

The Prompt of Using KIT IPA Toward Students Achievement on Science in Term of Scientific Attitude

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Abstract

The aim of this research is to know the tendency of using KIT IPA toward students achievement on science in term of scientific attitude. The type of this research is quasiexperiment. The populations of this research are all of students of grade eight in SMP Negeri 3 Kasihan Bantul. Besides, the sample is using simplerandom sampling. The methods of collecting the data are documentation, test, and questionnaire. The validity of questions tested with Pearson product moment. The reliabilities instruments are tested with KR-20 and the questionnaire with alpha cronbach formula. The technique of data analysis is using ancova experiment. The result of this research shows that $F_{count} = 11,258$ with $p = 0,002$. It means that there is a significant difference on students achievement on science by using KIT IPA in term of scientific attitude.

Keywords : *KIT IPA, Students Achievement Scientific and Scientific Attitude*

Background

Education in Indonesia continues to grow. In its development, education in Indonesia still needs improvement. In the academic field, learning outcomes are the key component to know the extent to which learning objectives can be achieved or not. To optimize education required aspects of development, both physical and psychological development which includes intellectual development, language, motor, and religious moral and social-emotional.

At the junior high school level (SMP) is given knowledge about nature and surroundings, which is learned in the subjects of Natural Sciences (IPA). Science education is one aspect of education that uses science as a tool to achieve educational goals, especially to improve understanding of the natural world.

In the management of science learning in schools, teachers should be able to provide learners knowledge about the concepts contained in the material IPA. The science-learning process emphasizes the provision of direct experience to develop students' scientific attitudes to explore and understand science knowledge.

An integrated instrument component (KIT) toolkit is a manufactured and packaged device in a teaching unit box, which resembles a series of test equipment in the science lesson and comes with a user manual. The use of KIT IPA media in learning, will invite students to study IPA in full, not just memorize the concepts of natural knowledge, but also learn what, why, and how the concepts are found through experimental activities in the laboratory.

The aid of laboratory equipment in the form of KIT IPA in SMP Negeri 3 Kasihan is still not utilized in the learning activities. This is due to the limited number of KIT IPAs, the lack of mastery of IPA KIT, and the learning activities take longer if done through practicum. The result of science learning of grade VIII (eight) students in SMP Negeri 3 Kasihan on UTS semester 1 (one) average score is 50.15 still below KKM value is 75.

By using integrated instrument component media (KIT) IPA, it is expected that students will receive learning materials optimally and can develop their scientific attitude so that their learning result will increase. Therefore, it is necessary to optimize real science learning in SMP Negeri 3 Kasihan Bantul. One of them is by using KIT IPA. Equipment IPA KIT can support the real implementation of learning in school. In addition, the use of KIT IPA can develop students' scientific attitude.

This research is aimed descriptively to know the tendency of science learning outcomes and scientific attitude learning using KIT IPA and without using KIT IPA, comparative to know the effect of IPA KIT usage on science learning outcomes in terms of the scientific attitude of students of grade VIII SMP Negeri 3 Kasihan Bantul teachings years of 2016/2017.

Literature Review

According to Nyoman Kertiasa (in Khikmatiar Juanita Abdilah, 2016: 13), KIT IPA is a science learning tool provided by MoNE which is packed in one box. In line with that, according to Lilis Indayani (2015: 58), KIT IPA media is IPA equipment produced and packaged in a box of teaching units, which resembles a series of experimental skills testing equipment in the field of IPA study and comes with a user manual.

According to Wardhana (in Lilis Indayani 2015: 58), KIT IPA for SMP consists of 4 packages namely KIT Mechanics, Hydrostatic Heat KIT, KIT Optika, and Magnet KIT Electricity. The IPA KIT has an advantage according to Lilis Indayani (2015: 58), which aids in the development of IPA concepts, provides a concrete basis for thinking, provides real experiences that can foster self-activities, leads to regular, ongoing thinking. While the disadvantages of using KIT IPA props, the effectiveness of props depends on the renderer, the making sometimes requires a higher cost, the student does not always know how to interpret the model, requiring more information from the teacher.

According to Trianto (in IM Budiana, IB Surya Manuaba, & IN Suadnyana, 2016: 2), IPA is a systematic collection of theories, its application is generally limited to natural phenomena, born and developed through scientific methods such as observation and experimentation and demanding scientific attitudes such as curiosity, openness, honesty, and so on. Learning outcomes are the result of teaching and learning activities. According to Slameto (2013: 2), learning is a process by which a person undertakes to gain a whole new behavioral change, as a result of his own experience in interaction with his environment.

According to Endang Komara (2014: 1), learning is a component of the science of education with respect to the purpose and reference materials of interaction, either explicit or implicit (hidden). In the academic field, learning outcomes are a key component to know the extent to which learning objectives can be achieved or not. Achievement or not the purpose of learning seen from the results of student learning. At the junior high school level (junior high) learning about nature and surrounding areas is studied in the subject of Natural Sciences (IPA). The science-learning process emphasizes the provision of direct experience to develop students' scientific attitudes to explore and understand science knowledge.

Attitudes are referred to in science or science in the form of scientific attitude or scientific attitude. According to Zainal Arifin (2013: 159), attitude is a behavioral tendency to do things with certain methods, techniques, and patterns to the world around them, both in the form of people and in the form of certain objects. According to Triandis (in Slameto, 2013: 190) defines attitudes as follows: An attitude is an idea of an attitude of a class of action to a particular class of social situations. The formula states that the attitude contains three components, namely cognitive components, effective components, and behavioral components. Meanwhile, according to Desi Nur Anisa (2013: 20), Scientific attitude is an attitude that must be developed in the science lesson, because with a good scientific attitude then students' attitudes toward science lessons are also more positive.

Methodology

This type of research is quasi-experiment. This research was conducted in class VIII SMP Negeri 3 Kasihan Bantul academic year 2016/2017 with address Ngentak Street, Bangunjiwo, Kasihan, Bantul. The population in this study is all students of class VIII in SMP Negeri 3 Kasihan consisting of 5 classes of 130 students.

The study was conducted on the even semester of the academic year 2016/2017 ie in February to April 2017. Independent variables in this study are learning using KIT IPA and without using KIT IPA, while the dependent variable is the result of science learning on the subject of vibration and wave, as well as variables involvement or covariate in this study is students' scientific attitude.

The technique of collecting data is taken with documentation technique used to collect semester midterm value (UTS) one which is used to know the ability of early knowledge of the student, test technique used to collect data of science learning result of student, and questionnaire technique used to collect student's scientific attitude data.

The prerequisite analysis test includes the test of distribution normality with Chi-Square test, homogeneity test of variance using Fisher test, and relationship linearity test. Furthermore, to test the hypothesis used one-track anakova test.

The hypothesis in this research that there is a difference of science learning result of class VIII student of SMP Negeri 3 Kasihan Bantul between learning using KIT IPA with learning without using KIT IPA in terms of student's scientific attitude.

Findings and Discussion

1. Research result

a. Criteria for Science Study Results

Based on the results of the study, the results of science learning obtained by the assessment of science learning outcomes for:

$$\begin{aligned} \text{Maximum score is ideal} &= 24 \times 1 \\ &= 24 \end{aligned}$$

$$\begin{aligned} \text{Minimum score is ideal} &= 24 \times 0 \\ &= 0 \end{aligned}$$

$$\begin{aligned} \text{Ideal average (M)} &= \frac{1}{2} \times (24+0) \\ &= 12 \end{aligned}$$

$$\begin{aligned} \text{Ideal standard deviation} &= \frac{1}{6} \times (24+0) \\ &= 4 \end{aligned}$$

Taking into account the ideal average of ideal deviations can be obtained the ideal curve criteria as follows :

Table 1.

The normal ideal curve criteria for IPA learning outcomes

Interval	Category
$18,000 \leq \bar{X} \leq 24,000$	Very high
$14,000 \leq \bar{X} < 18,000$	Height
$10,000 \leq \bar{X} < 14,000$	Medium
$6,000 \leq \bar{X} < 10,000$	Low
$0,000 \leq \bar{X} < 6,000$	Very Low

From the result of research is obtained by the result of the test of distribution normality, variance homogeneity test, and linearity test of relation as a prerequisite test of analysis and hypothesis test as follows :

1) Science learning outcomes which study using KIT IPA.

The learning outcomes of IPA learning using KIT IPA obtained the highest score = 23, lowest score = 7, with mean = 19,155 and standard deviation = 3,581. In the ideal norm, curve lies at intervals of $18,000 \leq \bar{X} \leq 24,000$ including very high category. So the tendency of science learning outcomes of students of grade VIII SMP Negeri 3 Kasihan Bantul who use KIT IPA including very high category.

- 2) Science learning outcomes that are learning without using KIT IPA
 Results of science learning without learning to use KIT IPA obtained the highest score = 21, the lowest score = 6, with the average = 14.731 and standard deviation = 4.928. In the normal curve lies at $14,000 \leq \bar{X} < 18,000$ intervals including the high category. So the tendency of science learning outcomes of students of grade VIII SMP Negeri 3 Kasihan Bantul without using KIT IPA including high category.

b. Criteria for Student's Scientific Attitude

Based on the results of research, students' scientific attitude obtained the students' scientific attitude evaluation norms to :

- Maximum score is ideal = 20×5
 = 100
 Minimum score is ideal = 20×1
 = 20
 Ideal average (M) = $\frac{1}{2} \times (100+20)$
 = 60
 Ideal standard deviation = $\frac{1}{6} \times (100+20)$
 = 20

Taking into account the ideal average of ideal deviations can be obtained the ideal curve criteria as follows :

Table 2.

The normal ideal curve criteria students' scientific attitudes

Interval	Category
$90,000 \leq \bar{X} \leq 100,000$	Very High
$70,000 \leq \bar{X} < 90,000$	Height
$50,000 \leq \bar{X} < 70,000$	Medium
$30,000 \leq \bar{X} < 50,000$	Low
$20,000 \leq \bar{X} < 30,000$	Very Low

- 1) Scientific Attitude Students who learn using KIT IPA
 The scientific attitude of students whose learning using KIT IPA obtained the highest score = 91, lowest score = 69, with mean = 75,308 and standard deviation = 6,137. In the ideal norm, curve lies at the interval of $70,000 \leq \bar{X} < 90,000$ including the high category. So the tendency of the scientific attitude of students of class VIII SMP Negeri 3 Kasihan Bantul using KIT IPA including high category.
- 2) Scientific Attitude Students who are learning without using KIT IPA
 The scientific attitude of the students whose learning without using KIT IPA obtained the highest score = 85, lowest score = 53, with mean = 69,192 and standard deviation = 8,188. In the ideal norm, curve lies at intervals of $50,000 \leq \bar{X} < 70,000$ including the

medium category. So the tendency of science learning outcomes of students of grade VIII SMP Negeri 3 Kasihan Bantul academic year 2016/2017 which learning without using KIT IPA including medium category.

c. Testing Prerequisite Analysis

1) Test the distribution normality

The distribution normality test serves to test whether or not the normal distribution of research data. The formula used to test the normality of the data is the formula chi-squared (χ^2) with the criterion if χ^2_{count} is obtained with $p > 0,050$ then the data is normally distributed.

Table 3.

Results of normality test of the distribution of IPA study

Group	db	χ^2_{count}	p	Spread
KIT IPA	9	13,967	0,214	Normal
Without KIT IPA	9	9,728	0,373	Normal

In table 3 shows that the index obtained $\chi^2_{\text{arithmetic}} = 13,967$ with $p = 0.214$ for the learning group using KIT IPA and $\chi^2_{\text{count}} = 9,728$ with $p = 0,373$ for the learning group without using IPA KIT. Because $p > 0,050$ for both groups it can be concluded that the data of both groups are normally distributed.

Table 4.

The result of normality test of student's scholarship

Group	db	χ^2_{count}	p	Spread
KIT IPA	9	3,679	0,931	Normal
Without KIT IPA	9	3,969	0,913	Normal

In table 4 shows that the index obtained $\chi^2_{\text{count}} = 3,679$ with $p = 0,931$ for the learning group using KIT IPA and $\chi^2_{\text{count}} = 3,969$ with $p = 0,913$ for the learning group without using IPA KIT. Because $p > 0,050$ for both groups it can be concluded that the data of both groups are normally distributed.

2) Test the homogeneity of variants

To know that the sample is homogeneous compared to the criterion $F_{\text{count}} < F_{\text{table}}$ at the significance level of 5% or $p > 0,050$ then the variant of each homogeneous group.

Table 5.

Results of homogeneity of a variant of IPA learning outcomes

Group	N	Variant	F_{count}	p	Inf
KIT IPA	26	24,285	1,89	0,05	Homogeneous
Without KIT IPA	26	12,826	3	8	

Based on the data in table 5 obtained $F_{\text{count}} = 1.893$ with $p = 0.058$. Because $p > 0,050$ it can be concluded that the sample comes from a homogeneous variant.

Table 6.
The result of homogeneity test of students' scientific attitude variance

Group	N	Variant	F _{count}	p	Inf
KIT IPA	26	67,042	1,780	0,078	Homogeneous
Without KIT IPA	26	37,661			

Based on the data in table 6 obtained $F_{count} = 1.780$ with $p = 0.078$. Because $p > 0,050$ it can be concluded that the sample comes from a homogeneous variant.

3) Test the relationship linearity

In the empirical F linearity test at a significant $0,050 < F$ theoretical level, then the data is called linear.

Table 7.
Linearity test results relation

Group	F _{count}	p	Inf
KIT IPA and without KIT IPA viewed from students' scientific attitude	0,002	0,965	Linier

From the calculation of table 5 in the group learning using KIT IPA and without using KIT IPA obtained $F_{hitung} = 0.002$ with $p = 0.965$. Because $p > 0,050$ it can be concluded that variable is stated linear.

4) Hypothesis testing

To test this hypothesis tested anakova with criterion if F_{table} obtained $p \leq 0,050$ or $p \leq 0,010$ then hypothesis accepted.

Table 8.
Summary of childova test

Group	JK	db	RK	F _{count}	p	Ket
KIT IPA VS without KIT IPA, student's scientific attitude	213,158	1	213,158	11,258	0,002	Very significant

Based on the data in table 6 test anakova IPA learning results obtained $F_{count} = 11.258$ with $p = 0.002$. Because $p \leq 0.010$, the proposed hypothesis is accepted and very significant.

2. Discussion

a. Desriptively

- 1) The tendency of science learning outcomes whose learning to use KIT IPA obtained the highest score = 23, the lowest score = 7, with the mean = 19.155 and standard deviation = 3.581 located at interval $18,000 \leq \bar{X} \leq 24,000$ so that in the normal curve is in a very high category. This is because learning by using KIT IPA can help teachers

to explain the material and concepts of science to students. According to Wibawa and Mukti (in Citron Payu and Ahmad Zainuri, 2015: 8), the medium/props KIT of natural science or loan boxes is one of the three-dimensional media. KIT IPA as a visual aid also helps teachers in explaining concepts, formulating and forming concepts, strengthening concepts on students, training students in problem-solving, and encouraging students to think critically. Thus, students can understand the lesson well and get a high value of science learning outcomes.

- 2) The tendency of IPA learning outcomes without learning to use KIT IPA obtained the highest score = 21, lowest score = 6, with mean = 14,731 and standard deviation = 4.928 which is located at interval $14,000 \leq \bar{X} < 18,000$ so in a normal curve is in the high category. This is because learning without using KIT IPA still using lecture method. According to Abdul Majid (2013: 194), lectures as a method of learning is a way used in developing the learning process through lecture (lecture). Where students are not actively involved in the learning process. Thus, students' understanding of the concept of IPA cannot be conveyed properly. In addition, IPA learning without the use of IPA KIT cannot facilitate the students' ability to think critically, analyze and solve problems systematically.
- 3) The tendency of a scientific attitude of students whose learning using KIT IPA obtained the highest score = 91, lowest score = 69, with mean = 75,308 and standard deviation = 6,137 which is at interval $70,000 \leq \bar{X} < 90,000$ so that in a normal curve is in the high category. This is because in the learning process by using KIT IPA as a tool to experiment, can help the development of scientific attitude toward a more positive. KIT IPA facilitates students to practice, so as to help students develop their scientific attitude such as honest attitude, meticulous, responsible, appreciate other people's opinions can be improved.
- 4) The tendency of scientific attitude which learning without using IPA KIT was obtained the highest score = 85, lowest score = 53, with mean = 69,192 and standard deviation = 8,188 which is at interval $50,000 \leq \bar{X} < 70,000$ so in a normal curve is in the medium category. This is because the learning process that does not use KIT IPA can not facilitate student learning activities directly. Thus, students' scientific attitudes such as honesty, meticulousness, responsibility, respect for the opinions of others cannot be improved.

b. Comparatively

Based on the results of analysis test anakova obtained $F_{\text{count}} = 11,258$ with $p = 0,002$ which means that $p \leq 0,010$ then the proposed hypothesis accepted and there is a significant difference between the learning using KIT IPA and without using KIT IPA on science learning outcomes of students in terms of students' scientific attitude. And it is proven that learning using KIT IPA is better than learning without using KIT IPA.

From the results of this study obtained the average learning outcomes of science students whose learning using KIT IPA is 19,155 with the average scientific attitude of

students is 75,308 while the average learning outcomes of students who did the learning without using KIT IPA is 14,731 with the average scientific attitude of students is 69,192. Differences in the average score of science learning outcomes in terms of scientific attitudes are caused because students who learn using KIT IPA will make it easier for students to understand the concept of science and learning will be interesting and fun so that students' understanding of the given IPA materials will be successful. The tools inside the IPA KIT can also be used as props. Students can experiment on their own and develop a scientific attitude to conceptualize and discover the concept of science itself. While in learning without using KIT IPA, teachers play a more active role than students. No activity can support his understanding and scientific attitude.

Conclusion

Based on the results of this study can be concluded descriptively that the tendency of learning outcomes of IPA learning using KIT IPA is very high with the average value = 19,155. While the learning outcomes of the learning without using KIT IPA is high with the average value = 14,731. And the tendency of a scientific attitude of students whose learning using KIT IPA is high with average value = 75,308. While the scientific attitude of students whose learning without using IPA KIT is being with an average score of 69,192. The results of comparative data analysis show that there is a very significant difference between learning outcomes between learning using KIT IPA and without using KIT IPA in terms of students' scientific attitude (result of test anakova obtained $F_{count} = 11,258$ with $p = 0,002$. The average of science learning outcomes and scientific attitude of students using KIT IPA is higher than the learning without using KIT IPA. Means there is an influence of IPA KIT usage of science learning result in view of the scientific attitude of the student of class VIII SMP Negeri 3 Kasihan Bantul academic year 2016/2017.

References

- Abdul Majid. (2013). *Strategi Pembelajaran*. Bandung : PT Remaja Rosdakarya
- Citron Payu dan Ahmad Zainuri. (2015). *Pelatihan KIT IPA Bagi Guru-Guru Sekolah Dasar di Kecamatan Kwandang Kab. Gorontalo Utara*.
- Desi Nur Anisa. (2013). Pengaruh Model Pembelajaran Poe (*Predict, Observe, And Explanation*) Dan Sikap Ilmiah Terhadap Prestasi Belajar Siswa Pada Materi Asam, Basa Dan Garam Kelas Vii Semester 1 Smp N 1 Jaten Tahun Pelajaran 2012/2013. (Vol.2 Nomor 2). Hlm: 17-23.
- Endang Komara. (2014). *Belajar dan Pembelajaran Interaktif*. Bandung : Reflika Aditama
- I.M. Budiana, I.B. Suryamanuaba, & I.N. Suadnyana. (2016). Model Project Based Learning Berbantuan Media KIT IOA Meningkatkan Hasil Belajar IPA. e-Jurnal PGSD. 4 (1). 1-12

- Khikmatiar Juanita Abdilah. (2016). *Penggunaan Alat Peraga KIT Sains pada Pembelajaran Ilmu Pengetahuan Alam di MI Negeri Karang Sari Kecamatan Kembaran Kabupaten Banyumas Tahun Pelajaran 2015/2016*. Purwokerto : IAIN
- Lilis Indayani. (2015). *Peningkatan Prestasi Belajar Peserta Didik Melalui Penggunaan Media KIT IPA di SMP Negeri 10 Probolinggo*. Jurnal Kebijakan dan Pengembangan Pendidikan. (Vol.3 Nomor 1). Hlm: 54-60.
- Ngayu Khodijah. (2014). *Psikologi Pendidikan*. Jakarta : PT Raja Grafindo Persada
- Slameto. (2013). *Belajar dan Faktor-Faktor yang Mempengaruhi*. Ed. Rev. Jakarta : Rineka Cipta
- Sugiyono. (2013). *Metode Penelitian Pendidikan Pendekatan Kuantitatif, Kualitatif, dan R&D*. Bandung : Alfabeta
- Suharsimi Arikunto. (2013). *Dasar-dasar Evaluasi Pendidikan Edisi 2*. Jakarta : PT Bumi Aksara
- Zainal Arifin. (2013). *Evaluasi Pembelajaran Prinsip Teknik Prosedur*. Bumi Siliwangi : PT Remaja Rosdakarya