INVESTIGATE THE CORRELATION OF SCIENCE LEARNING INTEREST ON SCIENCE PROCESS SKILLS THROUGH SCIENTIFIC APPROACH

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Abstract

In this study, the learning process was carried out using a scientific approach, then measuring the students' interest in science lessons and science process skills. This study aims to: 1) Determine the level of student interest in science lessons using a scientific approach, 2) Investigate the effect of the scientific approach on students' science process skill levels, 3) Investigate the relationship between interest in science lessons and science process skills. The research method used in this study is descriptive and associative correlational survey research methods. The instruments used in this study consisted of 1) questionnaire on the level of students' interest in science, 2) interview sheets, 3) Science Process Skills Test. The samples of this research were 45 students of AnNizam grade VII. The results showed that the investigation of the majority level of student interest was 52% at a high level, the results of examining the effect of scientific learning on process skills using the independent sample t-test obtained $t_{count} > t_{table}$, namely $6.16 > 1.68$. The simple regression investigation found a strong relationship between interest and science process skills of about 0.63.

Keywords: Interest; science lessons; science process skills; scientific approach

Abstrak

Pada penelitian ini dilakukan proses pembelajaran menggunakan pendekatan saintifik kemudian dilakukan pengukuran minat siswa terhadap pelajaran sains dan keterampilan proses sains. Penelitian ini bertujuan untuk: 1) Mengetahui tingkat minat siswa pada pelajaran sains pmenggunakan pendekatan saintifik, 2) Menyelidiki pengaruh pendekatan saintifik terhadap tingkat keterampilan proses sains siswa, 3) Menyelidiki hubungan antara minat pada pelajaran sains terhadap keterampilan proses sains. Metode penelitian yang diigunakan pada studi ini adalah metode penelitian survey bersifat deskriptif dan asosatif korelasional. Instrumen yang digunakan dalam penelitian ini terdiri dari: 1) Kuesioner tingkat minat siswa terhadap pelajaran sains, 2) Lembar wawancara, 3) Tes Keterampilan Proses Sains. Sampel penelitian ini adalah siswa AnNizam kelas VII berjumlah 45 siswa. Hasil penelitian menunjukkan bahwa penyelidikan tingkat minat siswa mayoritas 52% pada level tinggi, hasil pemeriksaaan pengaruh pembelajaran saintifik pada keterampilan proses menggunakan independent samplet-test diperoleh $t_{hitung} > t_{tabel}$ yaitu $6,16 > 1,68$. Penyelidikan regresi sederhana diperoleh hubungan yang kuat antara minat dan keteampilan proses sains sekitar 0,63.

Kata kunci : Minat; pelajaran sains; keterampilan proses sains; pendekatan saintifik

INTRODUCTION

Science lessons require understanding rather than just memorizing (Handayani, Adisyahputra, & Indrayanti, 2018). Science knowledge is built with cognition awareness which includes observation and analysis activities through a series of experiments in the laboratory to strengthen understanding in-depth and comprehensively (Wonoraharjo, 2010; Wardani, Lindawati, & Kusuma, 2017). Therefore science lessons must be designed to be attractive and easily understood by the level of thinking of students.

Based on the stage of cognitive development, junior high school students in Indonesia are at the level of formal operational cognitive development (Slavin, 2011). At this stage, students are still in the transitional stage from reasoning logically in the form of concrete objects to abstract thinking. Therefore, it requires a learning process that can accommodate their level of thinking.

According to Piaget (Rifa'i & Anni, 2012) there are three main principles of learning, namely: 1) Active learning, which requires learning conditions that involve students in learning, for example by conducting experiments or observing activities directly, 2) Learning through social interaction. Direct interaction between teachers and students and fellow students will stimulate the cognitive development of students, 3) Learning through their own experiences can be done by involving students in a scientific event and can reflect on it in oral and written form.

These three main principles of learning are found in the scientific approach to learning design. A scientific approach is a learning approach that encourages students to participate in seeking knowledge related to the subject matter through various scientific process activities such as those carried out by scientists in carrying out scientific investigations (Kurniawati, Anitah, Suahrno, 2017).

The use of a scientific approach in the learning process relies on scientific facts and those around students and in practice, it begins with an observation followed by the analysis process (Utanto, Widhanarto, & Maretta, 2017). Learning using a scientific approach emphasizes the involvement of students in the learning process using steps: observing, asking, trying, associating, communicating can improve learning outcomes, basic process skills, and integrated science process skills (Sujarwanta, 2012; Marjan, Arnyana, & Setiawan, 2014).

Science process skills are skills needed to learn science at an advanced level so that students are able to process information and discover new useful things (NRC, 2012). Process skills are mental and physical abilities needed to study science, problem-solving, and development of the social side of an individual (Akinbobola & Afolabi, 2010: 234). Process skills are based on observing what scientists do in studying events in nature. Activities to develop skills that process the results of observations will enable students to find and develop their own facts and concepts and will develop the required values and attitudes (Lete, Sutopo, & Yuliati, 2016).

The abilities that appear in basic science process skills are in line with the steps of scientific learning in the form of observation, classification, prediction, inferring, and communication

abilities. These basic process skills are needed to build new discoveries in science (Handayani, et al, 2018).

The use of a scientific approach in learning also has an impact on student interest in science lessons. The scientific approach takes advantage of learning through fun and amazing experiences about scientific facts (Bulunuzz & Jarrett, 2010). At the age of the junior high school, science learning that is carried out should be fun and not stressful to foster a strong interest in these subjects (Krapp & Prenzel, 2011).

Interest is one component of attitude that is related to positive experiences of a lesson and is closely related to cognitive abilities (Hidi et al., 2004). Interests have an important role in making student career decisions in the future (Krapp & Prenzel, 2011). Student interest in science lessons affects students' interest in studying science at an advanced level (Tai et al., 2006). Therefore, so that students' interest in science lessons has a long-term impact, it is necessary to design learning that makes students interact positively with lessons, one of which is the application of scientific learning.

METHOD

Research Method

The research method used in this study is a descriptive and associative correlational survey research method. Correlational research generates and tests a hypothesis about the relationship between variables or states the size of the relationship between variables (Arikunto, 2010). The following is a research method design for correlation:
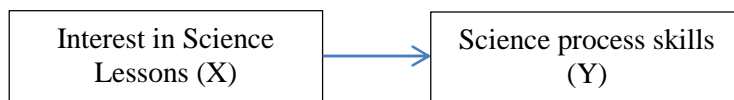
Figure 1: Design of research method

To investigate the effect of the scientific approach on process skills, a posttest-only group design was used (Sugiyono, 2017). This design was carried out to investigate the effect of using scientific-based learning in science learning on students' science process skills. The research design can be seen in Table 1 below:

Tabel 1. Desain posttest-only group design

Group	Treatment	Posttest
Experimen	X	O1
Control		O2

X = Treatment (Learning uses a scientific approach)
O_1 = Experimental group posttest
O_2 = Control group posttest

Research Subjects and Objects

The research subjects involved in the application of teaching materials were 45 students.

The research subjects involved were 47 students of Junior High Islamic School An Nizam Medan. Subjects are given learning using a scientific approach. The object of research is the relationship between student interest in science lessons and science process skills through the application of learning based on a scientific approach.

Instruments and Procedure

The instruments used in this study consisted of 1) questionnaire on the level of students' interest in science, 2) interview sheets, 3) Science Process Skills Test. The samples of this research were 45 students of AnNizam grade VII. The stages of the procedure in this study are as follows: 1) The stages of preparation for the preparation of Scientific Learning Plans, Student Worksheets (LKS), compilation, student interest questionnaire sheets, and student process skills tests. 2) The stages of implementing learning using science. At this stage, learning is carried out in two classes where one class uses student worksheets and learning uses the scientific stage while the other class uses worksheets without scientific learning. Filling interest in science lessons, science process skills tests, and interviews are conducted after the learning takes place. The criteria for interest and process skills adapted from Aqib (2011) can be seen in Table 2.

Tabel 2. Science Process Interest and Skills Criteria

No	Level	Predicate of success
1	86 – 100%	Very High
2	71 – 85%	High
3	56 – 70%	Medium
4	41 – 55 %	Low
5	< 40 %	Very Low

Data Analysis Technique

The data analysis used in this research is descriptive analysis, simple regression analysis, and inferential analysis. Simple regression analysis is used to see the relationship between interest and science process skills, the inferential analysis uses the independent sample t-test.

RESULTS AND DISCUSSION

Results

Learning using a scientific approach promotes inductive reasoning by collecting specific evidence into a broader idea relationship (Kemendikbud, 2013). Scientific method refers to phenomena with specific studies and then formulated general conclusions in the form of new knowledge, or correcting and combining it with previous knowledge (Ministry of Education and Culture, 2013). The scientific approach is a work process carried out by scientists to gain knowledge. Therefore, the use of a scientific approach in the learning process can trigger students to actively construct concepts, laws, or principles either through guidance or independently (Ine, 2015).

Learning through a scientific approach is a learning process designed in such a way that students actively construct concepts, laws, or principles through the stages of observing (to identify or find problems), formulate problems, propose or formulate hypotheses, collect data, analyze data, draw conclusions and communicate. In this study, the application of the scientific approach is carried out on the subject of quantities and units. In table 3 an overview of the scientific learning plan is described.

Table 3. Description of Scientific Learning on Quantities and Units Material

Learning Activity Steps	Description of Event
Initial activities	• Open lessons with prayer • Conducting apperception (Asking about the importance of measurement in daily activities, asking jobs related to measurement activities, what if in life there are no measuring instruments).
Core activities	**Observing** Students are invited to observe objects/objects provided (for example water, blackboards, tables, cooking oil, sugar, salt, shoes, toy cars, plants, our bodies). **Asking (Questioning)** • According to you all of the objects shown can you explain one by one the size of the objects. • In your opinion which of these objects can be measured and which cannot be measured. • Why do you think there should be a measuring instrument **Collecting data (experimental)** • Divide students into groups. • Students make measurements on objects using each measuring instrument in the form of meter, scale, liter (measuring volume), thermometer, and stopwatch. • Students carry out experiments according to the instructions on the worksheet **The reasoning or Analyzing or Associating (Associating)** • Processing and analyzing the observed data from each experiment to answer the questions previously collected. • Discuss the results of data analysis and verify the results of processing with data in the sourcebook **Communicating** • Make a report on the experiment and present it using grammatically correct. • Students and teachers review the results of student reports, evaluate, and conclude together. • Give awards to groups that perform well.
Closing Activities	• The teacher directs students to make a summary of the material and collects it. • Giving assignments • The teacher informs the material topics to be studied at the next meeting.

After learning using a scientific approach is carried out to measure students' interest in science lessons. The acquisition of students' level of interest in science lessons can be seen in table 4.

Table 4. Student Interest Level in Science Lessons

No	Frequency	Percentage	Kategori minat
1	5	22%	Very high

2	12	52%	High
3	6	26%	Medium
4	0	0%	Low
5	0	0%	Very low

The results of the interviews were conducted with five students who were randomly selected. The results of the interview can be seen in table 5.

Table 5. Interview Result

No	Question	The Answers That Appear
1	What do you think about the learning that has been followed?	• I can understand more about this lesson and have fun while following the lesson. • Good and easy to understand • I became like science lessons • It's fun because I like science lessons • It is quite difficult to understand the lesson
2	Do you like learning by using experiments?	• I like experimenting because it is more understandable. • I really like • Yes, I like science lessons using experiments • I like it because it is easy to understand and the material that is given is fun. • I like experimenting
3	Are you motivated to learn if you use learning like this?	• I am motivated to learn when using learning like this. • Yes, I am very motivated • I am motivated in learning. • Yes, I am motivated to learn science • Fairly motivated

Then an investigation was carried out about the effect of learning with a scientific approach on science process skills, the data obtained can be seen in table 6.

Table 5. Results of statistical analysis independent sample t-test

	Experimental Group	*Control Group*
Mean	46,69565217	21,43478261
Variance	219,9486166	166,7114625
Observations	23	23
Pooled Variance	193,3300395	
df	44	
t Stat	6,160948049	
t Critical one-tail	1,680229977	
P(T<=t) two-tail	1,95692E-07	
t Critical two-tail	2,015367574	

Furthermore, the relationship between interest in science lessons and science process skills is investigated. The data can be seen in table 6. The results of regression analysis state that there is a strong relationship between interest and science process skills of 0.63. From the value of determination obtained 39% means that interest can influence process skills by 39% the rest is influenced by other factors.

Table 6. Results of Simple Regression Analysis Between Interests and Science Process Skills

Regression Statistics	
Multiple R	0,632256
R Square	0,399747
Adjusted R Square	0,371164
Standard Error	11,7606
Observations	23

Discussion

Learning science requires seriousness because you have to understand various kinds of concepts ranging from basic concepts to complex ones. Studying science also requires the ability to understand the theories in the textbook. This of course will foster boredom and dislike in studying science. Therefore, early-level students must be fostered an interest in studying science by designing active and fun learning. This is what causes interest in science lessons to be cultivated so that students have the motivation to learn them. Psychological involvement in learning can increase focus attention, increase cognitive function, persistence, and involvement in learning (Hidi, 2006).

In this study, learning was carried out using a scientific approach to see its effect on students' science process skills and to investigate the relationship between interests and science process skills. Learning using a scientific approach was found to have a significant effect on science process skills where the results obtained in this study are in line with the research results of Fadela, Fadiawati, and Tania (2016) which state that learning using a scientific approach has an effect on improving students' process skills in learning reaction rates. The scientific approach also has an effect on improving student learning outcomes Firman, Baedhowi, & Murtini, 2018. The scientific approach seeks students to have a positive interest in science lessons so that it affects the improvement of students' science process skills.

CONCLUSION

Learning using a scientific approach results in the acquisition of the majority of students' interest at a high level. This suggests that the acquisition of high student interest will affect student process skills. The results of examining the effect of scientific learning on process skills using the independent sample t-test obtained t count > t table, namely 6.16 > 1.68. The simple regression investigation found a strong relationship between interest and science process skills of about 0.63. The results of this investigation prove that learning science requires students' interest to be motivated to learn it. Interest can maintain interest retention in order to survive because science is a subject that is categorized as difficult and requires seriousness.

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