Students' Attitude Towards Science and Its Implications on Science Learning Outcomes of Junior High School Students

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Abstract: Students' Attitude Towards Science and Its Implications on Science Learning Outcomes of Junior High School Students. **Objectives**: this study aims to determine the differences in student attitudes towards science subjects and student learning outcomes in science subjects at the junior high school level, as well as to determine the effect of student attitudes on student learning outcomes in science subjects at the junior high school level. **Methods**: This study used a mixed research method with an explanatory design. The sampling technique used is simple random sampling. The number of research samples was 120 active students. **Findings**: The results of the research on the results of the regression test showed that there was an influence between student learning attitudes and student learning outcomes in each of the junior high schools studied. **Conclusion**: the conclusion is that students can grow and improve their learning attitudes for better learning outcomes and the teacher as a facilitator can direct students and also guide them to have the right learning attitude.

Keywords: science attitude, learning outcomes, junior high school students.

*Abstrak: Sikap Siswa Terhadap IPA dan Dampaknya pada Hasil Belajar IPA Siswa Sekolah Menengah Pertama. **Tujuan**: penelitian ini bertujua mengetahui perbedaan sikap siswa terhadap mata pelajaran IPA dan perbedaan hasil belajar siswa pada mata pelajaran IPA di tingkat SMP, serta untuk mengetahui pengaruh sikap siswa terhadap hasil belajar siswa pada mata pelajaran IPA di tingkat SMP. **Metode**: Penelitian ini menggunakan metode penelitian campuran dengan desain explanatory. Teknik pengambilan sampel yang digunakan adalah simple random sampling. Jumlah sampel penelitian adalah 120 siswa aktif. **Temuan**: Hasil penelitian pada hasil uji regresi menunjukkan bahwa terdapat pengaruh antara sikap belajar siswa dengan hasil belajar siswa pada masing-masing SMP yang diteliti. **Kesimpulan**: kesimpulannya adalah siswa dapat menumbuhkan dan meningkatkan sikap belajarnya untuk hasil belajar yang lebih baik dan guru sebagai fasilitator dapat mengarahkan siswa dan juga membimbingnya agar memiliki sikap belajar yang benar.*

Kata kunci: sikap IPA, hasil belajar, siswa SMP.

■ INTRODUCTION

Education is the process of forming and developing the knowledge, skills, and attitudes of each individual. Education is one of the most important aspects of human civilization where the education system must meet the needs of a large, growing, diverse population, in which the educational process leads to the formation of attitudes, intellectual development (Safarah & Wibowo, 2018; Widiasih et al., 2019; Yasa et al., 2020). One of the education systems is the curriculum. In Indonesia the curriculum has undergone a change, namely the 2013 curriculum which aims to find solutions to all existing problems to get a good, quality education whose implications are for the progress of a nation and state and can be developed in students' science learning attitudes (Aisyah & Astuti 2021; Sari et al. 2019; Sari, Asrizal, & Afrizon 2022). Education theory is the initial basis and benchmark in developing the application of education in which the 2013 curriculum categorizes competencies into 4, namely spiritual attitude competencies (KI-1), social attitudes (KI-2), knowledge (KI-3), and skills (KI-4) (Alev and Kara 2021; Brathatapa 2021; Kamid et al. 2022). These competencies are obtained and realized in the learning process.

Learning becomes a process in providing education for each individual. Learning becomes an interactive process between teachers and students where the learning process will be boring if the teacher only explains without any reciprocity with students where later the learning process will determine whether or not students' abilities and learning outcomes will be good (Rijal & Bachtiar, 2015; Wulandari & Agustika, 2018; Kalsum et al., 2021). Science learning in junior high school implicitly aims to develop students' potential to have communicative competence in analyzing natural phenomena in everyday life, so they can understand these symptoms and use them to

facilitate (Wiyoko, 2019; Agustin & Jamna, 2021). The success of science learning is influenced by internal factors and external factors Internal factors arise from within the child himself, and the science learning process focuses more on a series of investigation processes about a concept of events that occur around students (Suandewi & Citra Wibawa, 2017; Jufrida, Basuki, et al., 2019). A series of investigation processes will have an impact on student learning attitudes, especially in science lessons.

A good attitude in participating in science lessons will have a positive impact on the learning process. Generally, attitudes are related to individual loyal beliefs that are stable and attitudes will determine a person's behavior regarding their relationship in providing an assessment of certain objects and providing direction for further actions. (Hacieminoglu 2019; Hasibuan 2018; Maison et al. 2020). Students' attitude towards science is a way to measure the evaluation of teaching and learning processes in the classroom for each student so that teachers can know each student responds to science learning with an indication that students reject or accept science learning in students (Anggraini, 2018; Jufrida, Kurniawan, et al., 2019; Astalini et al., 2020). The importance of attitudes towards science learning in junior high school is shown by the behavior of students when learning with positive and negative attitudes towards science who are equipped with the ability to conduct experiments and are influenced by facilities to conduct experiments (Astalini et al., 2018; Astalini et al., 2019; Astalini & Kurniawan, 2019). A positive attitude will be able to have a positive impact on learning.

So that learning provides learning outcomes in the form of increased ability, cognitive, affective and psychomotor. Learning outcomes are an index of student success in learning which is characterized by the ability of students obtained after completing the exercises in learning and

changes in the abilities of individuals after receiving the learning experience (Tampubolon et al., 2021; Harun, Kartowagiran, and Manaf 2021; Tarigan et al. 2021). Learning outcomes have an important role in the process that depends on equal involvement between students under the guidance of the teacher so that to improve the learning outcomes process carried out by students the teacher can manage the learning and teaching process that makes students active (Lestari 2015; Puspitasari & Airlanda 2021; Shandra and Movitaria 2022).Learning outcomes will not be maximized if the use of time is not considered by the teacher and the learning process is not carried out in accordance with signs where students' science learning outcomes are low because until now the learning process is still using the absolutism paradigm. (Rusmono & Ghozal, 2019; Sinaga & Simanjuntak, 2021; Mairina & Amini, 2021). So that student learning outcomes in science learning can be maximized.

The research that is relevant to the current research is that conducted by Ningrat, Tegeh, & Sumantri (2018) stated that the contribution of learning styles and learning motivation to Indonesian language learning outcomes shows that learning styles and learning motivation affect the learning outcomes of Indonesian class V students. So that the current research conducted by researchers aims to determine the effect of students' attitudes on science learning on students' science learning outcomes. Then this study as a generalization of previous research where this research was conducted at the junior high school level with a mixed method research method.

This research is also relevant to previous research conducted by Kurniawan et al. (2019) stated that the variables of student attitudes and student discipline showed positive results and each class had a positive correlation and the majority of grade levels had a very strong correlation category. This means that strengthening the character of attitudes in science will be followed by strengthening the character of disciplines in science. So that the current research is an update of previous research by measuring the effect of the attitude variable on the learning outcome variable in science learning. With indicators measured on the attitude variable, namely the social implications of science, attitudes towards science investigations, and pleasure in learning science.

The position of this research is specifically at the junior high school level in the Natural Science subject which discusses students' attitudes towards science and student learning outcomes in science learning. Then measure the differences in the variables in each junior high school and measure the effect of student attitudes on science learning outcomes. The indicators of student attitudes towards science lessons are the social implications of science, attitudes towards science investigations, and pleasure in learning science. In order to improve his scientific attitude, it starts with a scientific thinking process that involves problem solving skills (Wahyudiati, 2022).

This research is important to do in order to know the responses of students' attitudes towards science learning and the influence of students' attitudes towards science subjects on student learning success. So this study aims to determine the differences in student attitudes towards natural science subjects and differences in student learning outcomes in natural science subjects at the junior high school level. The next goal is to find out the effect of student attitudes on student learning outcomes in natural science subjects at the junior high school level? From the description of the attitude variables and student learning outcomes in learning natural sciences. The research questions are: (1) What are the differences in student attitudes towards natural

science subjects and differences in student learning outcomes in natural science subjects at the junior high school level?; (2) How is the influence of student attitudes on student learning outcomes in natural science subjects at the junior high school level?

■ METHODS

Participants

Population is a group of individuals with characteristics and occupying the same space at a certain time related to non-human data. The research sample is the part that provides an overview of the population. The sample of this research was taken from the population of SMPN 17 Batanghari and SMPN 17 Batanghari, with the sample of this research being 60 students at SMPN 17 Batanghari and 60 students at SMPN 17 Batanghari. So that the number of samples of this research is 120 students. The sample collection technique is simple random sampling. Simple random sampling is that each individual has the same opportunity to be the subject of research (West 2016).

Research Design and Procedures:

This research is a mix method research with explanatory design. Mix method research is a mixture of quantitative and qualitative methods which will result in a better interpretation of the

research problem. Explanatory sequential design is a method carried out in two stages where qualitative methods are used to explain the results of quantitative data analysis (KUAN'!qual) (Ivankova, Creswell, & Stick 2006) .

Collecting data where the first thing to do is to select students based on the Category given by the researcher, then provide questionnaires and conduct interviews about student learning attitudes and student learning outcomes. Questionnaire is a data collection technique that is carried out by giving a set of questions or written statements to respondents to answer. This questionnaire was given to students at SMPN 17 Batanghari and SMPN 17 Batanghari, totaling 120 students who were the samples in this study, with the aim of knowing the differences in student attitudes and student learning outcomes and then the effect of student learning attitudes on student learning outcomes. Then the questionnaire data was processed using the SPSS 25 application. The use of the SPSS application was used to view descriptive statistics in the form of mean, min, max, percentage, and category of students as well as to see the results of several tests such as testing assumptions and testing hypotheses. The data needed in research can be collected or obtained from various data sources. The data collection procedure in this study is in accordance with the following diagram:
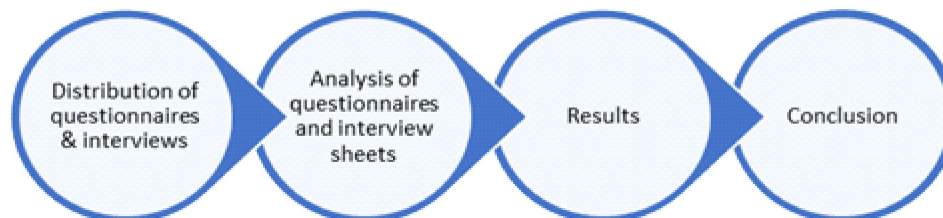

Figure 1. Research procedure chart

Instrument

The research instrument consisted of a questionnaire and an interview. The questionnaire used was a questionnaire on student learning

attitudes and student learning outcomes, as well as interviews with teachers and students. There are 19 valid statement items about student learning attitudes and multiple choice consisting

of 25 questions, 20 valid questions with a cronbach alpha of 0.78 about student learning outcomes on this instrument using a Likert scale. The scale consists of 5 points with 5 points for Very not good, 4 for Not good, 3 for Enough, 2 for Good, and 1 for Very good.

The questionnaires for this research can be seen in table 1 and table 2 below. The description of the questionnaire instrument for student learning attitudes is as follows:

Table 1. Grid of student learning attitude questionnaire instruments

Variable	Indicator	No. Statement Items
Student learning attitude	Social implications of the natural sciences	1,2,3,4,5,6,7
	Attitude towards sciences investigation	16,17,18,19,20,21,22
	Fun in learning natural sciences	31,32,33,34,35
Total Statement		19

The questionnaire instrument grid on student learning outcomes in science learning is with a total of 20 questions. Then as for the category description of the questionnaire instrument of student learning attitudes and student learning outcomes, namely as follows:

Table 2. Description of the student learning attitude questionnaire category

Category	Indicator Interval		
	Students' attitudes towards science		
	The social implications of science	Attitude towards science investigation	Fun in learning science
Very not good	7 – 12.6	7 – 12.6	5 – 9
Not good	12.7 – 18.2	12.7 – 18.2	10 – 13
Enough	18.3 – 23.8	18.3 – 23.8	14 – 17
Good	23.9 – 29.4	23.9 – 29.4	18 – 21
Very good	29.5 – 35.0	29.5 – 35.0	22 – 25

The description of the questionnaire category for student learning outcomes is in the Very Bad Category, the indicator interval is 0-4, the indicator interval is not good category 5-8, the indicator interval category is enough, the indicator interval is 9-12, the indicator interval is good category 13-16, and the indicator interval is very good category. 17 – 20.

Data analysis
In this research, quantitative data were obtained from statement questionnaires and multiple-choice questionnaires, then qualitative data were obtained from student and teacher interviews.

Then for quantitative data analysis using descriptive statistics and inferential statistics. The descriptive statistics used are frequency, mean, median, min, max and percentage tables. Then inferential statistics using parametric tests in the form of testing assumptions and testing hypotheses. To test the hypothesis, the assumption test must be fulfilled where the data is normally distributed, homogeneous and linear so that parametric tests can be carried out, namely hypothesis testing in the form of T test and regression test. Normality test serves to determine the data that has been collected is normally distributed or comes from a normal population.

Provided that the value of sig. > 0.05 means that the data is normally distributed, then the requirements for the value of sig. > 0.05 the data is homogeneous, and for the linearity test the condition is that the value of sig. < 0.05 means that the data is linear (Kamid et al. 2022). Once fulfilled, the hypothesis is tested, namely the t-test which serves to determine the comparison between variables with the condition that the value of sig. < 0.05 then it has a difference and the regression test serves to determine the effect of a variable on other variables provided that the value of sig. < 0.05 then it has an effect (Astalini et al. 2018; Alfauzan et al. 2022). Continued for qualitative data analysis using the Miles and Huberman model. Miles and Huberman's model in the analysis process consists of three stages, namely data reduction, data display, and drawing conclusions and verification (Helmis 2020).

■ RESULT AND DISCUSSIONS

By using data analysis in the form of descriptive and inferential statistics and then strengthened by the results of interviews, the results and discussion can be obtained as follows. The first is obtained for the data on the mean of student attitudes on indicators of social implications of science, presented in the following diagram:
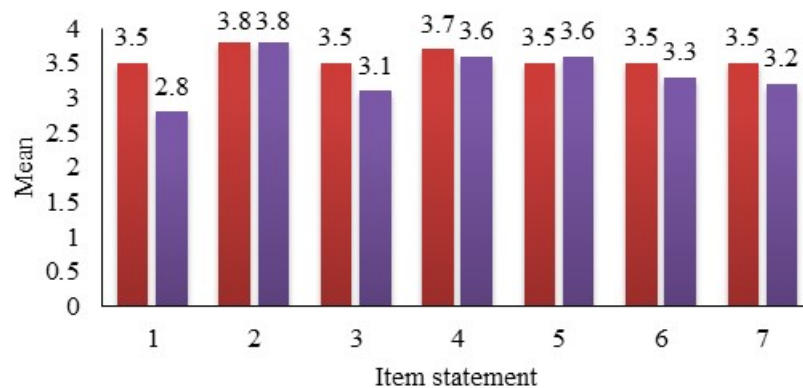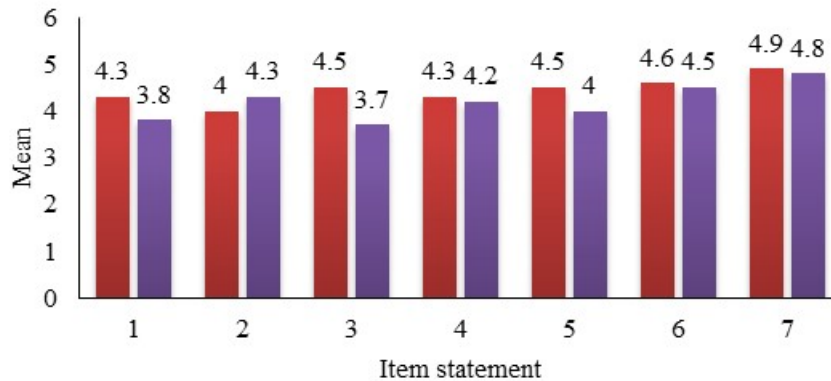

Figure 2. Mean score per item statement of social implications toward natural science

Based on the Figure, it can be seen that the average attitude indicator data in the form of the implications of social science above can be seen that SMPN 17 Batanghari (red) has an average score of > 3 which is more dominant in approaching a good category and in SMPN 17 Muaro Jambi (violet) also has a value average > 3 or included in approaching a good category. Then from the results of descriptive statistics obtained a description of student learning attitudes on the indicators of social implications of science show that SMPN 17 Muaro Jambi is more dominant in a good category with a percentage of 53.3% and in SMPN 17 Batanghari with a percentage of 66.7% in a good category. Then based on the results of interviews with students, it is known that science subjects have a good influence on themselves, where by studying science they can find out the causes and effects of several natural phenomena that occur. Then students also said that by studying science, they could know scientific attitudes in science, they could work together in groups, then they could know terms in science and so on. Of course, to increase the social implications of science, a stimulus from

teachers as educators is needed as conveyed by students, teachers, and learning partners to become a driving force for good attitudes in science learning. These results are in line with the research conducted by Tanu et al. (2020) that teachers are also a factor in increasing students' positive attitudes in learning science. Furthermore, indicator attitude towards science investigations are presented in the following diagram:


Figure 3. Mean score per item statement of attitude towards science investigation

Based on the trunk chart of the average attitude indicator data in the form of attitudes towards the above scientific investigation, it can be seen that SMPN 17 Batanghari and Muaro Jambi SMPN both have an attitude towards science classified as good and almost very good. And from the results of descriptive statistics obtained a description of student learning attitudes in an indicator of attitude towards the investigation of natural science, it was found that SMPN 17 Batanghari with a percentage of 43,3% in a good category is superior and in SMPN 17 Muaro Jambi with a percentage, 43,3% in the good category. Based on the results of the interviews, it was also known that the students were enthusiastic in conducting science experiments which according to him by conducting experiments could make the understanding of learning material more leverage because it was practiced directly or provided direct experience to students in conducting science investigations. Students also said that they needed teacher guidance and guidance when conducting experiments. This stimulus and enthusiasm and responsiveness of teachers can make them have a positive attitude, namely being able to carry out science investigations, through experiments, assignments and so on. This is in line with previous research conducted by Astalini et al. (2019) that when students find it difficult to solve problems in science learning students will ask, respond, think rationally and conclude this is where the role of the teacher is to facilitate students in conducting science investigations.

Furthermore, the attitude indicator in the form of pleasure in learning science students which consists of 9 statement items can be presented with the mean data of each indicator in the following diagram:

Based on the trunk chart of the average data per statement above, we can see that the pleasure of students in learning science at SMPN 17 Batanghari is good, with the average category in a good category. Which has a good impact on science learning activities in class, where fun in
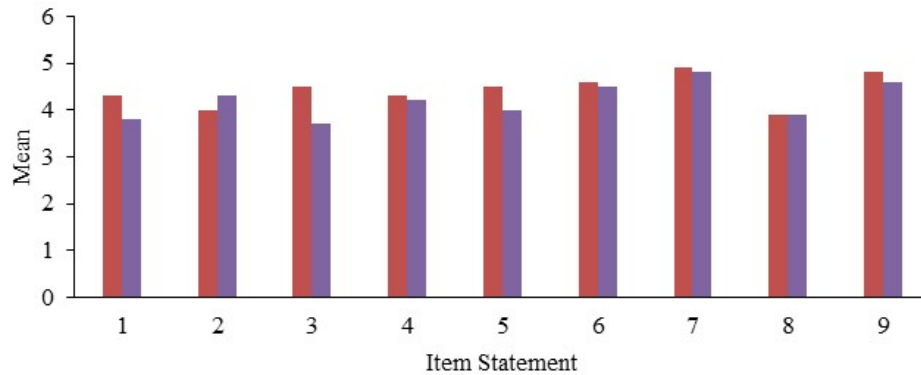
Figure 4. Mean score per item indicator statement Enjoyment in learning science students

learning science will make students more serious in participating in science learning in class. And based on descriptive stats obtained a description of student learning attitudes on pleasure indicators in science learning in SMP 17 Batanghari dominant in the good category with a percentage of 46.7% and in SMPN 17 Muaro Jambi is more dominant in the good category with a percentage of 43.3%. Reinforced by the results of interviews with teachers that students will be active in learning in class if the teacher is able to liven up the classroom atmosphere with enthusiasm, for example in learning science it is not monotonous only on theories and concepts but also directly on its application which they can grasp or understand with reason. So in the assumption that the teacher will try to provide examples of the science concepts that are closest to everyday life.

Appreciation and innate skills of teachers in teaching are the main factors in increasing students' enjoyment of learning science. The teacher also said that with the pleasure of learning science students could have an impact on student learning outcomes. In line with previous research conducted by Nugraha et al. (2020), that the student's learning style, class atmosphere is a factor in students' enjoyment of science learning where a good student attitude can make students' minds more scientific, objectivity, and increase curiosity.

Furthermore, a discussion of student learning outcomes in science learning at SMPN 17 Batanghari and SMPN 17 Muaro Jambi is presented in the diagram below. The first is a bar chart of the mean data of students' science learning outcomes as follows:
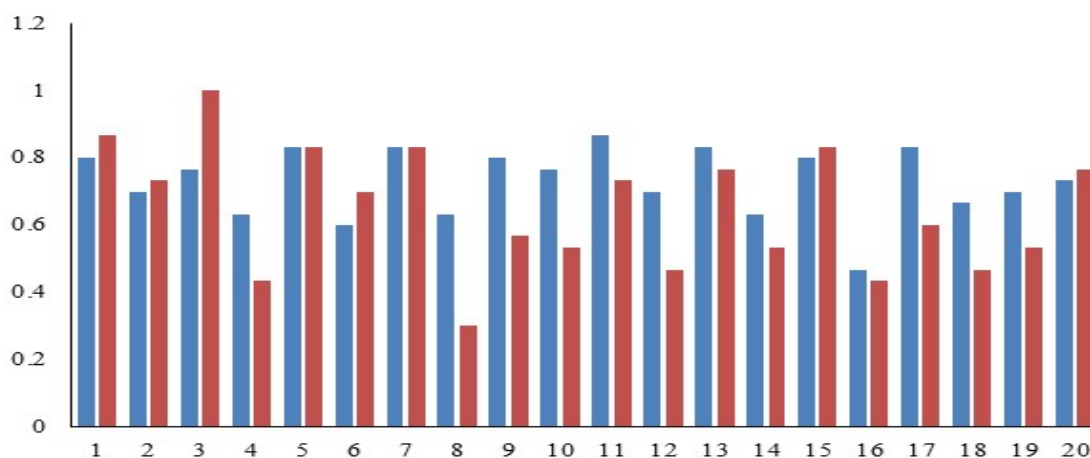
Figure 5. Mean score of students' science learning outcomes

Based on the average data obtained, it is known that the learning outcomes of students are average enough in learning science and only a small portion of those who have poor learning outcomes. Then from descriptive statistics obtained a description of student learning outcomes at SMPN 17 Muaro Jambi more dominant in a sufficient category with a percentage of 43.3% and in SMPN 17 Batanghari it was found that the category was also more dominant in the category quite good with a percentage of 46.7%. From the results of interviews with teachers conducted, it is found that students are required to be able to excel and pass assessment standards by organizing interactive learning activities and applying them directly so that students can be directly involved. Students' attitudes towards learning science have a positive influence if students' attitudes are positive which makes students learn science more often. The teacher also said that if there were still students who had not been able to achieve the standard of assessment, it was because the students were lazy in studying who considered science lessons to be difficult.

Previous research that examined student attitudes in learning was carried out by Musengimana, Kampire, and Ntawiha (2021) examine students' attitudes to chemistry learning. Previous research provides literature on the factors that influence school attitudes towards science learning in the field of chemistry. In his research, it was found that the factors that had a positive attitude towards learning chemistry had to be controlled such as interest, classroom, environment, curriculum relevance, teacher behavior, perceived difficulties and independent effort in science subjects. The difference in the current study is the school level and the subjects

that must be studied. So the current research is important to do to find out whether attitudes have an influence on student learning outcomes. And from the results of the current study, it is known that the positive attitude of students when learning science has an impact on students' science learning outcomes.

Furthermore, to test the hypothesis of the effect of students' attitudes on students' science learning outcomes, it is necessary to test the assumptions first as a prerequisite for testing the hypothesis later. The conditions that must be met are that the data obtained are normally distributed, homogeneous and linear. The assumption test was carried out using the help of SPSS Version 25. For the normality test, the results obtained significant values for the student learning attitude variables at SMPN 17 Muaro Jambi and SMPN 17 Batanghari, namely 0.200 and 0.210 where the results were >0.05, meaning that the data were normally distributed as well as learning outcomes. students in each school the data is normally distributed with a significance value > 0.05. Then the homogeneity test obtained the significance value of the data on each variable in each school > 0.05 which means the data is homogeneous. Furthermore, to test the linearity of attitudes and student learning outcomes at SMPN 17 Muaro Jambi and SMPN 17 Batanghari, a significance value of 0.024 and 0.023 was obtained, respectively, where the results were <0.05, meaning the data was linear. With the fulfillment of the assumption test, it is possible to test the hypothesis.

The descriptions of the results for the T-test of student learning attitudes and student learning outcomes at SMPN 17 Muaro Jambi and SMPN 17 Batanghari are shown in the table below:

Table 3. T-test description of student learning attitudes and student learning outcomes

Variable	School	Sig.(2-tailed)
Student Learning Attitude	SMPN 17 Muaro Jambi	0.037
Student learning outcomes		0.030
Student Learning Attitude	SMPN 17 Batanghari	0.044
Student learning outcomes		0.041

Based on Table 3, the description of the T test of student learning attitudes and student learning outcomes at SMPN 17 Muaro Jambi and SMPN 17 Batanghari obtained the results, namely the value of sig. (2-tailed < 0.05, it can be concluded that there are differences in student learning attitudes and student learning outcomes at SMPN 17 Muaro Jambi and SMPN 17 Batanghari.

This research was previously conducted by Kurniawan et al. (2019) and Astalini, Kurniawan, & Sumaryanti, (2018), where previous research aimed to determine student attitudes towards science in Muaro Jambi, Indonesia. The results of previous studies showed that students' attitudes were good towards science subjects. So that this research is a generalization, complement and update of previous research. Where in the current research, it measures student learning attitudes towards science learning outcomes for junior high school students, with the attitude indicators used that are different from previous research, namely the social implications of science, attitudes towards science research and enjoyment in learning science. Then the t-test of students' attitudes in each school was carried out and a test of the influence of student's learning attitudes on students' science learning outcomes which was strengthened by the results of interviews.

Next is a simple linear regression test to determine whether or not there is an influence on students' attitudes towards students' science learning outcomes. The following table describes the results for the correlation test between student learning attitudes and student learning outcomes at SMPN 17 Muaro Jambi and SMPN 17 Batanghari shown in the table below :

Table 4. Description of the regression test of student learning attitudes and student learning outcomes

Schools	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
SMPN 17 Muaro	63.457	3.556		12,473	.023
Jambi	.055	.033	.032	.303	.0245
SMPN 17	83.452	6.345		13,200	.024
Batanghari	.083	.055	.045	.302	.0325

Based on the description of the regression test Table 4 student learning attitudes and student learning outcomes at SMPN 17 Muaro Jambi and SMPN 17 Batanghari obtained, the results of the regression test are sig. (2-tailed) < 0.05 then, it can be concluded that there is an influence between attitudes student learning and student learning outcomes at SMPN 17 Muaro Jambi and SMPN 17 Batanghari.

Previous research conducted by Purwati et al. (2018) stated that science learning integrated with Islamic values provides opportunities for students to connect scientific knowledge with concepts and experiences in real life as Muslims,

so that students can feel learning becomes meaningful. Where learning outcomes are influenced by several factors, including learning strategies. In the current study, researchers measure the effect of student learning attitudes in science lessons on science learning outcomes in junior high schools. The current research is an update from previous research by measuring the variable science learning outcomes with the attitude variable. With mixed research methods explanatory design.

■ **CONCLUSIONS**

The conclusion from the results and discussion that has been described above is that for the test of student learning attitudes and student science learning outcomes, namely the value of sig. (2-tailed) < 0.05, it can be concluded that there are differences in student learning attitudes in each junior high school which researched and there are differences in student science learning outcomes in each of the junior high schools studied. The results of the regression test, namely the value of sig. (2-tailed) <0.05, it can be concluded that there is an influence between student learning attitudes and student learning outcomes in each of the junior high schools studied. These results are also strengthened by the results of interviews conducted, namely your teacher stated that students have various thoughts and attitudes and student learning outcomes in science are also influenced by the student's attitude towards science lessons.

The implication of this research is that students can grow and improve their learning attitudes for better learning outcomes and the teacher as a facilitator can direct students and also guide them to have the right learning attitude. The limitation of this study is that it only compares the variables between student learning attitudes and student learning outcomes and has not been tested with other variables. This study also only measures student attitudes and learning outcomes in science subjects. Researchers suggest to conduct further research to compare the variables of student learning attitudes and student learning outcomes with other variables. So it is hoped that generalizations and updates can be made for further research.

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