Attitude and Understanding of Concepts: It's Influence in Science Learning

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A R T I C L E   I N F O

A B S T R A K

Pengukuran sikap sangat penting karena guru dapat mengetahui bahwa setiap siswa merespon pembelajaran IPA dengan indikasi siswa menolak atau menerima pembelajaran IPA pada siswa. Penelitian ini bertujuan untuk menganalisis bagaimana sikap IPA siswa, menganalisis pemahaman konsep siswa pada materi hukum Newton dan menganalisis pengaruh sikap IPA terhadap pemahaman konsep siswa pada materi hukum Newton. Penelitian ini merupakan jenis penelitian campuran yaitu metode campuran dengan tujuan untuk mengetahui bagaimana sikap IPA, bagaimana pemahaman konsep siswa, dan pengaruh sikap IPA terhadap pemahaman konsep siswa. Penelitian ini mengambil sampel sebanyak 358 siswa SMP dengan teknik pengambilan sampel yang digunakan adalah purposive sampling. Instrumen yang digunakan adalah angket sikap sains siswa, angket pemahaman konsep, dan lembar wawancara. Analisis data yang digunakan berupa statistik deskriptif, regresi linier sederhana, dan Miles Huberman untuk data kualitatif. Hasil yang diperoleh dari penelitian adalah rata-rata keseluruhan siswa berada pada kategori baik pada kedua variabel, diketahui juga terdapat pengaruh sebesar 51,2% pengaruh sikap IPA siswa terhadap pemahaman konsep siswa. Hal ini tentunya menggambarkan bahwa siswa SMP di kecamatan Telaipura cukup baik dalam memahami konsep-konsep hukum Newton.

A B S T R A C T

Attitude measurement is very important because the teacher can find out that each student responds to science learning with an indication that students reject or accept science learning in students. This research is aimed to analyse how the science attitude of students, analyse understanding of students' concepts on Newton's law material and analyse the effect of science attitudes on students' understanding of concepts in Newton's law material. This research is a mixed type of research, namely a mixed method with the aim of knowing how science attitudes are, how students understand concepts, and the effect of science attitudes on students' conceptual understanding. This study took a sample of 358 junior high school students with the sampling technique used was purposive sampling. The instruments used were student science attitude questionnaires, concept understanding questionnaires, and interview sheets. Analysis of the data used in the form of descriptive statistics, simple linear regression, and Miles Huberman for qualitative data. The results obtained from the study are that the overall average of students is in a good category on both variables, it is also known that there is an influence of 51.2% of the influence of students' science attitudes on students' understanding of concepts. This certainly illustrates that junior high school students in the Telaipura sub-district are quite good at understanding Newton's law concepts.

1. INTRODUCTION

Science subjects are one of the subjects in the elementary level education curriculum (Agustina, 2018; Saehana et al., 2019). Science lessons are a dynamic science, and always develop in accordance with the progress of Science and Technology (Nunaki et al., 2019; Suprapto et al., 2021). Science learning in junior high school itself is an integrated science learning which consists of 3 branches, namely physics, biology, and chemistry. Physics is one of the branches of science which has now been introduced or taught to junior high school students. At the junior high school level, assessment is not only in the form of numbers but can also be in the form of attitudes that can be seen in the student learning environment (Kamid et al., 2021; Suharsa. & Sasongko, 2020). However, in online practice, this attitude measurement tends to be more passive because the teacher cannot directly monitor students, the teacher only relies on student activity during learning so that in this case there are different methods in measuring student attitudes online compared to face-to-face. Attitude is an ability to evaluate something which is reflected by an attitude of accepting, refusing, or ignoring (Azman et al., 2020; D. A. Kurniawan et al., 2018). Attitude can also be defined Attitude is the assessment of each individual towards an object (Adegboyega, 2018; Adnan, 2020). The object of attitude can be concrete or abstract, and concludes a person's personality.

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Attitudes are generally related to the beliefs/feelings of each individual which are stable and difficult to change (S. Y. Chen & Liu, 2020; Uge et al., 2019). Attitude measurement is very important because the teacher can find out that each student responds to science learning with an indication that students reject or accept science learning in students. In the final assessment, the measurement of student attitudes has the same position as student learning outcomes which are of course very closely related to students' understanding of concepts during learning. Understanding is the level of ability that the testee (respondent) expects able to understand the meaning or concepts, situations and facts he knows (Purwanto, 2009; Simanjuntak et al., 2021). In this case, the testee does not only memorize verbally, but also understands the concept of the problem or fact being asked (Bao & Koenig, 2019; Diana, P., Marethi & Pamungkas, 2020). Understanding concepts is the basis of understanding principles and theories, so to understand principles and theories, students must first understand the concepts that make up these principles and theories (Dewi & Ibrahim, 2019; Sands et al., 2018). In science learning itself, understanding concepts is used to avoid misconceptions in students and is one of the requirements in achieving success in learning science, because it is a very fatal thing if students do not understand science concepts, especially in the online era which makes learning not very effective, especially for Newton's law material in physics learning.

Newton's law is a concept or material that explains how the relationship between internal forces and external forces when moving or at rest, this concept or material is very important to understand because it is the basis of many physics concepts at a more advanced level (Abdurrahman et al., 2018; Astalini et al., 2021b). Research from previous researcher reveals that there are still many junior high school students who have difficulty understanding Newton's law, especially in the early stages, namely the introduction of forces (Pasaribu & Saparini, 2017). This can be caused by several factors where Newton's law has quite unique characteristics because it is easy to be an example, but often makes mistakes in understanding the concept that are quite fatal (Nuriyah et al., 2018; Sari et al., 2018). It is undeniable that students' understanding of concepts is closely related to their attitudes (Agnafia, 2021; Yang et al., 2021). However, sometimes in school institutions, they prioritize understanding students' concepts and improving their attitudes are not given much attention. According to previous study attitudes can make students come up with new innovations / ideas and can grow new insights with existing knowledge in the surrounding environment (Andayani et al., 2021). By cultivating new insights, of course, it will develop students' creative mindset, they don't just memorize but apply it in their daily life. Based on this, this research is considered important because it can see how the attitudes and understanding of students' current concepts are, this will later be useful for teachers in determining effective teaching strategies in the classroom. This research is a continuation of previous research that discusses a similar theme or study. One of the is research that examines similar things but there is a difference, namely that it is more focused on learning physics, while this study focuses on a broader study, namely science (B. Kurniawan et al., 2018). Then, the research from other researcher found is more varied by adding STEM studies and computational thinking skills, but the sample is elementary school students (Sun et al., 2021). As for the research state that attitude variable is combined with students' perceptions and concerns in online school assignments (Maison et al., 2021).Based on this, this research is aimed to analyse how the science attitude of students in Telanaipura sub-district. Then analyse the understanding of students' concepts on Newton's law material in the Telanaipura district. And the last one analyse the effect of science attitudes on students' understanding of concepts in Newton's law material.

2. METHODS

The type of research chosen by the author is a mixed method. Mixed method research is research that combines quantitative data and qualitative data into one (Astalini et al., 2021a; Fitriani et al., 2021). The sample used is 358 in the district of Telanaipura. The sampling technique used is purposive sampling, purposive sampling is a sampling technique carried out by determining the category of the sample. The instruments used are divided into two, namely quantitative instruments in the form of attitude questionnaires and understanding of students' concepts, while for qualitative instruments in the form of interview sheets. For the attitude questionnaire, 3 indicators were taken, namely the social implications of science, interest in adding time to study science, and interest in a science career with a Likert scale of 1 to 5. Then the range was determined as show in Table 1.

Then to test the understanding of the concept, it consists of 15 questions which are divided into three indicators, namely the concept of Newton's law, the working forces, and their application. As for the intervals can be seen in the Table 2.

Table 1. Range of Students' Science Attitude Questionnaire Categories

Interval	Category
96,61 – 115,00	Very good
78,21 – 96,60	Good
59,81 – 78,20	Enough
41,41 – 59,80	Not Good
23,00 – 41,40	Very not good

Table 2. Range of Students' Understanding Test Categories

Interval	Category
12.1 – 15.0	Very good
9.1 – 12.0	Good
6.1 – 9.0	Enough
3.1 – 6.0	Not Good
0.0 – 3.0	Very not good

Then for the interview contains 5 questions posed to students. After the data is obtained, the writer then analyzes the data. The data analysis technique used is descriptive statistics for quantitative data and Miles Huberman for interview data with students. Then the research procedure can be seen in the Figure 1.

Figure 1. Research Procedure

3. RESULT AND DISCUSSION
Results

The results of the descriptive statistical test were assisted by the SPSS version 25 application, while the results can be seen in the Table 3.

Table 3. Descriptive Statistical Test Results of Students' Science Attitudes

Interval	Category	F	%	Mean	Median	Max	Min
96.61 – 115.0	Very Good	120	33.51				
78.21 – 96.60	Good	185	51.67				
59.81 – 78.20	Enough	53	28.64	78.5	75	95	60
41.41 – 59.80	Not Good	0	0				
23.0 – 41.40	Very not Good	0	0				
		358	100				

From the Table 3, it can be seen that from as many as 358 students there are 120 students in the very good category and 185 students in the good category, and 53 students in the sufficient category, then the mean value is 78.5, the median value is 75, the maximum value is about 95, and the minimum value of 60. This shows that students' attitudes in learning science are in a good category. Then for understanding students' concepts of Newton's law material, it can be seen in the following Table 4.

Table 4. Results of Descriptive Statistical Tests Students' Conceptual Understanding

Interval	Category	F	%	Mean	Median	Max	Min
63.01 – 75.00	Very Good	104	29.05				
51.01 – 63.00	Good	200	55.86				
39.01 – 51.00	Enough	54	15.08	59.5	62	74	42
27.01 – 39.00	Not Good	0	0				
15.00 – 27.40	Very not Good	0	0				
		358	100				

From the Table 4, it can be seen that from as many as 358 students there are 104 students in the very good category and 200 students in the good category, and 54 students in the sufficient category, then the mean value is 59.5, the median value is 62, the maximum value is 74, and the minimum value of 42. This indicates that the understanding of the concepts possessed by students is in good condition. Before performing the linear regression test, the researcher first tested the assumptions shown in Table 5.

Table 5. Assumption Test

Variable	Normality test	Linearity test
Science Attitude	0.093	-
Conceptual Understanding	0.175	-
Science Attitude * Conceptual Understanding	-	0.015

Based on Table 5, the results of the assumption test, it can be seen that the data is normally distributed and also linear. After that, the researcher then conducted a simple linear regression test to find out whether there was an effect of student responses on creative thinking skills. The results can be seen in Table 6.

Table 6. Regression Test

Unstandardized Coefficients		Standardized Coefficients	T	Sig.
B	Std. Error	Beta		
48.916	6.032		8.110	0.000
0.016	0.077	0.041	0.212	0.017

Based on Table 6, the significance value was obtained in 0.017 which fulfilled the requirements so that it can be said that there is an influence of students' attitudes on understanding students' concepts, then to find out how big the influence is, it can be seen in the following Table 7.

Table 7. Contribution Variable

R	R Square	Adjusted Square	R Std. Error of the Estimate
0.715	0.512	0.523	4.75

Based on Table 7, it can be seen that the influence of attitude has a contribution of 51.2% and the rest is influenced by other variables that are not calculated in this study. To strengthen the results of quantitative data, researchers also collect qualitative data by conducting interviews. The results of the interviews can be seen in Table 8.

Table 8. The results of the interviews

Question	Answer
How is the process of learning science, especially Newton's law material?	Less conducive
Do teachers use learning models in learning to help students understand the material?	Not yet
What is the attitude of students in learning?	Pretty good
Are students interested in a career in science?	Some are there
Is the time allocated to students in science learning sufficient?	Enough but there must be an increase in quality

Discussion

Based on the results of descriptive statistical tests of the two variables, it can be seen that for the science attitude variable students are in the very good category with the mean acquisition of 78.5, the median value of 75, a maximum of 95 and a minimum of 60. Then for the variable understanding of the concept of students, the mean is in the good category with a mean of 59.5, a median of 62, a maximum of 74, and a minimum of 42. The attitude of a student himself is one of the internal factors that influence science learning outcomes (D. A. Kurniawan et al., 2019; Widani et al., 2019). Students with positive attitudes tend to have higher conceptual understandings than students with negative science concepts

(McLaren, 2019; Riwahyudin, 2015). The attitude of a student determines the success of the material absorbed in the learning process (Benson et al., 2020; D. Chen et al., 2021). The success of students in absorbing the teaching material presented by the teacher in the learning process will lead to a positive understanding of the concept of science in the individual student, on the other hand, failure will cause a low understanding of the concept of science in question. Based on the results obtained, the acquisition of student scores is a benchmark for researchers to determine students' conceptual understanding of the material being taught (Sagala et al., 2019; Widyastuti et al., 2019). During the research process, the improvement of students' understanding of concepts in science subjects, Newton's law material was good, but more improvements were needed from various aspects. With the importance of understanding this concept, it makes not only students but also all teachers and principals think of real solutions in increasing students' understanding of concepts (Hasnunidah et al., 2020; Muslim et al., 2021).

Then in terms of variable attachment, it was found that 51.2% of the influence of science attitudes on students' understanding of concepts. This of course means that students' science attitudes determine how students make decisions, such as studying harder or only studying at school. This research has a complementary relationship with previous research. For example, research that examined a sample of students on physics concepts in general, this is different from what was studied by researchers who focused on Newton's law material (Sulistiyono et al., 2019). Then for research which made the variables of attitude and understanding of concepts as student learning outcomes after using their products in the form of online (Alfathy et al., 2018). Meanwhile, research from previous researcher that examines how the learning model can affect students' attitudes and understanding of concepts (Siagian, 2018). Based on this, the update of this research can be seen from the specifications of the selected material, how many samples were studied, and the design of the research itself. This research has implications that affect the learning environment of students and teachers' teaching. For students, this research can make students more enthusiastic in pursuing better learning outcomes, on the other hand the teacher can pay more attention to any weaknesses that have been hindering previous learning, and more importantly understanding students' concepts. Very good students can determine the minimum completeness criteria at the school (Duruk et al., 2017; Ulia & Sari, 2018). A good minimum completeness criteria makes the reputation of the school better, this will have an impact on new student admissions in the future (Ardaya, 2016; D. Chen & Kurniawan, 2022). This research basically has several weaknesses that must be completed by further research, such as the data taken focuses on quantitative data so that qualitative data is used only as a complement to quantitative data. Then for this study only take data and do not do learning before doing research, so for further research the researcher suggests that learning is carried out by the author before taking data.

4. CONCLUSION

The acquisition of student scores is a benchmark for researchers to determine students' conceptual understanding of the material being taught. During the research process, the improvement of students' understanding of concepts in science subjects, Newton's law material was good, but more improvements were needed from various aspects. With the importance of understanding this concept, not only students but also all teachers and principals think of real solutions in increasing students' understanding of concepts. Then in terms of variable attachment, it was found that 51.2% of the influence of science attitudes on students' understanding of concepts. This of course means that students' science attitudes determine how students make decisions, such as studying harder or only studying at school. Based on the data and discussion described, it can be concluded that the average sample studied has a very good science attitude and understanding of concepts, this is certainly influenced by previous learning. The effect of student responses on students' creative thinking skills was also found to be 51.2, while the rest were influenced by other variables.

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