Effectiveness of Direct learning on IPA Learning

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Article Info	Abstract
	The Direct learning *model was one of the learning models commonly used in science education; however, it was considered less effective and resulted in monotonous learning. This study aimed to analyze the effectiveness of the* Direct learning *model in science education. The research was conducted at Muhammadiyah Private Junior High School 1 Medan using an experimental method with a pre-experimental design model of the one-shot case study type. The results of the study showed that* Direct learning *was not effective for science education, as the calculated t-value of 0.519 was smaller than the t-table value of 1.697. The ineffectiveness of* Direct learning *was due to its teacher-centered nature, which was unsuitable for science education that required students to be active in the learning process. Therefore, the* Direct learning *model was not suitable for application in science education.*

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1. INTRODUCTION

Science learning is learning related to the existence of science, phenomena, scientific facts, and scientific attitudes [1]. Science learning must be adapted to the characteristics of 21st century learning. 21st century learning is learning that is not only oriented towards learning material, but also refers to students' skills in applying, solving problems, thinking critically and innovating [2]. 21st century learning is learning that places more emphasis on student-based learning or better known as student-centered, in accordance with the independent curriculum which places more emphasis on student-centered learning [3].

The learning model is a learning component that occupies a very important position. A learning model is a plan or pattern in learning that is used as a learning designer in a class [4]. The learning model is one of the main indicators of success and improvement in student learning outcomes [5], [6]. The learning model is one part or component of learning that must be adapted to 21st century learning, where students are the center of attention in the learning process [7]. However, in reality there are still many teachers who use the Direct learning model.

Direct learning model is a learning model where the teacher provides learning material directly to students in a structured manner, this model makes the teacher the center of learning [8]. This learning model uses techniques and methods of transferring information directly to students, such as through lectures, demonstrations, questions and answers, etc. Direct learning model is a model that is generally often used by teachers in science learning. Direct learning model is a learning model that is not suitable to be applied in the 21st century, because this model integrates teacher-centered learning while the 21st century places more emphasis on how students construct their own knowledge [9], [10]. The results of research conducted by Sitio et al (2021) state that the Direct learning model makes students' science process skills low, because this model rarely provides opportunities for students to be able to build their knowledge independently.

This research aims to analyze the effectiveness of Direct learning model on student learning outcomes in science learning. This research focuses on the extent to which Direct learning can

improve understanding of the material, especially the development of various other innovative learning models

2. RESEARCH METHOD

This research uses experimental research methods using pre-experimental design with a plan one shot case study. Pre-experimental design is an experimental method that uses one class group that has been given a treatment [12]. One shot case study is a research design where only one treatment is carried out and then it is estimated that it will have an effect after a test is carried out [13]. Design pre-experimental design with a plan one shot case study presented in table 1.

Table 1. Research Design *One shot case study*

Group	Time →	
Group 1	Tx	Obs

Information:

Tx   : *Treatment* or treatment

Obs   : *Observation* or assessment

This research was conducted at Muhammadiyah 1 Medan Private Middle School in a class of class VII students studying the subject of heat temperature and expansion. The population used in this research was class VII at Muhammadiyah 1 Medan Private Middle School. The sample used in this research was class VII at Muhammadiyah 1 Medan Private Middle School. The sampling technique uses Engineering *Purposive Sampling,* this technique is a sampling technique with special treatment. [14].

The instrument used in this research was a test instrument for student learning outcomes on heat temperature and expansion material. Student learning outcomes can be declared good if the value exceeds or is equal to the Learning Goal Achievement Criteria (KKTP). Standard KKTP at Muhammadiyah 1 Medan Private Middle School if the score is > 75. Based on this, the following hypothesis can be formed:

H_0 : Direct learning is effective in increasing the average value of student learning outcomes

H_a : Direct learning is not effective in increasing the average value of student learning outcomes

Data analysis uses the T test with one sample T test, whereas to carry out this test homogeneous data is required. So, a homogeneity test is needed as a prerequisite test for the T test.

3. RESEARCH RESULTS AND DISCUSSION

3.1.Research result

Results of description analysis in the experimental class after applying the Direct learning model presented in the table.

Table 2. Analysis of Description Results

No	Statistics	Mark
1	Maximum Score	98,00
2	Shoes Minimum	48,00
3	Number of Values	2376,00
4	Rate-Rata	76,65
5	Variance	181,04
6	Standard Deviation	48,00

Normality Test

The normality test acts as a requirement to be able to carry out further hypothesis testing. Normality tests need to be carried out to determine the level of normal distribution in research sample class data [15]–[17]. The normality test used is Shapiro-Wilk which uses a significance level of 0.05. If the significance is > 0.05 then it can be concluded that the data is normally distributed, conversely if the significance value is < 0.05 then it can be concluded that the data is not normally distributed and the data cannot be analyzed further. The results of the normality test are presented in table 3.

Table 3. Shapiro-Wilk Normality Test Results

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Hasil_belajar	.138	31	.142	.965	31	.401

a. Lilliefors Significance Correction

The normality test results show a significance value of 0.142. The normality test results obtained are greater than the specified significance level, in other words sig > 0.05. So it can be said that the sample class data is normally distributed data.

Hypothesis Testing

The hypothesis is tested via the t test, namely the one *sample t test* which is a single t test carried out to determine whether the average results of the collected sample data are different from the predetermined data [18], [19]. The specified data is worth 75 which is the KKTP standard. Test results *one sample t test* presented in table 4.

Table 4. One sample t test result

One-Sample Test

	Test Value = 75					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Hasil_belajar	.519	30	.608	1.25806	-3.6940	6.2101

Test results *one sample t test* shows that the significance value is 0.608>0.005, which means the significance value is greater than the significance level. The t count results show a value of 0.519. To find the t table in a two-sided test, the t used is $t_{0,025}$ on df 30 as in table 4. The calculated t table is obtained through the t value distribution table, the t table value obtained is 1.697. Based on the results of the analysis, it was found that $t_{count} < t_{table}$, in other words H_0 rejected and H_a accepted. In other words, it can be concluded that the learning model of Direct learning is not effective when applied to science learning.

3.2. Discussion

The test results concluded that Direct learning is not effective when applied in science learning, this is of course caused by several things. Direct learning is a learning model that adheres to behaviorism learning theory [20]. This theory emphasizes changes in behavior and abilities, but what is between the two is not considered [21]–[23]. This theory makes students as absolute recipients and teachers as absolute givers. The application of behaviorism theory

is not suitable when applied to science learning which tends to make students more active, if applied this theory makes learning monotonous and boring [24].

a Direct learning *model* is a teacher-centered learning model, teachers can directly deliver material to students without the students' role in seeking knowledge. Generally, the methods used are the lecture method and the demonstration method. The lecture method is a method that is very often used by teachers, including in science learning. This method is a cheap method, because it does not require thorough preparation and is very easy to do. The lecture method is generally less popular with students. In accordance with the results of research conducted by Nisa'i et al (2022) which states that the lecture method in learning science can cause students to become bored, as a result student motivation becomes low and interest in learning science decreases. The demonstration method is quite effective when applied in science learning. However, the use of methods that do not vary causes learning to become saturated [26].

The Direct learning model also emphasizes how teachers deliver learning material in a raw manner [27]. This means there is no connection between the Direct learning model and 21st century learning which places greater emphasis on students' critical thinking and problem solving, creative thinking and innovation, communication and collaboration [28]. Students' critical thinking skills can improve if students can build their own knowledge, students can build their knowledge through experience and investigation [29]. Creative thinking is the ability to produce original ideas in order to solve a problem. It is impossible for students to produce new ideas if learning is only centered on the teacher [30]. The same thing is the case with other skills in the form of communication and collaboration which can be achieved if students are active and work together in learning [31], [32]. Based on the discussion above, it can be concluded that the Direct learning model is not suitable to be applied in the science learning process, because the learning process that takes place is not in accordance with the characteristics of 21st century learning which places more emphasis on student activity.

Another reason why the Direct learning model is less effective in science learning is because generally this model does not relate learning to everyday life, or better known as contextual learning [33]. Science learning needs to be linked to everyday life. Contextual learning can improve understanding of abstract concepts, help build the relevance of science, and increase student engagement [34]. The Direct learning model emphasizes memorization rather than understanding. The Direct learning model also makes students less likely to touch real problems, making it difficult for students to understand real problems [35].

4. CONCLUSION

Direct learning model is a learning model that is less effective when applied in science learning. Direct learning is a teacher-centered learning model, so it is not suitable when applied in science learning which tends to make students more active. Direct learning generally using lecture methods and demonstration methods which are less effective when applied to science learning. Direct learning is also not in accordance with the learning process in the 21st century. This model places more emphasis on teachers providing knowledge, while the 21st century learning model emphasizes student activity.

5. ACKNOWLEDGEMENT

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