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Analysis of Attitude Toward Science on Junior High School Students: A Survey Research

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Abstract

Attitude towards science is one factor that influences student achievement in science learning. Attitude toward science is essential for students, unfortunately, attitude toward science will decrease as the student's grade increases. This research analyzed the attitudes towards Science of Junior High School Students in Indonesia. This research used a survey method. The participants were 1070 junior high school students in Indonesia. The instrument used is a questionnaire and open-ended questions. questionnaire including 40 multiple-choice questions with 4 dimensions. The findings showed the average attitude toward school science (3.18), desire to become a scientist (2.67), the value of science to society (3.60), and perception on scientists (2.89). The average obtained from the four dimensions is (3.08) which means the level of agreement of the student is moderate. Open-ended questions corroborated these results, explaining why students like and do not like science. The three most common reasons students like science are because learning science is fun, studying science will increase knowledge, and often doing experiments. The three most common reasons students don't like science are because science is difficult, has many formulas, and makes them dizzy. The research results show that the average score of students' attitudes toward science is moderate, so teachers are expected to use varied learning models to improve students' attitudes toward science.

Keywords: *Attitude toward science, Student, Science*

Introduction

Some research has shown that, at its core, science consists of procedures, outcomes, and mindsets (Chen et al., 2012). Science is a procedural field that centers on knowledge acquisition. As a product, it emphasizes the outputs and conclusions that flow from this understanding. On the other hand, research has shown that science aims to empower, educate, and inculcate good values in students from an attitudinal viewpoint (Redhana, 2019). Their views of science in various circumstances influence their attitudes toward science and can be either favorable or negative. According to Osborne et al., (2003), these settings include viewing science as a human activity, a topic taught in schools, and an essential component of society. Positive views of science can prevent non-scientific disinformation from being accepted. These viewpoints impact a person's willingness to accept scientific findings and are strongly associated with the scientific mentality (Rofieq & Fauzi, 2022).

The way that students view science is essential. Students with a positive attitude toward science are better equipped to improve their scientific abilities and apply science to daily activities. Positive characteristics, including curiosity, perseverance, and critical thinking influence this mentality (Osborne et al., 2003). Early infancy is a time when natural curiosity for learning about the world and nature grows, and it is at this time that a good attitude toward science is typically cultivated. This optimistic outlook may be fostered in several ways, such as

via varied experiences and the surrounding environment. Fostering and maintaining students' attitudes toward science, a topic that has been thoroughly researched has been the long-standing objective of scientific education (Fulmer et al., 2019). This emphasis on attitudes is important because it greatly impacts students' desire to pursue professions in science and their ability to persevere in science-related topics throughout their academic careers (Osborne et al., 2003). Science education is important because it gives students a fundamental understanding of science. Students become more conscious of environmental concerns when they gain this information (Hadzigeorgiou & Skoumios, 2013). Additionally, science education equips students with the knowledge and skills necessary to respond to various natural events that arise in their environment. Given its crucial significance, scientific education must be recognized as an essential component of curricula, prioritized at all levels of education, from preschool to after-school programs, and directed at a wide range of social groups (FasterCapital, 2024). Unfortunately, there is evidence that students' attitudes toward science tend to deteriorate through middle and high school (Said et al., 2016).

Previous research has demonstrated a beneficial relationship between students' attitudes toward science and their cognitive capabilities. Along with the importance of students' attitudes, Kaplan emphasized the value of students' accomplishments in the scientific domain as a critical indicator and predictor of results in science education (Prokop et al., 2011). According to Fitriani et al., (2016), integrating learning content with real-life circumstances from daily experiences might facilitate science learning applications in educational institutions. We may favorably influence students' attitudes toward science by tying the educational process to real-world experiences. This is consistent with the idea that solving issues might begin with small-scale components. Creative teaching methods are crucial to putting this idea into reality. Two such cutting-edge methods are inquiry-based learning and genuine learning (Widowati et al., 2017). Constructivist and inquiry-based teaching strategies can positively impact students' attitudes toward science (Juuti et al., 2010).

The Science Technology Society, ethnoscience instruction, exploratory case studies, ICT in science education, parents' attitudes toward science, and visually enriched integrated science and language instruction are just a few strategies available to improve attitudes toward science (Lee & Erdogan, 2007). Collecting information about participants' current attitudes about science is crucial before attempting to change their opinions. Every country has different conditions regarding views toward science, such as Qatar for example. There was no discernible difference in the attitudes of male and female students toward science in a survey of about 978 youngsters (Said et al., 2016). The validity of the ASSASS instrument was used in the study. It is clear from the conclusions drawn from the three research in the previous article that the outcomes are not all the same. Furthermore, these researchers used various tools and techniques to evaluate their subjects. Attitude toward science has also been researched by (Hidajat, 2021) in Aceh using different instruments. This research explores students' attitudes toward science learning based on gender and school grade level in Aceh, Indonesia. The participants were 1,023 students from sixth-grade elementary school and eighth-grade middle school. Data was collected using TOSRA. By using a Likert scale, based on gender, the research results show that female students have a more positive attitude towards science than male students. According (Maison et al., 2020). Different results were also found for attitudes toward science at 3 junior high schools in Jambi. This research used a survey method but the instrument used was a science attitude questionnaire, the results of which showed that students' attitudes towards science subjects were based on indicators of adopting a scientific attitude, enjoyment in learning science, and interest in increasing time studying science are in a good category, and there are also significant differences in students' attitudes towards science subjects

Research on attitudes toward science, particularly on biological knowledge and skepticism regarding conspiracy theories, has been conducted in Indonesia. The results show

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that views toward science and skepticism about conspiracy theories are not significantly correlated (Rofieq & Fauzi, 2022). Additionally, studies using various tools have been conducted to determine the extent of attitudes toward science in Jambi. A questionnaire with 24 questions and interview questions about preferences for experimentation and its value in acquiring knowledge and skills was used in this study. The questionnaire featured three distinct indicators: attitude toward science investigation, adoption of a scientific attitude, and career interest in science. The results show that people in Jambi have a favorable opinion of science (Astalini et al., 2019). Not only do countries have different results, but in one country using the same instrument, the results are different, as is the case with research conducted by (Suryadi et al., 2020) Using MATS (My Attitude Toward Science) as a research instrument, the participants involved were middle and high school students in one district in the Pangkep area, South Sulawesi province. This research found that ATS affected education level, and differences in attitude toward science were found between genders. Other research that uses this instrument also shows significant gender differences, but different from previous research, the participants in this research are resident scientist students.(Hanson et al., 2020). However, the difference between this research and previous research is the instrument used. These instruments are MATS and open-ended questions, which can strengthen the research results. This research also uses a survey method to optimize the number of participants from various regions on the island of Java, apart from different regions. This research aims to analyze the attitudes toward science of junior high school students in Java Island. This research explains the profiling of students' attitude toward science in Indonesia and also explains whether attitude toward science of male and female student are different.

Method

Research Design

The method used in this study uses a quantitative survey method, which contains structured questions to respondents in which level one questions discuss respondents' opinions about an attitude toward science and the questions that identify their comfort or confidence in their answers. The survey method collects information from a large population with a relatively small sample. The survey model is often used as a research report. The survey model is a helpful research methodology and can be viewed as a systematic data collection tool for large-scale studies. The data collected by these methods are often quantitative. In research, several tools can be used individually, in combination, or as triangulation. The most common tools used in survey research are mailed questionnaires, face-to-face interviews, and telephone interviews. There are two research types: cross-sectional measurements and longitudinal studies. A cross-sectional study collects data from a specific population sample (Kesmodel, 2018)

Participant

This study involved 1070 participants consisting of 431 male and 639 female students. Respondents in this study were junior high school students in Indonesia who came from various provinces, as well as cities or regencies in Indonesia, such as Jakarta, Bandung, Grobogan, Bekasi, and Sragen. The respondents consist of three levels: grade 7th, grade 8th, and grade 9th, but they have different ages. The percentage of participants in each level and the age of participants can be seen in Table 1 and Table 2.

Table 1. Percentage of Participant Grade

Grade	Percent
7th	42.7
8th	32.6
9th	24.7
Total	**100**

Table 2. The Age Range of The Participants

Age	Total
12	66
13	374
14	353
15	245
16	31
17	1
Total	**1070**

Data Collection Tools

The data collection process uses Google Forms to make it easier for respondents to fill in and simplify data processing in Microsoft Excel. Google Forms was chosen because it can maximize participation from respondents from various cities in Indonesia. In addition, using Google Forms can also save time in data collection. Data was collected for two weeks, from 3 May 2023 to 17 May 2023, and distributed through teachers via the Internet.

In the Google form, there are 40 questions about an attitude toward science, which consist of four types of questions related to attitude toward science, including attitude toward school science, desire to become a scientist, value of science to society, and perception on scientist, each of which the questions consist of a two question test, the first question asks the respondent's opinion regarding the four types of questions above and the second type of question is an essay question that asking about the reason why the students like science and didn't like science.

Each of the four types of questions above has its value; some are correct if the respondent answers strongly agree or positive, and there are questions that, if answered strongly disagree or negatively, are true. In the attitude toward school science type of questions, there are 14 questions, seven of which are positive and seven others are negative. The question of the type of desire to become a scientist consists of two questions, one of which is positive. One other question is negative. In the questions about the values of society, there are 12 questions, with six positive questions and six other negative questions. Finally, the perception on a scientist-type question consists of 12 questions, all of which are negative.

The instruments in this study came from previous journals that discussed attitudes toward science. Still, previous journals examined elementary school students who were scattered in cities and villages up to high school. Previous journals did not explain results regarding clear differences between the males and females, nor did they provide reasons for these results to be obtained. Previous research only explained one dimension of results from perceptions of scientists, where the results only showed that the students they studied had a neutral response to perceptions of scientists. There was no explanation as to why they got these neutral results.

The instrument in this study uses the MATS. This instrument has criteria for use. The first criterion is that this instrument must be usable from elementary to high school (ages 8-18 years). In this instrument, four dimensions can be understood from all grade levels (elementary to high school). The first dimension discusses the attitude toward school science, which will apply because elementary and high school teachers teach science subjects. In the second

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dimension, the value of science to society, the value of science for society can fulfill the goals of implementing science in schools. The second desire to become a scientist is a dimension that crosses class levels because students will usually continue to explore what they might do when they grow up. In contrast, the last dimension discusses the perception of scientists, namely how students view scientists. The second criterion is related to simple evaluation (Hillman et al., 2016).

Data Analysis

After the data was distributed, 1,070 students participated in this study. This research consists of 40 questions, including attitude toward school science, desire to become a scientist, value of science to society, and perception on scientists. The Likert scale was used in the evaluation, with the answers "strongly agree", "agree", "neutral", "disagree" and "strongly disagree". These 40 questions have answers that have positive and negative ratings. The average scale obtained from the data is calculated and represented as a percentage to calculate the student attitude toward the science category. The categories presented can be seen in Table 3.

Table 3. Analysis of Likert Scale (Sanpanich, 2021).

Mean Score	The level of agreement
0.00 – 1.50	Very low
1.51 – 2.50	Low
2.51 – 3.50	Moderate
3.51 – 4.50	High
4.51 – 5.00	Very high

For questions with a positive meaning, students get a score of one if they answer strongly disagree, a score of two strongly disagree, a score of three neutral, a score of four agree, and a score of five strongly agree. Meanwhile, points for questions with negative meanings use assessments that are the opposite of positive questions. Students will get a score of five if the answer strongly disagrees, a score of four disagree, a score of three neutral, a value of two agree, and a value of one strongly agree. If the port is positive but the average value obtained by students is less than three, the student disagrees. On the negative port, the assessment is reversed, meaning that if students get scores above three, on the negative port, it means that students do not agree with the port. The student agrees with the headquarters if the average value is less than three.

In previous research that utilized the same instrument as the current study, it was explained that if the average score obtained on the scale was less than 3.00, students disagreed with the stereotypes presented in the instrument. Conversely, students agreed with the stereotype if the average score exceeded 3.00.

In addition, an analysis using SPSS was carried out to answer the second research question. First, a normality test is performed to check whether the data is normally distributed. Then, a follow-up test was carried out to compare the attitudes toward science of male and female students. The results of this analysis are discussed in the next results section. Regarding ease of scoring, many items may already be in a convenient Likert scale format and require some adjustments, while others are easily interchangeable. For example, a scale of one to five can be used to assess this instrument (Hillman et al., 2016).

Results

Student Profiling Attitude Towards Science in Indonesia

The largest and smallest dimension average values have something to do with the questions listed in the open-ended question and will be discussed in the next section. Then, to answer each research question, a different method is needed to find the results. The number one answer to the research question is, "How is profiling of student attitude toward science?". The mean attitude toward science can be seen in Figure 2.

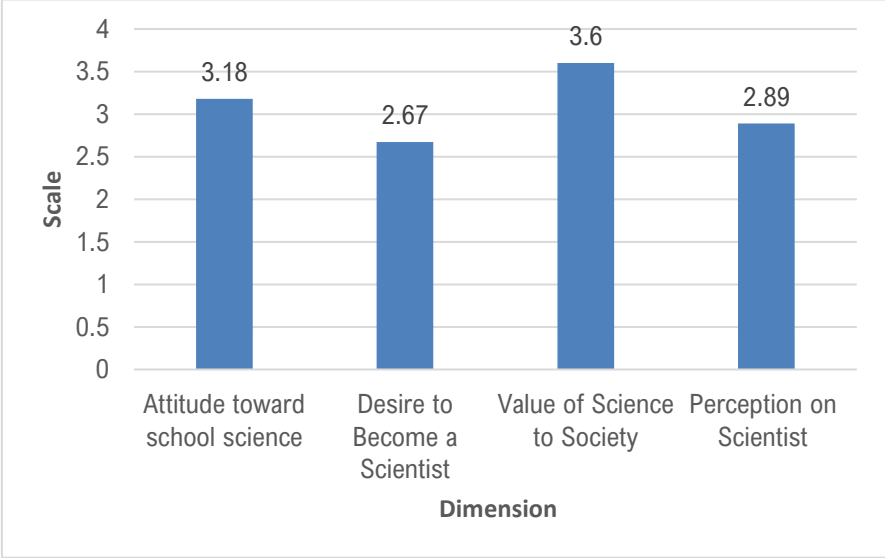


Figure 2. Mean attitude Toward science

Based on Figure 1, the average value obtained from the four dimensions above is (3.08), meaning students agree with the stereotype. Besides that, the graph above also shows the attitude toward science of junior high school students, which consists of four dimensions: attitude toward school science, desire to become a scientist, value of science to society, and perception of scientists. The results show that the value of science to society gets the highest average (3.60), followed by attitude toward school science (3.18), perception on scientists (2.89), and desire to become a scientist (2.67). After getting the average from Excel, the data distribution will be analyzed further to determine variations in the data distribution using each dimension's average and standard deviation. There are four tables below that explain the mean and standard deviation for each dimension. The result of attitude toward science can be seen in Table 4.

Table 4. Attitude toward school science, 14 items, 7 positively worded; **7 negatively worded**

Item Number	Participants	Min	Max	Average	Standard Deviation
2	1070	1	5	3.41	0.72
7	1070	1	5	2.86	0.74
9	1070	1	5	3.19	0.85
18	1070	1	5	3.20	0.75
23	1070	1	5	2.96	0.94
24	1070	1	5	3.31	0.78
28	1070	1	5	3.15	0.89
5	1070	1	5	3.55	0.82
6	1070	1	5	3.26	0.90
10	1070	1	5	2.86	0.84
15	1070	1	5	2.98	0.94

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20	1070	1	5	3.57	0.88
31	1070	1	5	3.59	0.79
36	1070	1	5	2.53	0.77
	Average			3.18	0.82

The table above shows the average value of attitude toward school science (3.18) this value exceeds the average, which means that the level of agreement of the students' attitude toward school science in junior high school students is moderate, besides that the table above also describes the highest scores and lowest average scores. The highest average score is in the statement I usually understand what we are talking about in science which has a value of (3.41). Hard for most students to understand (2.53). The statement was negative, but the result was a score of less than three, meaning that students agreed that science was difficult for them to learn. The second dimension is the desire to become a scientist. The result of Desire to Become a Scientist can be seen in Table 5.

Table 5. Desire to Become a Scientist, 2 items, 1 positively worded; **1 negatively worded**

Item Number	Participants	Min	Max	Average	Standard Deviation
11	1070	1	5	2.63	0.93
30	1070	1	5	2.70	0.84
	Average			2.67	0.88

Based on the table above, the overall average value of the desire to become a scientist is below the average (2.67). This means that the students' level of agreement in this dimension is moderate categories. There are only two statements related to the desire to become a scientist. The biggest value is in the statement I do not want a job as a scientist because I have no interest in it (2.70), while the smallest value is in the statement I would like a job as a scientist (2.63) both scored below the average score (3.00) which means most students do not want to become scientists in the future. The third dimension is the value of science to society. The result of the value of science to society can be seen in Table 6.

Table 6. Value of Science to Society, 12 items, 6 positively worded, **6 negatively worded**

Item Number	Participants	Min	Max	Average	Standard Deviation
12	1070	1	5	3.40	0.79
29	1070	1	5	3.46	0.76
34	1070	1	5	3.51	0.77
38	1070	1	5	3.33	0.81
39	1070	1	5	3.80	0.78
40	1070	1	5	3.91	0.81
4	1070	1	5	3.81	0.71
8	1070	1	5	3.48	0.83
19	1070	1	5	3.91	0.80
26	1070	1	5	3.62	0.84
27	1070	1	5	3.52	0.81
32	1070	1	5	3.33	0.77
	Average			3.60	0.79

Based on the table above, the average value of science to society (3.60) is more than the average value (3.00), meaning that the level of agreement of the students' attitudes towards science to society has been high. The table also shows that the highest average value was

obtained in statement science, which helps to understand the world (3.91), and statement science is not useful to anyone but scientists (3.91). The two highest average values are above the average value (3.00), which means students agree that science helps students understand the world and think that science is useful for everyone, not just scientists. The lowest average is found in the statement science is not useful to anyone but scientists (3.33). The average value is above three, and the statement is negative, which means that students do not agree with the given statement. The fourth dimension is the perception on scientists. The result of the perception on scientists can be seen in Table 7.

Table 7. Perception on Scientists, 12 items, all are stereotypes

Item Number	Participants	Min	Max	Average	Standard Deviation
1	1070	1	5	3.22	0.95
3	1070	1	5	2.45	0.81
13	1070	1	5	3.69	0.81
14	1070	1	5	2.24	0.79
16	1070	1	5	2.41	0.93
17	1070	1	5	2.63	0.71
21	1070	1	5	2.08	0.85
22	1070	1	5	2.64	0.84
25	1070	1	5	2.86	0.70
33	1070	1	5	3.73	0.76
35	1070	1	5	3.62	0.82
37	1070	1	5	2.99	0.72
Average				2.89	0.80

The table above shows the value of the perspective on the scientist dimension. In this dimension, all statements are positive, and of all the statements proposed, the average value is (2.89) which means the level of agreement of the student is moderate. The table above also describes the highest score in the statement of Scientists working in labs (3.69) and the lowest score obtained by the statement of Scientists being male (2.08). This means that students agree with the statement, while in the second statement, scientists are male (2.08). The value is less than (3.00), which means students do not agree with the statement. Apart from using research instruments, this research also uses open-ended questions that reinforce the results obtained. There are two open-ended questions, and Table 8 is the answer to open-ended question number one, namely, the reason students like science.

Table 8. Reason Students Like Science

No	Reason	Percentage (%)
1.	Because science lessons are fun	20
2.	Because science lessons are interesting	13
3.	Because science lessons are easy	6
4.	Because science lessons are useful for humans	12
5.	Because in science lessons we often do experiments	13.3
6.	Because science lessons are related to everyday life	12.4
7.	Because studying science will increase your knowledge	13.7
8.	Because some student has dreams related to the field of science	3
9.	Because of the teacher, science lessons become easy to understand	6.6
Total		**100**

The table above shows the most common reasons why students like science. There are 9 reasons, the 3 most common reasons are that science lessons are fun 20 percent, science studies will increase your knowledge 13.7 percent and science lessons we often do experiments

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13.3 percent. The second open-ended question discusses the reasons why students don't like science, and Table 9 contains why students don't like studying science.

Table 9. Reason Student didn't like science

No	Reason	Percentage (%)
1.	Because science lessons are difficult	56
2.	Because in science lessons a lot of calculations use formulas	18
3.	Because science lessons make you dizzy	10
4.	Because science lessons take a lot of notes	5
5.	Because science lessons involve a lot of memorization	5
6.	Because the material in science is not interesting	2
7.	Because science lessons are boring	2
8.	Penjelasan dari guru yang membingungkan	2
	Total	**100**

Based on the table above, there are seven reasons why students don't like science. The three most common reasons students don't like it are science lessons are difficult 56 percent, science lessons a lot of calculations use formulas and science lessons are confusing.

Significant Differences Between Gender Attitudes Toward Science in Indonesia

In this study, we will analyze the same topic but with a different group of participants. These results were obtained through processing average data using Microsoft Excel. Data regarding average differences will be visualized in Figure 3.

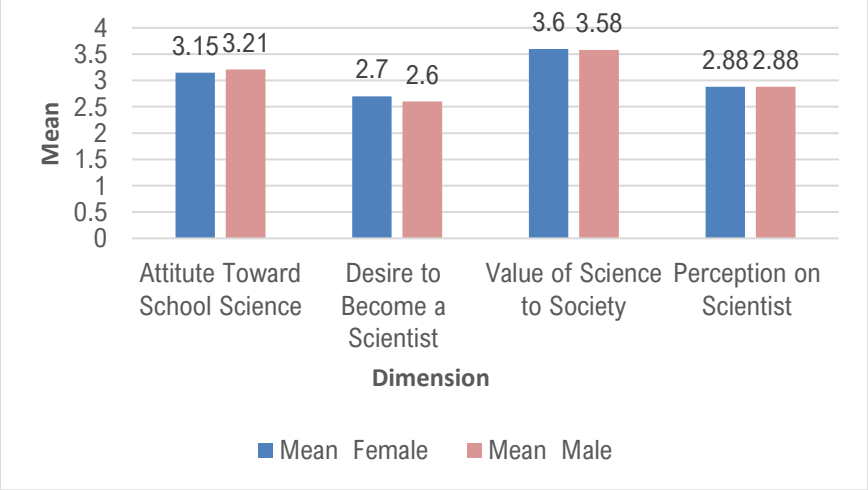


Figure 3. Mean Attitude Toward Science in Gender

Gender differences were analyzed not only using Excel averages. For further analysis, SPSS version 20 was used in this research. In the first step, a normality test will test the data for distribution. The results are shown in Table 10.

Table 10. TableTest of Normality

Gender	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Female	0.047	429	0.022	0.992	429	0.016
Male	0.048	429	0.021	0.995	429	0.175

The results show that the sig values of male and female students are the same, below 0.05, which means that the data distribution is not normal. The data obtained from research on Google form, a total of 1070 participants consisting of 431 male students and 639 female students. The data will show normal if the two compared amounts are the same. However, the above test is not enough to prove that there is a significant difference between attitudes toward science in male and female students. Further tests, such as a homogeneity test, are needed to prove whether the data is homogeneous.

Further tests, such as homogeneity, are carried out to compare the average or examine the differences between male and female students. The homogeneity test results can be seen in Table 11.

Table 11. Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
0.110	1	1066	0.740

The data above shows sig (0.740), which means the data is homogeneous because of the results above (0.05), a further test will be carried out using the Mann Whitney U test or the non-parametric, function of the Mann Whitney test to find out whether or not there is a difference between two independent samples. The result of the Mann-Whitney U test is provided in Table 12.

Table 12. Mann-Whitney Test

	Result in ATS
Mann-Whitney U	136520.500
Wilcoxon W	228755.500
Z	-0.110
Asymp. Sig. (2-tailed)	0.912

The table above is the table of results from the Mann-Whitney test, the sig value above shows 0.912 or above 0.5, which means that there is no significant difference between male students and female students. All the data obtained showed no significant difference between male and female student attitudes toward science.

Discussion

Based on the results obtained from the table of average values of attitude toward science among students, different results were found in each dimension. The largest value was in the dimension of science to society (3.6), then attitude toward school science (3.18), and perception of scientists. (2.89), and desire to become a scientist (2.67) in line with the findings in the open-ended question, one of the reasons why students like science is that science is related to everyday life. This means that most students know science's importance in their daily lives. While the smallest value of the four dimensions is the desire to become a scientist, this is also in line with the reasons why students don't like science. If you look at the biggest reason why students don't like science, it's because science is difficult, but if you look at other reasons too, These things are interconnected. Science is difficult because there are a lot of calculations,

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memorization, and boring, which makes science uninteresting for students. Students like science from experiments, but they don't want to be scientists because many complex calculations are involved. Apart from that, the OECD report (Taipei & Authority, 2019) shows that in terms of confidence and motivation towards science among students in Indonesia, Indonesia is still developing compared to other countries such as Japan. Meanwhile, when compared with ASEAN countries such as Thailand, which has relatively the same characteristics as Indonesia, students' interest and attitudes towards science are still relatively low, and they tend to consider science irrelevant to their lives. (Hung, 2018)

If all these reasons are combined, it can be concluded that the factor that causes students to like science is teachers, who play an important role in learning. If their science teacher can explain science easily and interestingly, students will prefer science lessons, not forgetting science itself, which is related to experiments. In that case, this can also increase students' motivation to learn science. One of the reasons students like science is because of the many experiments that are carried out. Carried out in class, and if science lessons are successful at school, then students will apply them to their daily lives. This is also in line with the reason the largest ATS score is obtained by the value of science to society dimension. Experiments are very important in science lessons (Kayacan & Ektem, 2019); therefore, teachers must facilitate students to carry out simple experiments when studying. They should encourage the students to feel confident about their results and satisfied with their attempts at scientific exploration (Ambusaidi et al., 2016)

Furthermore, differences were found in the table of average ATS scores for male and female students. Still, there are only slight differences, such as the average attitude toward school science for males (3.15). In contrast, for females (3.21), the desire to become a scientist in male students (2.7) and female students (2.6), the value of science to society for male students (3.6) and female students (3.58), is different from other dimensions, only the average value The average perception on scientists has the same results between male and female students is (2.88). In the previous analysis, the values for the average of each gender were the same and different. To further analyze whether there were significant differences between male and female students, three types of analysis were used, the first analysis used the normality test to determine whether the data was normally distributed. Based on the table results from the normality test, the value obtained is (<0.05), which means the data is not normally distributed, because the data is not normally distributed, the next test uses the homogeneity variance test. The value obtained from this test is (0.740 > 0.05). This means the data is homogeneous, and the final test uses the Mann-Whitney test. The results show (0.912>0.05), meaning the data shows no significant differences between male and female students.

There are several results based on the mean results obtained from the MATS instrument. The first is that the Attitude Toward Science among students in Indonesia is quite good (3.08), but this does not mean ignoring the Attitude Toward Science in learning at school. According to (George & George, 2016) Their attitude toward science value will decrease as their grades increase in school. This is a strong reason why an attitude toward science is important to learn and apply in school. Although the average obtained is quite good, if we examine it in more detail there are differences between each of the dimensions used in this research instrument.

Previous research was conducted on attitudes toward science, but the results were different, the first research was conducted by (Tai et al., 2022) about attitudes toward science using instruments modified Attitude Towards Science Inventory (mATSI). The number of participants involved was 2016 students with details of 996 students from class 6 and 1020 students from class 7. The research results showed that attitudes toward science in female students decreased as they got older. However, research in China conducted by (Hong, 2010)

shows that it is not only female students whose attitude towards science has decreased but the same thing is also seen in male students. The attitude towards science in students decreases as the class increases, in this research, it was also found that female students in secondary school students in China prefer the subject humanities compared to science, the opposite result is that male students prefer science lessons compared to female students.

Other studies discuss attitudes toward science, but the researchers used the instruments to see whether there was an impact in increasing attitudes toward science or not, such as research conducted by (Lee & Erdogan, 2007) in Korea, which involved 7 teachers and 591 students involved in this research, the results of the research showed an increase in attitudes toward science. They were able to increase creativity in respondents. This research used the attitude toward the science inventory instrument. Similarly, in Taiwan, attitudes toward science increased after participants from grades 3, 7, and 8, as many as 37 students, were given treatment in the form of innovative teaching strategies for 20 weeks. To measure this increase, several instruments were used in this research, such as quantitative instruments and interviews, in addition to being able to increase attitudes toward science. Data from this study could support future research on attitudes toward science. Based on these findings teachers can choose and create effective strategies to improve students' attitudes towards science and increase their desire to learn science. The results of this research also provide support for further research into elements that increase students' enthusiasm for learning science, especially in simplifying science learning. Teachers can use the results of this research as a reference to continue carrying out activities that make students like science, such as conducting experiments in class.

Conclusion

The attitude toward science of junior high school students in Indonesia is good. The details of the static data show that the dimension of attitude toward science results. Attitude toward school science (3.18), desire to become a scientist (2.67), value of science to society (3.60), student perception on scientists (2.89). This was early because the students said science lessons are fun and when they are learning about science will increase their knowledge, but some students have a reason why they don't like science because they said science lessons are difficult. Furthermore, it was found that there was no significant difference between male and female students in attitudes toward science. This study recommends that researchers spread research instruments more widely and evenly to get more specific results regarding attitudes toward science. This research can be used for researchers who want to research topics related to this study.

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