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Attitude for Physics: The Condition of High School Students

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Abstract

The purpose of this study was to determine student attitudes towards learning physics in high schools in the city of Jambi and Batang Hari. The method used is a survey type quantitative research method. The data collection technique in this study used purposive sampling technique with the research instrument used was a questionnaire instrument. The data analysis used in this research is descriptive analysis. Based on the results of the study, attitudes based on indicators of social implications, scientist normality, and attitudes towards physics research conducted at SMAN 8 Jambi City with the physics attitudes at SMAN 10 Batang Hari can be concluded that the results displayed are different from the category results and the number of respondents. So that there are different conditions from the two SMAs. This comparison also shows that SMAN 8 Kota Jambi shows a better attitude seen from the percentage and number of respondents.

Key words: Attitude towards physics, Student, Senior High School

INTRODUCTION

Education is an activity carried out for someone to be better than before. Education is a system, namely systematization of the process of acquiring experience so that it becomes knowledge. Thus, the Educational philosophy is defined as the process of acquiring useful learning experiences for students in their lives (Papadiamantaki, Fragoulis, & Soroliou, 2016). Education can improve everyone's knowledge, skills, and habits through teaching, training, and research. In education in Indonesia itself, there are several levels, one of them is the High School level (Astalini, Kurniawan, Perdana & Pathoni, 2019). Education is a system, namely systematization of the process of acquiring experience so that it becomes knowledge. Therefore, the philosophy of education is defined as the process of acquiring learning experiences that are useful for students in their lives (Khoiri, Hindarto, &Sulhadi, 2011).

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Basically, to get an education that is in accordance with the standards, a person will learn so that they can improve their abilities and knowledge. Studying is one of the most critical decisions in someone's life (Juita, 2020). Students will learn to increase their knowledge and knowledge to education that is in accordance with existing standards (Suciyati & Masrita, 2020).

The learning potential will be honed according to the school level taken. Like elementary schools, junior high schools, high schools, and even higher levels. The ability and potential that exists will be honored and developed according to the level of education that they follow (Gougoulakis, 2017). During school, from basic to junior secondary, you have been taught about Natural Sciences. Development of a science framework that has been painted that has the science of attitudes as students behavior is the main purpose of science learning (Rokhmah, Sunarno, & Masykuri, 2017).

That student is partici- lively active in Alamte's knowledge, the enabling platform for discussion and marketing of students to think and produce will be effective in learning (Şener, N., Türk, & Taş, 2015). Science attitude is a cognitive concept and normally associated with mental processes (Sekar, & Mani, 2013). So, when

entering high school, Natural Sciences began to consist of three lessons, namely biology, chemistry, and physics.

Physics is Natural Sciences that studies natural phenomena and interactions within them through observation, measurement, and analysis. Basically, physics learning needs to be adapted to the way previous physicists have acquired knowledge. Therefore, learning physics emphasizes the provision of direct and student-centered experience (Kurniawati, Wartono, & Diantoro, 2014). In schools, teachers have always commented that failure in physics is due to their negative attitude and lack of interest in the subject (Velo, Nor, & Khalid, 2015). At school, teachers always comment that failure in physics by some students is because they have a negative attitude towards the subject.

The degree to which a person displays a positive or negative evaluation towards a particular behavior is considered to be one's attitude (Mishkin, Wangrowicz, Dori D., & Dori Y. J., 2016). Attitude is a central part of human identity (Rahman, 2019). This attitude navigates one's action because attitude is a tendency to behave (Susilawati, Hernani, & Sinaga, 2017). In physics, this attitude can be related to the normality of scientists, attitudes toward inquiry in physics, and social implications.

The social implications of physics show how the effects and effects of physics in social life. Many social benefits are obtained as a result of the development of science and technology. In school learning, both in the classroom and in the lab, the social implications of physics can be seen from how students work together and independence in groups. Students can be active and motivated during the learning process if they are required to be able to share information, collaborate in groups and respect others (Astalini, Kurniawan, & Sumaryanti, 2018)

Normality of scientists is someone who looks ordinary and is the same as ordinary people. A scientist can solve problems and find something new. Attitudes are drawn from scientists in solving problems and discovering new discoveries that can be used as role models for students. In physics learning, for example, students in the class are diligent in writing and diligent in learning (Astalini, Kurniawan, Perdana & Pathoni, 2019).

Attitudes toward inquiry in physics contain the perceptions of students and students about ways or actions in solving problems or problems in physics (Astalini, Kurniawan, Perdana & Pathoni, 2019). Factors that are alleged to affect low scientific creativity are the process of physics learning in Indonesia that is generally separated from the practical subjects, physics learning tends to be emphasized on the mathematical concepts and solving physics problems mathematically (Suyidno, Nur, Yuanita, & Prahani, 2018). Problem-solving in physics, usually done by analyzing, observing, measuring, and then concluding. This is done not only during practical work but also in the classroom. When in class, students must be active, critical, to learning, because with activity and criticality students can find answers to problems that must be solved. Learning physics is an active process, so it is learning the students to explore the understanding, developing thinking skills and science process skills including scientific investigation (Rifati,2015).

So that physics learning aims to provide the provision of experience and process skills, increase the creativity and scientific attitude of students. Scientific attitude is one form of intelligence possessed by each individual. The critical attitude is a complex of values and norms which are held to be binding on the man of science (Ali, 2018). Basic competencies in scientific attitudes include courage and courtesy in asking questions and arguing, wanting to know, caring for the environment, carrying out activities that show environmental concern, collaborating, being honest with facts, diligent, tenacious, creative and innovative (Subali & Wahyuni, 2010). The competence dimension of attitude implies the willingness of the students (and the professionals) to move from their professional field to another (Gerald, 2018). It also can form scientific abilities and cultivate themselves with the values of science in every dimension of life (Arief, & Utari, 2015).

The purpose of the study was to compare the attitudes of students to physics learning in high schools in Jambi City District and Batang Hari. The indicators used are the social implications of physics, the normality of scientists, and attitudes toward inquiry in physics. In this study the questions asked were:

1. What is the attitude of social implications for physics?
2. What is the attitude of the normality of scientists to physics?
3. What is the attitude towards investigation in physics?
4. What is the comparison of the physics attitudes of senior high schools in Jambi City District and Batang Hari Regency?

METHOD

The research design used is a quantitative research method with a type of survey research. Quantitative research methods can be interpreted as research methods that are based on the philosophy of positivism, used to examine certain populations or samples, data collection uses research instruments, quantitative/statistical data analysis, intending to test predetermined hypotheses (Cohen, Manion, & Morrison, 2013). According to (Creswell, 2015) research is a quantitative research procedure, the researcher administers a survey of samples or in the entire, opinion, behavior, or specific characteristic of the population.

The population is a group of individuals who have the same characteristics. For example, all teachers will be school teachers and all secondary school administrators will be population administrators. As this example illustrates, populations can be small or large. You need to decide which groups you want to study (Creswell, 2012). In this study, the population used was state high school students in Jambi City.

A sample of individuals taken from a larger population. The population of people in whom we are interested in, and to whom we want the results of the study to apply. A sample is required because, in most instances, it is not necessary to study everyone in the population. Clearly, then, in taking a sample, it is absolutely vital that it be representative of the population (Bruce, Daniel, & Debbi, 1955). The number of samples used is 326. Which consists of 174 students at SMAN 8 Jambi City and 152 students from SMAN 10 Muaro Jambi. The sampling technique used in this study was purposive sampling. Purposive sampling is a sample that is done by taking subjects rather than based on strata, random or regional but based on the existence of certain goals (Heridiansyah, 2012). Dimana kriteria pada penelitian ini adalah siswa yang belajar fisika.

The instrument used in this study is a questionnaire instrument. Questionnaires are useful to consider when conducting a postal survey. They can be cheaper than personal interviewing and a quick sample is large and widely dispersed. For any postal survey regardless of the sample size, you must allow at least six weeks for the first wave of questionnaires to be returned and another four weeks for each successive mailing. As with telephone interviewing, a postal survey is useful if your respondents are widely distributed. However, the lack of personal contact between the respondent and the researcher, the design and layout of the questionnaire is all important (Mathers, & Amanda, 2009).

In this study, the questionnaire used was the adoption questionnaire from Darmawangsa (2018) study with 54 item statements and Cronbach Alpha's 0.9. The attitude questionnaire uses a Likert 5 scale that is Very Setuju (SS) with a score of five, Agree (S) with a score of four, Neutral (N) with a score of three, Disagree (TS) with a score of two, and Strongly Disagree (STS) with a score one.

Table 1. Statement of attitude indicators for physics

Variable	Indicator
Attitudes towards science courses	Social implications of physics
	Normality of scientists
	Attitude towards inquiry in physics

The data analysis used in this study is descriptive statistics and inferential statistics. Descriptive statistics used are in the form of mean, median, and mode. While inferential statistics used are through the normality test, homogeneity test, and t-test. All data analysis techniques used are assisted with the *IBM SPSS Statistics* 22.0 program.

RESULT AND DISCUSSION

The renewal of this study is an indicator used to describe attitudes towards Physics at SMAN 8 Kota Jambi and SMAN 10 Batang Hari. The indicators used are the social implant, the normality of the scientist, and the attitude towards investigations in physics originating from the research of Fraser. Applied in Indonesian and conducted by Darmawangsa (2018) has a *Cronbach alpha* value of 0.9.

Social Implications of Physics

The results of attitude indicators on the social implications of physics are in the Table 2.

Table 2. Indicator of social implications for the attitude of physics at SMAN 8 Batang Hari

Range	Attitude	total	%	Min	Max
5.0 - 9.0	Not very good	1	0.6	9.00	25.00
9.1 - 13.0	Not good	7	4.0		
13.1 - 17.0	Pretty good	71	40.8		
17.1 - 21.0	Well	76	43.7		

21.1 - 25.0	Very good	19	10.9

Based on Table 2. shows that the social implications of physics are 174 respondents with a good dominant. It can be seen in the Table 2 that the data is 43.7% in the good category. Then a very bad attitude is 0.6%, bad attitude 4.0%, good attitude 40.8%, and very good attitude is 43.7%. So it can be said that the social implications of physics at SMAN 8 Jambi City predominantly occur.

Table 2b. Indicator of social implications for the attitude of physics at SMAN 10 Batang Hari

Range	Attitude	total	%	Min	Max
5.0 - 9.0	Not very good	10	0.6		
9.1 - 13.0	Not good	89	4.0	10.00	23.00
13.1 - 17.0	Pretty good	50	40.8		
17.1 - 21.0	Well	2	43.7		
21.1 - 25.0	Very good	10	10.9		

For indicators of social implications at SMAN 10 Batang Hari with 151 respondents, the dominant is not good with a percentage of 58.9%. The results of the attitude are not very good at 6.6%, 33.1% for the category is quite good, 1.3% for good. Staying at SMAN 10 Batang Hari, the attitude of the social implications of physics is not good.

The results of the data in Table 2 show the results of the indicators of social implications of SMAN 8 Jambi City are more dominant with this attitude category is quite good, and for SMAN 10 Batang Hari the dominant attitude is not good. With the number of students who answered the indicators of social implications in SMAN 8 Jambi City more than the SMAN 10 Batang Hari, 76 and 2. The social implications of physics show how the effects and effects of physics in social life (Astalini, Kurniawan & Sumaryanto, 2018) The social implications of physics can be done during the learning process, such as discussion with question and answer in the classroom, when practicing the cooperation between students and students and students and teachers. At SMAN 8 Jambi City has a pretty good impact on the attitude of physics in its social life, compared to SMAN 10 Batang Hari has a bad impact on social life. Social implications can be seen by the existence of an independent attitude and cooperation in learning. In independent learning, students are required to care about knowing things they have not yet known (Ellianawati & Wahyuni, 2010).

Normality of Scientists

The results of attitude indicators towards the normality of scientists are in the Table 3a.

Table 3a. Indicator of normality of scientists towards physics at SMAN 8 Kota Jambi

Range	Attitude	Total	%	Min	Max
5.0-9.0	Not very good	6	3.4		
9.1-13.0	Not good	107	61.5		
13.1-17.0	Pretty good	58	33.3	10.00	24.00
17.1-21.0	Well	3	1.7		
21.1-25.0	Very good				

On the indicator of the normality of scientists found in Table 3a. is for SMAN 8 Kota Jambi there are 174 respondents with a more dominant result which is bad attitude where there is 61.5%. Then for a very bad attitude is 3.4%, the attitude is quite good 33.3%, there is a good attitude 1.7%, and for a very good attitude is 0%.

Table 3b. indicator of the normality of scientists towards physics at 10 Batang Hari High School

Range	Attitude	Total	%	Min	Max
5.0-9.0	Not very good	10	6.6		
9.1-13.0	Not good	89	58.9		
13.1-17.0	Pretty good	50	33.1	10.00	23.00
17.1-21.0	Well	2	1.3		
21.1-25.0	Very good				

For the Table 3b is the data of SMAN 10 Batang Hari with the number of respondents 151 who produced 58.9% is a normal attitude of scientists who are not good. Then following the normality of the scientist's data is quite good with a number of 33.1%, the attitude is not very good is 6.6%, and the attitude of the normality of a good scientist is 1.3 %.

In Table 3 shows the results of the indicators of the normality of scientists from SMAN 8 Kota Jambi and SMAN 10 Batang Hari dominantly in the bad category. Indicators of normality of scientists at SMAN 8 Jambi City had more respondents than SMAN 10 Batang Hari, 107 and 89. Normality of scientists is an attitude that is able to solve problems and find new discoveries which will then be used as role models (Astalini , Kurniawan, Pernda & Pathoni. 2019). If this attitude is applied in the classroom, it will help students to improve students' criticism of the problems to be solved. For example, being able to work on the questions given by the teacher in easy ways. What happened at SMAN 8 Kota Jambi and

SMAN 10 Batang Hari is that the attitude of normality of scientists to physics shows a bad attitude. This happens because students assume that life as a scientist is a life that is always surrounded by impossible things. Ideally, a scientist is seriously pursuing the scientific world (Maftukhin, 2015).

Attitudes towards Investigation in Physics

The results of attitude indicators towards investigations in physics are found in the Table 4.a.

Table 4a. Attitude indicator towards investigation in physics at SMAN 8 Kota Jambi

Range	Attitude	Total	%	Min	Max
9.0 -16.2	Not very good	4	2.3	21.00	43.00
16.3 - 23.4	Not good	67	38.5		
23.5 - 30.6	Pretty good	94	54.0		
30.7 - 37.8	Well	9	5.2		
37.9 - 45.0	Very good				

While the attitudes towards inquiry in physics are found in Table 4a with the number of respondents being 174. With the results of attitudes towards the dominant physics investigation, the attitude is quite good with percent 54.0%. then followed by bad attitude data that is 38.5%, attitude towards investigation in good physics is 5.2%, and in this attitude also does not have percent for a very good attitude.

Table 4b. Indicator of attitude towards investigations in physics at SMAN 10 Batang Hari

Range	Attitude	Total	%	Min	Max
9.0 -16.2	Not very good	1	0.7	10.00	43.00
16.3 - 23.4	Not good	10	6.6		
23.5 - 30.6	Pretty good	76	50.3		
30.7 - 37.8	Well	55	36.4		
37.9 - 45.0	Very good	9	6.0		

For Table 4b, that is the attitude towards inquiry in physics with the number of respondents 151. The results of this attitude towards investigations in physics which have the most or the most dominant results are fairly good attitudes, namely 50.3%. Then there is an attitude towards inquiry in physics which is a good attitude with a value of 36.4%, an attitude that is not good 6.6%, a very good attitude which is 6.0% and a very bad attitude is 0.7%.

In Table 4 shows the results of students' attitudes toward physics with indicators of investigation in physics from SMAN 8 Kota Jambi and SMAN 10 Batang Hari dominantly with fairly good categories. Indikator attitudes toward the inquiry in physics at SMAN 8 Jambi City more than 10 Batang Hari SMAN namely 94 and 76. The attitude towards inquiry in physics is the action of students in solving problems or problems in physics (Astalini, Kurniawan, Perdana & Pathoni, 2019). So that we know the attitude of students is quite good in investigating problems in physics at the High School. This is indicated by the existence of scientific attitudes held by students. Scientific attitude is very meaningful in social interaction, science, and technology (Gani, & Safitri, 2016)

CONCLUSION

Based on the results of the study, attitudes based on indicators of social implications, scientist normality, and attitudes towards physics investigations conducted at SMAN 8 Jambi City with the physics attitudes at SMAN 10 Batang Hari can be concluded that the results shown are different from the results of the category and the large number of respondents. So that there are different conditions from the two SMAs. This comparison also shows that SMAN 8 Kota Jambi shows a better attitude seen from the percentage and number of respondents.

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