students 220 and the percentage of 8%.

4. CONCLUSION

Based on the results of research conducted on the attitudes of students towards science subjects in junior high schools in Muaro Jambi, represented by three indicators, it can be concluded that the attitude of students towards natural science subjects is good. The details of the statistical data show that the indicators of attitudes towards investigations in Natural Sciences have good results, indicators of adoption of scientific attitudes have good results, and on indicators of interest in a career in the field of science have good results.

In this study also found several obstacles in each indicator, namely: attitude indicators towards investigations in science with 247 students and 8% as percentage, indicators of adoption of scientific attitudes with the number of students 415 and a percentage of 15%, and indicators of career interest in the science field with the number of students 220 and the percentage of 8%. This is because students still have a negative attitude towards science. To change the attitudes of students, the teacher should design learning creatively and adapt to the conditions of students so as to create an attitude of acceptance by students towards the science subjects.

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