Implementation of the IDEA Learning Model (Issue, Discussion, Establish, and Apply) with the Quasi Experiment Method for Understanding Concepts in the Basic Programming

Subject Matter for Class X at SMK Negeri 1 Suwawa

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ABSTRACT

Arithmetic and Logic Operations is one of the materials in the Basic Programming subject which aims to create a program by applying arithmetic and logical operations, this material emphasizes students to understand programming concepts to achieve learning goals [1]. But in reality, students tend to be passive resulting in students tend not to understand the concept. The purpose of this study was to determine the effect of the IDEA learning model on understanding concepts in Arithmetic and Logic Operations material in class X TKJ SMK Negeri 1 Bulango Selatan [3]. This study uses the Quasi Experiment research method with the type of Time Series research. This research was conducted at SMK Negeri 1 Bulango Selatan with 35 students in class X TKJ as research subjects [2]. Data processing techniques are Normality Test and Hypothesis Test with the help of the SPSS Version 22.0 program. The normality test with the Shapiro-WIlk test shows that the data has a significant value > 0.05 in other words that the data is normally distributed, then proceed with hypothesis testing using the paired samples t test formula with a significant value (2-tailed) < 0.05 which means that ha is accepted, and ho is rejected. The results of the study show that there is an influence of the IDEA learning model on conceptual understanding.

Keywords: *IDEA learning model, Arithmetic and logic operations, Concept understanding.*

1. INTRODUCTION

Basic programming is one of the subjects included in the expertise program basic subject group (C2) in the competence of Computer and Network Engineering expertise, according to references from the Regulation of the Director General of Elementary and Secondary Education Number 464/D.D5/ RK/2018. One of the topics taught in basic programming is arithmetic and logic operations [14]. The purpose of this lesson is to teach students to create programs by implementing arithmetic and logical operations.

This material places a significant emphasis on understanding programming concepts so that learning objectives can be achieved. Based on the results of observations in class X TKJ SMK Negeri 1 Suwawa, there is an application of conventional learning methods with a lecture approach (teacher-centered) in basic programming subjects. The teacher-centered learning model is an approach in which the teacher's role is very dominant in the teaching and learning process, which results in students being passive and only acting as listeners. In addition, on several occasions, the teacher only gave material to students to record without providing adequate explanation. As a result, students tend to feel bored and have difficulty understanding the concepts taught in the subject matter.

The solution to overcome the above problems is to apply a learning model that aims to increase understanding of the concept. One learning model that can be used to improve understanding of concepts is the IDEA learning model (Issue, Discussion, Establish, and Apply) [9]. The IDEA learning model is an idea-based learning model with the aim of increasing and developing conceptual understanding [5]. Based on research conducted by Setiawan (2020) the practicality

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of the IDEA learning model in learning makes students interested in understanding the material because they don't just listen, students also have group discussions and presentations. So it is hoped that the IDEA learning model will effectively influence conceptual understanding.

2. METHOD

This research was conducted at SMK Negeri 1 Suwawa which is located on Jl. Deki, Huntu Barat Barat Village, Kec. Suwawa, Kab. Bone-Bolango. The time for conducting the research is in the odd semester of the 2022/2023 academic year.

In this study, the approach used was a quasi-experimental quantitative approach with a form of research design, namely Time Series Design [15]. In this design only use the experimental class without class. control. Classes are not randomly selected. The following describes the structure of the time series design in table 1

Table 1. Design Time Series.

Pretest	**Action**	***Posttest***
O1O3O5	X	O2O4O6

Information:

O1O3O5 = result of assessment prior to special action

X = special actions, namely applying the IDEA learning model

O2O4O6 = result of assessment after special action

Before being given the action, the experimental class will be given a pretest three times to measure the situation and determine the stability of the experimental class. After that, special actions are given using the IDEA learning model. In the final stage, to measure the effect of the IDEA learning model, a post-test was given.

The research design is designed to provide clear direction for the objectives to be achieved in the research. If the research objectives are clear and well designed, the research will go well.

The steps taken in this study can be seen in Figure 1.

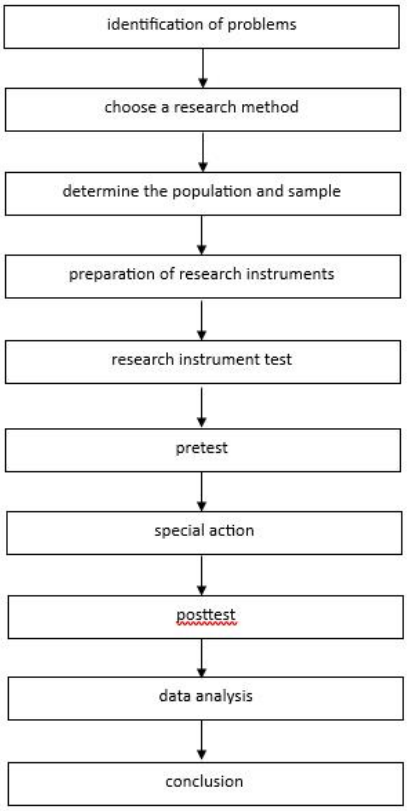

Figure 1 Research Stages.

3. RESULT AND DISCUSSION

The following are some of the research instruments that will be used:

3.1. Pretest and post-test instruments

This research instrument was used to measure students' understanding of concepts before and after the action was taken. The pretest was conducted to measure students' initial abilities before the IDEA learning model was applied. After applying the IDEA learning model, a post-test will be given. Post-test conducted to measure the final ability of students [10].

The form of the test instrument given is in the form of a written essay test. The form of the description test can determine students' ability to understand questions and understand concepts. The preparation of the test is carried out by compiling a grid of questions based on the indicators of the ability to understand the concepts presented in table 2.

Table 2. Lattice of indicators of ability to understand concepts

No	Concept understanding indicator	Question Item Number	
		Pretest	Post-test
1	Restating a concept	1,2	1,2
2	Classify objects according to their nature or according to their concept	4,5	4,5
3	Give examples and non-examples of a concept	3	3
4	Presenting concepts in various forms of representation	7	7
5	Develop sufficient terms of a concept	8	8
6	Using, utilizing, and selecting certain procedures or operations	6	6
7	Applying concepts or solving problems	9,10	9,10

3.2. Validity and Reliability

The validity test carried out in this study was construct validity by using the opinions of experts (judgment experts) [4]. After the research instruments were arranged according to the indicators to be measured, then the research instruments were consulted with experts. After consulting with experts, the instrument was then tested on respondents outside the sample [8]. The research instrument was tested on students at SMK Negeri 1 Suwawa with a total of 31 students [11].

After obtaining trial data that has been distributed to 31 respondents, the next step is to test the validity of using the product moment formula. The test is carried out by correlating the score of the statement items with the total score of the variables using the following formula:

$$r_{hitung} = \frac{n(\Sigma XY)-(\Sigma X).(\Sigma Y)}{\sqrt{\{n.\Sigma X^2-(\Sigma X)^2\}.\{n.\Sigma Y^2-(\Sigma Y)^2\}}} \quad (1)$$

Information:

= Correlation coefficient Product Moments

n = Number of respondents

X = Score of each respondent variable x

Y = Score of each respondent variable x

XY = Product of variables X and Y.

Testing the validity of the questions in this study used the product moment correlation which was analyzed using the SPSS 22.0 program [4].

3.3. Reliability Test

$$r_{11} = \left[\frac{k}{(k-1)}\right]\left[1-\frac{\Sigma\sigma^2 b}{\sigma^2 t}\right] \quad (2)$$

Information:

r11 = reliability coefficient alpha

k = number of question items

= number of item variants

= total variance.

If alpha > 0.90 then the reliability is perfect. If the alpha is between 0.70 - 0.90 then the reliability is high. If the alpha is 0.50-0.70 then the reliability is moderate. If alpha < 0.50 then the reliability is low. If alpha is low, it is likely that one or more items are unreliable.

3.4. Research Results

3.4.1. Validity test

The purpose of instrument validation is to measure the precision and accuracy of a measuring instrument (research instrument). The decision criterion is that the question items will be said to be valid if the validity index value is $\geqslant$ 0.4. Calculation of the validity of the questions in this study using the SPSS 22.0 program with product moment formula. The results of the content validity test of the test instrument can be seen in Table 3.

Table 3. Validity test

Question No.	R count	table	onclusion
1	0.740	0.4	Valid
2	0.441	0.4	Valid
3	0.483	0.4	Valid
4	0.466	0.4	Valid
5	0.492	0.4	Valid
6	0.451	0.4	Valid
7	0.420	0.4	Valid
8	0.425	0.4	Valid
9	0.867	0.4	Valid
10	0.641	0.4	Valid

3.4.2. Reliability Test

Reliability indicates the extent to which the measurement is consistent in its measurement. Calculation of reliable instruments using the SPSS 22.0 program withinternal consistency reliability method using Cronbach Alpha reliability coefficient [12]. The results of the test instrument reliability test can be seen in Table 4.

Table 4. Reliability Test

Cronbach's Alpha	N of Items
,702	10

3.4.3. Normality test

Table 5. Normality test

	Class	Kolmogorov-Smirnova			Shapiro-Wilk		
		Statistics	df	Sig.	Statistics	df	Sig.
Learning outcomes	pretest	,138	20	,200*	,975	20	,853
	posttest	,120	20	,200*	,952	20	,402

. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

3.4.5. Concept Understanding

Students' understanding of the concept of arithmetic and logical operations taught using the IDEA learning model can be seen by analyzing the averages obtained in the pretest and posttest. The following is the average value of students' understanding of the concept.

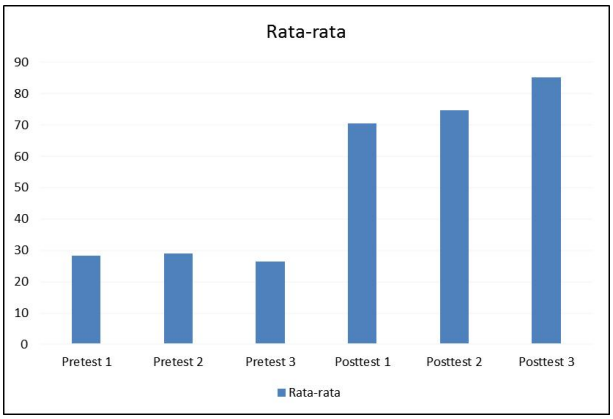

Figure 2 Average students' conceptual understanding of arithmetic and logic operation material.

Based on the picture above, the average value of students in pretest 1 = 29.75, pretest 2 = 29.25, pretest 3 = 27.55. After that, treatment 1 was carried out, the results of posttest 1 = 70.85, after that the second treatment was carried out and the average value of posttest 2 = 76.1 was carried out, and then the third treatment was carried out and the results of the average value of posttest 3 = 85.6.

3.4.6. Student Response

Students' responses to the IDEA learning model can be seen from the average responses of students who chose strongly agree (SS), agree (S), disagree (TS), strongly disagree (STS) [13]. The average student response to the IDEA learning model can be seen in table 6.

Table 6. Student response questionnaire recapitulation

Aspect	Percentage	Average Percentage	Criteria
Enthusiasm in participating in learning	76.1%	78.81%	Strong
Foster creativity and innovation	80%		
Makes it easy to understand the concept	79.52%		
Collaborate on discussions	77.85%		
Interest in learning	80.59%		

4. CONCLUSION

Based on the results of research and analysis of data regarding the effect of the IDEA learning model on material for arithmetic and logical operations at SMK Negeri 1 Suwawa that the results of the t test show that a significant value (2-tailed) is 0.000 <0.05, meaning that Ha is accepted and H0 is rejected or it can be concluded that the IDEA learning model influences the understanding of concepts in the material of arithmetic and logic operations in class X TKJ SMK Negeri 1 Suwawa. In addition, the results of the student response questionnaire analysis showed a positive response to learning with the IDEA learning model.

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