REVIEW OF EDUCATIONAL PSYCHOLOGY: ATTITUDE TOWARDS PHYSICS AND BIOLOGY

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Abstract

Purpose of the study: The attitudes of students when learning are behaviors that can be learned from psychology. This study aims to determine the comparison of students' attitudes towards physics and biology in Adhyaksa 1 Senior High School in Jambi City and the State Senior High School 8 in Batanghari Regency, Indonesia.

Methodology: The sample used was 282 students consisting of 140 students at Senior High School Adhyaksa 1 Jambi, and 142 students at Senior High School 8 Batanghari, and this type of research was a comparative quantitative study with a survey design. The instrument used was a questionnaire, and the data were analyzed using descriptive and inferential statistics.

Main Findings: The results obtained indicate that there are differences in the attitudes of students at senior high school Adhyaksa 1 Jambi with Senior high school 8 Batanghari with a ratio of 0.046 attitudes toward physics and 0.032 attitudes toward biology. Shows that students' attitudes toward physics and biology have some comparisons in the Batanghari region and the Kota Jambi.

Applications of this study: These findings can contribute to the realm of psychology to enhance students' positive attitudes towards physics and biology subjects in secondary education institutions, especially in the Indonesian region. Negative attitudes towards science, especially towards physics and biology such as those found in senior high schools in the Batanghari Regency and Jambi City, need to be pursued to become positive attitudes.

Novelty/Originality of this study: The novelty of this research is to explore the quality psychology knowledge of students for Physics and biology teachers, especially in education. Besides, to find out how students' attitudes towards science, especially physics and biology. In this case, the student attitudes towards physics and biology in the Batanghari Region and Jambi City.

Keywords: Attitudes Towards Biology, Attitudes Towards Physics, Psychology Education, Senior High School, Student.

INTRODUCTION

Indonesia is one of the developing countries in Asia. Natural and human resources are needed to become a developed country. The important role of education in improving human resources is required. Knowledge is essential for life, and education is a process to improve one's behavior or morals for the better. According to Syamsudin, Budiyono, and Sutrisno (2016), national education aims to develop the potential of students so that they become individuals who have good character, knowledgeable, creative, and responsible. While Astalini, Kurniawan, Perdana, and Pathoni (2019), states education is an activity, which is very important for all humans, with the existence of human education, can change behavior and knowledge for the better.

Psychology, as a branch of science, studies the processes and activities in the form of expressions of behavior (Soeparno & Sandra, 2011). Psychology itself is based on its general and specific objects. According to Nurcholidah (2019), general psychology is the psychology that monitors or investigates a person's activities. Whereas psychology specifically investigates and studies aspects of the specificity of human activity—one of the teenage activities of students, both in school and outside of school. The development of the current era greatly affects the personality of adolescents. So that the right environment will make students have good self-development too, especially in the formation of student attitudes.

Student self-development and student behavior are closely related to educational and social psychology. In the world of psychology, education is a science that studies students to learn (Dodi, 2016). One of which is learned in psychology is the development of student attitudes. The teacher will assess the development of student behavior or attitudes shown by students in learning. The process of assessing the attitudes, knowledge, and skills of students in school is one of the duties of a teacher (Gobena, 2017; Nadapdap & Istiyono, 2017). In addition to assessing, a teacher is also responsible for shaping the personality of students. Assessment in education must be performed to measure student's cognitive skills. It is expected to increase the success of the learning process. This shows the important role of the teacher in the learning process, especially for the formation of student personality or student attitudes when learning. This statement is in line with Ayu and Marzuki (2017) teachers have an important role in shaping students' personality and internalizing moral values to be implemented by the students. So it is known that the teacher's role in shaping the personality and behavior or attitudes of students at school is needed. So it is very helpful for teachers to identify student behavior in the learning process.

A person's attitude can be formed from the influence of his environment. Scientific attitude with environmental knowledge is a combination of attitude to solve problems and knowledge about the surrounding environment. The indicators for scientific attitude with environmental knowledge would be practically be seen from the change of attitude and real actions, for example, children are guided to discover some environmental cases in their classroom or school (Airlanda, 2018). The environment is one place to see the changes in attitudes and actions of high school students. High School students already know what is good and not for him. In addition, students can control themselves in scientific thinking. To develop attitudes, actions, and how students think of supporting subjects-physics and biology. Physics and biology are one of the sciences in the assessment of learning outcomes which considered complete if it includes cognitive, affective, and psychomotor aspects (Kurniawati & Atmojo, 2017).

Physics and biology learning also requires students to be able to solve a problem in learning. According to Istiyono, Dwandaru, and Faizah (2017), science (physics and biology) learning highly needs problem-solving skills, one of the efforts in elevating the learners' thinking skills. Biology and physics are part of science subjects that contribute to the development of science and technology (Afrizon, Ratnawulan & Fauzi, 2012). This is in line with Anaperta (2015), which states that science learning is a field of science that plays an important role in the development of science and technology. Besides, science learning is also part of science that studies natural phenomena that involve scientific processes and attitudes. According to Maison, Astalini, Kurniawan, and Sholihah (2018), science learning deals with various scientific concepts that some of its applications can be found in everyday life. But, science learning makes students inclined to consider it difficult to learn.

Learning difficulties experienced by students occur due to several factors. One of these factors is an internal factor. Internal factors referred to here are students' attitudes toward physics and attitudes towards biology, both positive and negative attitudes that arise when learning takes place. The positive attitude in question can be in the form of actions taken at the time of learning. The opinion above shows that scientific attitude influences the learning outcomes of science because the aspect of assessment is the aspect of attitude. Scientific attitude has three components, namely, beliefs, feelings, and actions (Mukhopadhyay, 2014). Dai and Stanberg (2014) state a positive attitude is shown by students for their personal goals, as well as the learning process. A positive learning attitude will lead to a higher intensity of activities compared to a negative learning attitude. Putra, Kusumawardhani, and Narhetali (2019) express the factors that give rise to intentions, which will influence the emergence of a behavior or action that is the attitude towards a particular behavior. So it is important for physics and biology teachers to know the attitudes of students in the learning.

A positive attitude toward physics and biology is very helpful in understanding the lesson. Active learning can increase student interest and curiosity so that positive attitudes of students will increase in learning (Astalini, Kurniawan & Farida, 2018). Students who enjoy learning biology and physics will show a positive attitude when the learning process takes place. Besides, students will also be enthusiastic when the teacher explains the material when learning even if the teacher gives an assignment. Furthermore, with the fun of students in taking physics and biology lessons in class, it will encourage students to add learning time related to physics and biology. Students who enjoy learning physics will be interested in increasing the time to study science, find out problem-solving, and increase knowledge about science (physics and biology). So students who like physics and biology will use their time as best as they can to study and provide additional time to study. But in reality, students do not like physics and just enough to like biology because they consider science learning difficult. Some abstract physics concepts and too many formulas in physics make students' interest in learning low, so students behave negatively. Meanwhile, learning biology memorizes a lot, and it makes students only like biology which causes student learning outcomes in physics and biology will be low or down (Astalini, Kurniawan & Sumaryanti, 2018). Therefore, the teacher plays an important role in being able to observe and analyze how students' attitudes about science lessons. Thus students can be excited and actively participate during teaching and learning activities.

The purpose of this study is expected to facilitate the physics and biology teacher in knowing the obstacles and problems faced by students when studying. Also, to understand the solutions to improve students 'attitudes towards physics and attitudes towards biology and to find out how students' attitudes are at senior high school 8, Batanghari Regency, and senior high school Adhyaksa 1, in Jambi City area.

These findings can contribute to the realm of psychology, which is to enhance students' positive attitudes towards Physics and Biology subjects in secondary education institutions, especially in the Territory of Indonesia and other countries. This can be seen in high schools in the Batanghari Regency and Jambi City areas that have obstacles for students, namely negative attitudes towards science. Besides, it aims to help teachers improve student understanding and student behavior towards physics and biology subjects in school.

METHODOLOGY

The design used in this study is a quantitative approach to survey methods. Quantitative research methods are referred to as research methods based on the philosophy of positivism, which is useful for examining a particular population or sample and analyze statistically to test a predetermined hypothesis. According to Shakouri and Nazori (2014), quantitative research deals with data in the form of numbers and uses mathematical operations to investigate their properties. According to Cohen, Manion, and Morrison (2004), research surveys are quantitative research procedures

where researchers manage sample surveys or across a population that is used to identify attitudes. This design applied because it was related to the objectives of the study, where the aim was to determine the attitudes towards science (physics and biology).

The data were collected by reviewing the attitudes of students at senior high school 8 Batanghari, Batanghari District, and senior high school Adhyaksa 1 Jambi, Jambi City Region. The population in this study were all students from the Natural Sciences class at senior high school Adhyaksa 1 Jambi and all students of the Natural Sciences class at senior high school 8 Batanghari. The sampling technique used is total sampling or commonly known as the census. The sample in this study amounted to 282 students.

The procedure carried out by researchers is by spreading the instrument in the form of a questionnaire to all students of the Natural Sciences class at senior high school 8 Batanghari and Adhyaksa 1 Jambi. The attitude questionnaire here was adopted from the study of Darmawangsa, Astalini, and Kuniawan (2018) with Cronbach Alpha 0.9. The indicators used are the adoption of a scientific attitude, the pleasure of learning, and the interest in increasing the amount of time for studying.

Data analysis techniques used in this study are descriptive statistics and inferential statistics. According to Kartianom and Mardapi (2017), this research is a quantitative descriptive study that uses content analysis in concluding by identifying various characteristics specifically, systematically, and generically. The results in this study are displayed in tabular form, namely the frequency distribution table of indicators of the adoption of scientific attitudes, the pleasure of learning and interest in increasing the time for learning. At the same time, inferential statistics utilize data to make estimation, decisions, predictions, or other generalizations about a broader set of data (Darius, 2017). The results of this analysis are in the form of normality, homogeneity, and comparison tests.

RESULTS

Based on the three indicators used, students' attitudes show a different percentage of results for each indicator and the range of values used. Student attitudes in terms of indicators of adoption of scientific attitudes at senior high school Adhyaksa 1 Jambi in Jambi City Region and Senior high school 8 Batanghari in the Batanghari Region are shown in Tables 1 and 2.

Table 1: Adoption of the scientific attitude at senior high school Adhyaksa 1 Jambi

Classification				Mean	Median	Min	Max	%
	Range	Attitudes	F					
Attitudes towards Physics	7.0 - 12.6	Very not good	0	25.09	25.00	16.00	34.00	0
	12.7 - 18.2	Not good	6					4.3
	18.3 - 23.8	Enough	43					30.7
	23.9 - 29.4	Good	71					50.7
	29.5 - 35.0	Very good	20					14.3
Total			140					100
Attitudes towards Biology	7.0 - 12.6	Very not good	1	23.00	25.00	12.00	32.00	0.7
	12.7 - 18.2	Not good	5					3.1
	18.3 - 23.8	Enough	40					29.1
	23.9 - 29.4	Good	69					48.1
	29.5 - 35.0	Very good	25					19.0
Total			140					100

In Table 1, the attitude of students towards subjects of physics and biology in terms of the adoption of scientific attitudes in senior high school Adhyaksa 1 Jambi categorized well.

Table 2: Adoption of a scientific attitude towards science lessons at senior high school 8 Batanghari

Classification				Mean	Median	Min	Max	%
	Range	Attitudes	F					
Attitudes towards Physics	7.0 - 12.6	Very not good	0	25.58	25.00	15.00	34.00	0
	12.7 - 18.2	Not good	1					0.7
	18.3 - 23.8	Enough	31					21.8
	23.9 - 29.4	Good	98					69.0
	29.5 - 35.0	Very good	12					8.5
Total			142					100
Attitudes towards Biology	7.0 - 12.6	Very not good	0	25.44	25.00	16.00	33.00	0
	12.7 - 18.2	Not good	4					2.9
	18.3 - 23.8	Enough	35					23.3
	23.9 - 29.4	Good	90					65.1

| | 29.5 - 35.0 | Very good | 13 | | | | | 8.7 |
| Total | | | 142 | | | | | 100 |

In Table 2, it is known that students' attitudes towards physics and biology subject in terms of the adoption of scientific attitudes in senior high school 8 Batanghari are categorized as good. The indicator of pleasure or enjoyment learning science is shown in Tables 3 and 4.

Table 3: The pleasure of learning science at senior high school Adhyaksa 1 Jambi

Classification				Mean	Median	Min	Max	%
	Range	Attitudes	F					
Attitudes towards Physics	10.0-18.0	Very not good	1					0.7
	18.1-26.0	Not good	10					7.1
	26.1-34.0	Enough	80	32.57	32.00	14.00	49.00	57.1
	34.1-42.0	Good	44					31.4
	42.1-50.0	Very good	5					3.6
Total			140					100
Attitudes towards Biology	10.0-18.0	Very not good	0					0
	18.1-26.0	Not good	6					4.3
	26.1-34.0	Enough	44	32.52	30.00	18.00	45.00	31.4
	34.1-42.0	Good	80					57.1
	42.1-50.0	Very good	10					7.2
Total			140					100

In Table 3, it is known that students' attitudes towards physics subject in terms of the joy of students learning physics at senior high school Adhyaksa 1 Jambi categorized as enough. But, attitudes towards biology categorized as good.

Table 4: The pleasure of learning science at senior high school 8 Batanghari

Classification				Mean	Median	Min	Max	%
	Range	Attitudes	F					
Attitudes towards Physics	10.0-18.0	Very not good	1					0.7
	18.1-26.0	Not good	15					10.6
	26.1-34.0	Enough	66	33.68	34.00	16.00	49.00	46.5
	34.1-42.0	Good	49					34.5
	42.1-50.0	Very good	11					7.7
Total			142					100
Attitudes towards Biology	10.0-18.0	Very not good	1					0.7
	18.1-26.0	Not good	10					7.1
	26.1-34.0	Enough	80	32.56	31.00	14.00	49.00	57.1
	34.1-42.0	Good	44					31.4
	42.1-50.0	Very good	5					3.6
Total			142					100

Table 4 shows that the attitude of students towards physics and biology in terms of the pleasure of students studying physics at senior high school 8 Batanghari categorized as enough. As for the indicators of interest in increasing the time for studying science will be shown in Tables 5 and 6.

Table 5: Interest to increase the time to study science at senior high school Adhyaksa 1 Jambi

Classification				Mean	Median	Min	Max	%
	Range	Attitudes	F					
Attitudes towards Physics	8.0-14.4	Very not good	1					0.7
	14.5-20.8	Not good	16					11.4
	20.9-27.2	Enough	97	24.68	24.00	13.00	37.00	69.3
	27.3-33.6	Good	24					17.1
	33.7-40.0	Very good	2					1.4
Total			140					100
Attitudes towards Biology	8.0-14.4	Very not good	2					1.4
	14.5-20.8	Not good	16					11.4
	20.9-27.2	Enough	24	24.66	23.00	12.00	38.00	17.1
	27.3-33.6	Good	97					69.3
	33.7-40.0	Very good	1					0.7

| Total | | | 140 | | | | | 100 |

In Table 5, it is known that students 'attitudes towards physics are evaluated in terms of the students' interest in increasing physics learning time at senior high school Adhyaksa 1 in Jambi categorized as enough. But, attitudes towards biology categorized well.

Table 6: Interest to increase the time to study science at senior high school 8 Batanghari

Classification				Mean	Median	Min	Max	%
	Range	Attitudes	F					
Attitudes towards Physics	8.0-14.4	Very not good	1	26.20	26.00	14.00	38.00	0.7
	14.5-20.8	Not good	9					6.3
	20.9-27.2	Enough	88					62.0
	27.3-33.6	Good	36					25.4
	33.7-40.0	Very good	8					5.6
Total			142					100
Attitudes towards Biology	8.0-14.4	Very not good	1	24.68	24.00	13.00	37.00	0.7
	14.5-20.8	Not good	16					11.4
	20.9-27.2	Enough	97					69.3
	27.3-33.6	Good	24					17.1
	33.7-40.0	Very good	2					1.4
Total			142					100

In Table 6, it is known that students' attitudes towards physics and biology subjects in terms of students interested in increasing the time to study are categorized as enough in senior high school 8 Batanghari. Furthermore, to find out the comparison of students' attitudes in physics and biology at senior high school Adhyaksa 1 Jambi with senior high school 8 Batanghari, normality and homogeneity tests were conducted before the comparison test was performed. The results of normality and homogeneity tests are shown in Table 7.

Table 7: Normality and homogeneity of Adhyaksa 1 Jambi and Batanghari 8 High schools

	Normality	Homogenitas
	Sig.	Sig.
SMA Adhyaksa 1 Jambi	0.055	0.053
SMAN 8 Batanghari	0.200[*]	

Table 7 shows that the data are normally distributed and homogeneous. It is indicated by the sig value ≥ 0.05, for the normality of 0.055 and homogeneity of 0.053. The data will be said to be normal and homogeneous if the sig value ≥ 0.05. At the same time, the results of the comparison test students' attitude towards the subjects of physics and biology in senior high school Adhyaksa 1 Jambi and senior high school 8 Batanghari is shown in Table 8.

Table 8: Comparison of student attitudes in science

		t-test for Equality of Means		
		Sig. (2-tailed) attitudes towards physics	Sig. attitudes biology	(2-tailed) towards
Attitude	Equal variances assumed	0.046	0.032	

In Table 8, it is known that there is a significant difference or ratio between the attitudes of students in physics and biology in senior high school Adhyaksa 1 Jambi and senior high school 8 Batanghari as 0.046 and 0.032.

DISCUSSION

The novelty of this research is to explore the quality psychology knowledge for physics and biology teachers, especially in education, in terms of student attitudes reviewed in the Batanghari Region and Jambi City. This behavioral or attitude psychology has implications for high social orientation scores (Arifianto, 2017). Thus students who behave well will be able to socialize well, especially during the learning process. In learning activities, students can accept, reject, or ignore these learning activities. Such an attitude will play a role in the process and learning outcomes achieved and related to student psychology.

Psychology studies the behavior exhibited by a person. This behavior is usually called attitude, both accepting (positive) and rejecting (negative). Attitude is also important in the realm of social psychology: both individual social psychology and inter-group attitudes. The degree to which a person displays a positive or negative evaluation towards performing a particular behavior is considered one's attitude (Brien, Hass & Savoi, 2012; Mishkin, Wangrowicz, & Dori, 2016). In the

learning process, students will be between accepting or rejecting the lessons that educators give: physics and biology subjects are compulsory subjects for students majoring in Natural Sciences (IPA) in high school. Science major students tend to have good skills in critical thinking. This ability is obtained through the habits of students majoring in Natural Sciences who are faced with complex and concrete problems, for example, in physics and biology. But sometimes, the ability of students in critical thinking does not make students like science (physics and biology). Darmaji, Kurniawan, and Irdianti (2019) states science is considered heavy and is avoided by some students. Students' attitudes towards science can be reviewed both from students' attitudes toward science teachers, and students' responses in the science learning process. Attitude is a picture of each type of human reaction, namely in the main components of emotions, cognitive, and behavior of a person towards something. So, a reflection of the tendency of students' interest in interpreting science can be seen from their attitude towards the lesson itself (Veloo, 2015; Djiwandono, 2017; Manasia, 2015). Attitudes to science are used to show everything a person feels and thinks about science (Sethi, 2015; Astalini, Kurniawan, Darmaji & Destianti, 2019).

Student participation in the learning process will show students' attitudes toward the subject. Students who are active in learning physics and biology represent students' interest in learning science. Conversely, students who are not interested in learning physics and biology tend to follow lessons passively. Psychologists say that attitude is the main reason for differences in individual behavior. Student responses shown through spontaneous reactions such as carrying out certain activities or actions are students' attitudes. Therefore, the teacher can find out students who are pulling or not when learning takes place. In this study, there are three indicators of students' attitudes towards physics and biology subjects. The indicators are 1) adoption of scientific attitudes, 2) enjoyment of learning physics and biology, and 3) interest in increasing physics and biology learning time. In this study, it was seen that students showed a fairly good attitude towards Physics and biology subjects.

This scientific attitude is used to measure a student's attitude scientifically. According to Syahrial et al. (2019) and Astalini et al., (2019), the adoption of a scientific attitude can measure students 'willingness and readiness to give scientific responses and students' openness to new information. Students who have high scientific attitudes will help the learning process improve. This is because scientific attitudes can shape students thinking creatively and critically (Kurniawan et al, 2019). The development of positive student attitudes towards physics and biology is one of the keys to students' success in learning science. Students will learn to be humble, honest, and open-minded in accepting the development of lessons. Someone who has a humble soul will more easily understand the problems that occur (Tiaranita, Saraswati, & Nashori, 2017). Because humble students usually behave positively.

A scientific attitude is also needed to solve problems. Students can understand the concepts of science and can use scientific methods based on scientific attitudes to solve problems related to everyday life. Lack of scientific attitudes of students, which is caused by the teacher never inviting students to do scientific activities during the learning process. According to Hardiyanti, Astalini, and Kurniawan (2018) and Asrial et al., (2019), the teacher also plays an important role in attitudes during the process of learning in certain subjects, and science certainly enters one of these domains. So the teacher can know the attitude of students towards physics and biology subjects. Learning activities will be conducive if supported by teachers who have the competence and high performance because teachers are the leading spearhead of children's education in schools. Therefore, teachers must know the science of psychology that is related to student behavior or attitudes while studying.

Students who like physics and biology will show a positive attitude towards learning. Fun in science is explained through students' attitudes in preparing to learn before the teaching and learning process is carried out. Besides, students' curiosity by finding information about knowledge of physics and biology concepts as well as students' interest in conducting experiments at home after learning in class shows students are interested in physics and biology lessons. Students who have a background in scientific attitude can answer well because they have a scientific concept (Fakhriyah et al., 2017; Astalini, Kurniawan & Putri, 2018). Students who have a positive attitude in the indicators of the adoption of scientific attitudes, as well as indicators of pleasure in learning, will increase their learning time than students in general. Students who love learning physics and biology subjects will have a high curiosity towards those subjects rather than other lessons (Astalini et al., 2019; Darmaji et al., 2018). Therefore, students consciously increase their learning time to explore science knowledge. Besides, most students admit that they are not very interested in learning science because many students do not provide time at home to study science, which causes students to learn physics and biology tends to down. Students' awareness to improve science learning outcomes is by increasing their learning hours.

CONCLUSION

Attitude is a description of the behavior of students who accept or reject something. Students' attitudes towards physics and biology are not only influenced by students' interest in the material but are also influenced by students' views about physics and biology teachers. Attitudes toward physics and biology can be seen from several indicators, namely the adoption of scientific attitudes, the enjoyment of learning physics and biology, and the willingness to increase the learning time of physics and biology. The results showed there were differences between the attitudes of students in Adhyaksa 1 Senior High School and Batanghari 8 Senior High School. But in theory, this area does not affect a person's

attitude. Attitudes are influenced by the environment, family, emotions, and economic factors. While their environment influences students' attitudes when studying.

LIMITATION AND STUDY FORWARD

This research is only to see how students' attitudes towards science and comparison of these attitudes in Adhyaksa 1 Jambi High School and Batanghari High School. These findings can contribute to the realm of psychology, which is to enhance students' positive attitudes towards Physics and biology subjects in secondary education institutions, especially in the Territory of Indonesia and other countries. Also, it aims to help teachers improve student understanding and student behavior towards Physics and biology subjects in school.

ACKNOWLEDGEMENT

CO-AUTHORS CONTRIBUTION

Maison is an associate professor in physics education with a focus on research in the fields of curriculum, misconceptions, and student attitudes. As the leading researcher, the task carried out is to coordinate all research performance, starting from the preparation of research instruments, data collection, data analysis, reporting, and publication. The research conducted is used to map students' abilities in terms of conceptual understanding, character, attitudes, and problems faced so that it can be used to revise and innovate the curriculum in terms of increasing student competencies, characters, and attitudes.

Aprizal Lukman is a professor in biology education and a researcher in a group of research: interest and motivation, student character and attitudes, and misconceptions in science education. In this study, he was a secretary who accommodated and evaluated the results of the research.

Nurdatul Jannah is a graduate student at Universitas Jambi and member Group Research ASPS (Attitude towards Physics and Science Processing Skills). The Contribution of this researcher is in terms of collecting and inputting data.

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