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The Effect Of The Application Of The Problem-Based Learning Model On The Critical Thinking Skills Of Grade X Students Of Sma Negeri 1 Kupang

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Abstract: *This study aims to examine the Effect of the Application of the Problem Based Learning Model on the Critical Thinking Ability of Grade X Students of SMA Negeri 1 Kupang. This research uses quantitative research methods with the type of research and research design Quasy Experimental Design or commonly referred to as pseudo-experiments with pretest-posttest control design research design, this research has two groups as research subjects, namely experimental class and control class. The respondents of this study were students of grade X A and X B SMA Negeri 1 Kupang. Sampling using simple random sampling. The data obtained is in the form of pretest-posttest values. This study used data collection techniques in the form of test techniques in the form of multiple-choice questions and documentation. The data was analyzed using SPSS version 26 to see the normality test and homogeneity test as a prerequisite test then continued with the t test. The results of this study show several things as follows: First, in the normality test (kolmogorov-Smirnov test) in the experimental class, namely the sig values of 0.200 and 0.113 while the control class of 0.165 and 0.119 by looking at the basis of decision making in the normality test of the two classes has a sig value of >0.05, then the data is normally distributed. Second, the homogeneity test for both classes, obtained a value of 0.768 > 0.05 by looking at the existing decision-making basis, in the homogeneity test the data is homogeneously distributed (the same). Third, the t-test using the independent test formula of the t-test sample obtained a value of t = 3.366 with a Sig. (2-tailed) value of 0.001 < 0.05.*

Keywords: *Problem-Based Learning, Critical Thinking, Effect, Application, Students*

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I. Introduction

Education is a process to develop personality, the ability to prepare competitive human resources in facing the development of the globalization era. In addition, education also plays an important role in shaping the character of reliable human resources. For this reason, the implementation of formal education must be adapted to the development and demands of development that require the type of expertise and skills. In Law No. 20 of 2003 concerning the national education system, article 3 paragraph 1 explicitly states that. "National Education functions to develop the ability and shape the character and civilization of a dignified nation in order to educate the nation's life, aiming to develop the potential of students to become people who believe and fear God Almighty, have noble character, healthy, knowledgeable, capable, creative, independent, and become democratic citizens as well as being responsible."

Based on Article 3 paragraph 1 places education as a guideline in realizing quality human resources. If the functions and objectives of the above education can be realized, then the autcome of the education is ensured to have high competitiveness and fighting power and have the ability skills needed in the era of globalization. The purpose of this national education is expected to be able to produce human resources who have the ability to communicate, work productively, have life skills to determine work priorities, self-evaluation, time management and problem solving according to skill needs in the 21st century. One of the government's efforts in advancing the world of education is to make curriculum changes.

The implementation of digital era education makes students become active learners rather than passive learners. The results of the Ministry of National Education's identification of the objective conditions of learning in schools today show problems including: (1) many students are able to present a good level of memorization of the material lessons he received, but in reality did not understand them; (2) most students are unable to make the connection between what they learn and how that knowledge will be used; and (3) students have difficulty understanding learning concepts as they are usually taught, namely by using something abstract with the lecture method (Taufik, et, al. 2010:32).

PPKn learning has been seen as boring and less fun learning so that students are less interested in learning it. Therefore, one of the efforts to improve the quality of learning is that teachers must be able to facilitate students in the learning process that leads to creative learning as an activity which has existed in the discourse of improving the quality of learning in the 21st century. In line with Langgar's research (2021) that teachers are the heart of the learning process. In that sense, teachers are required to always spur (guide and facilitate) each student to have activeness in understanding the qualities and potentials of students. One of the abilities expected in 21st century learning is critical thinking, so critical thinking is the main factor in PPKn learning.

Critical thinking is a method about scientific inquiry, namely: giving simple explanations, building basic skills, drawing conclusions, giving further explanations, and organizing strategy and tactics. Included in critical thinking is grouping, organizing, remembering and analyzing information. Critical thinking contains the ability to read with comprehension and identify the material needed with it can apply the problem-based learning model so that students' critical thinking can be measured.

The Problem Based Learning learning model is one of the recommended models in the 2013 curriculum learning, which helps students to think higher-order. In bloom Anderson & Krathwohl's taxonomic theory (2010: 24) that the difference between the Problem Based Learning learning model and other learning models is in learning outcomes. As it is understood that in the use of the Problem Based Learning learning model students are expected to be able to provide solutions to the problems given. While other learning models such as Discovery Learning which is learning that is not delivered as a whole, but students are asked to look for incomplete information without providing a solution to a problem.

The learning process using Problem Based Learning is a learning model that is carried out critically because students find problems, interpret problems, identify factors of occurrence problem, identify information and find strategies needed to solve problems (Ministry of Education and Culture, 2012). The use of the Problem Based Learning learning model is not only the presentation of a large number of facts to students, but also on the development of students' ability to think critically, solve problems and develop his knowledge. To be able to find solutions to these problems, students are required to find the data and information needed from various sources. The goal is that students are able to find solutions to problems or can solve problems that are being discussed critically and systematically and are able to draw conclusions based on understanding they (Trianto, 2007).

Farisi's research (2017) that the main purpose of the PBL model (problem-based learning) is the development of critical thinking skills and problem-solving skills, as well as developing the ability of students actively build up his own knowledge. Taty & Peter's research (2020) that the problem-based learning model, in the first phase, is orientation to students where students are given problems to actively think about problems that given.

Based on pre-observations conducted by researchers at SMA Negeri 1 Kupang, that this high school is one of the favorite schools and driving schools in Kupang City which has implemented The curriculum is independent, while the application of the problem-based learning model has been applied to some teachers but in the steps or syntax of problem-based learning cannot be applied all syntax, so that students' critical thinking skills cannot be measured properly, especially PKN subjects . This is due to the lack of teacher creativity in encouraging students to think critically in solving various problems related to learning material. In line with Bani's research (2021) that teachers should create creative learning, such as interactions between students and teachers, students and other students. In addition, students are encouraged to study various learning literature for the realization of quality learning. Therefore, one alternative to overcome the problem of learning quality is to apply innovative learning models and methods.

Based on the study of problems in this background and some previous research, the author feels the need to conduct research on "The Effect of the Application of Problem Based Learning Models on Ability Critical Thinking of Class X Students of SMA Negeri 1 Kupang".

Based on the formulation of the problem above, the objectives of this study are: To determine the effect of the application of the Problem Based Learning model on the critical thinking ability of grade X students of SMA Negeri 1 Kupang

II. Literature Review

No	Researcher Name/Year/Title	Similarities and Differences	Purpose of Pnelitian	Information
1.	Nurhayati Research (2019) the influence of *the problem-based learning* model on critical thinking skills on higher-order thinking skills in IKIP PGRI Pontianak students	The equation that previous researchers and researchers do now is that they both examine problem-based learning models, critical thinking skills. The difference from this study is that previous researchers examined the influence of *problem-based learning* models, critical thinking skills on higher-order thinking skills in IKIP PGRI Pontianak students while researchers are now researching the effect of applying the *problem-based learning* model on the critical thinking skills of Bhineka Tunggal Ika, grade X students of SMA Negeri 1 Kupang	This study aims to determine the effect of the application of problem-based learning models, critical thinking skills and their interaction on students' higher-order thinking skills on optical material	Journal
2.	Ikrimah Research (2018) the influence of *the problem-based learning* (PBL) learning model on metacognitive skills and critical thinking of grade IX students of SMA Kusan Hilir District	The similarity done by previous researchers and researchers now is that they both examine *the problem-based learning* model. The difference from this study is that previous researchers examined the effect of *the problem-based learning* (PBL) learning model on metacognitive skills and critical thinking of grade IX students of SMA Kecamatan Lower Kusan. Meanwhile, researchers are now examining the effect of the application of *problem-based learning* models on critical thinking skills	This study aims to determine the effect of the Problem Based Learning (PBL) model on metacognitive skills and critical thinking of grade XI high school science students of Kusan Hilir District	Journal
3.	Paradina Research (2019) the influence of the *Problem Based Learning* learning model on student learning outcomes in grade X of SMA Negeri 10 Bengkulu.	The equation done by previous researchers and researchers now is that they both examine the influence of problem-based learning models. The difference from this study is that previous researchers focused more on student learning outcomes, while researchers now examine how students' critical thinking skills in material. Bhineka Tunggal Ika instudents	This study aims to explain the effect of the application of the Problem Based Learning based learning model on student learning outcomes	Journal

4.	Ningsih Research (2019) The influence of the *problem-based* learning model on the *learning* outcomes of grade VIII students of SMP Negeri 2 Ternate City on the concept of motion.	The similarity done by previous researchers and researchers now is that they both examine *the problem-based learning* model. The difference in the study is that previous researchers examined the influence of the *problem-based* learning model on the learning outcomes of grade VIII students of SMP Negeri 2 Ternate City on the concept of motion, while Researchers are now examining the effect of the application of the *problem-based learning* model on the ability to think critically of Bhineka Tunggal Ika material in grade X students at SMA Negeri 1 Kupang	This study aims to find out 1). The influence of the *Problem Based Learning* Model on student learning outcomes on the concept of motion. 2). The Great Influence of the *Problem Based Learning* Model on student learning outcomes on the concept of motion in SMP Negeri 2 Ternate City	Journal
5.	Sani Research (2020) about the comparison of problem solving and *problem-based learning* models on the critical thinking skills of grade XI IPA MAN 2 students in Bengkulu City	The similarity of research conducted by previous researchers and current researchers is that they both examine *problem-based learning* models on critical thinking skills. The difference between previous researchers and current researchers is that previous researchers examined the comparison of problem solving and *problem-based learning* models on students' critical thinking skills, while researchers are now researching the effect of applying the *problem-based learning* model on the ability to think critically of Bhineka Tunggal Ika material.	This study aims to determine the comparison of the use of Problem *Solving* (PS) and *Problem Based Learning* (PBL) learning models on students' critical thinking skills on buffer solution material	Journal

III. Methods

This research uses an experimental method. According to Sugiyono (2012), the experimental method is a research method used to look for the effect of certain treatments on others under controlled conditions. Nana (2010), states that experimental methods are divided into 4, namely, pure experiments (true experiments), quasi-experimental experiments (quasi-experimental), weak experiments (weak experimental), and subject experiments single. This research is a quasi-experimental research consisting of two research groups, namely the experimental class by applying *the problem-based learning* model and the control class conduct learning as usual.

1. Time and Place of Research

This research was conducted at SMA Negeri 1 Kupang for the 2022/2023 academic year. Jalan Cak Doko No. 59, Oetete, Oetete Village, Oebobo District, Kupang City.

2. Population and Research Sample

Population

Population is the whole Reseacrch Subject (Arikunto, 2010). The population in this study is students of class X SMA Negeri 1 Kupang which consists of two classes, namely class X A and X B. The population of the two classes is 72 students.

Sample

While sampel is the smallest part of the population member area taken to represent the existing population (Arikunto, 2010). The sampling method in this study is the same as Arikunto's opinion (2010) which states that if the object studied is less than 100 people, it should be taken all for research or made into samples. So the number of samples is equal to the number of populations. The sample in this study is the class x population of SMA Negeri 1 Kupang where the number of samples is equal to the total population of 72 students. This sample selection is by *simple random sampling* technique. Details are in table 1.

Table 1.1 number of students

NO	Class	Number of students
1.	X A Experiment	36 Students
2.	X B control	36 students

Source: Administration of SMA Negeri 1 Kupang

3. Variable Resecarh

The variables in this study are:

1 Independent variable (X)
The independent variable in this study is the application of the Problem Based Learning model

2 Dependent Variable (Y)
The dependent variable in this study is students' critical thinking skills.

3 Control Variables include:

a. The time needed in the teaching and learning process is controlled by equating the number of hours of lessons.
b. The lesson material provided is the same, namely taking Bhineka Tunggal Ika material.
c. Control teachers by setting their own researchers as teachers.

Research Design

Pretest-Posttest Control Design research design (Sugiyono, 2015). The design of this study is illustrated in table 3.1:

Table 3.1 *Pretest-Posttest Control Design*

Class	*Pretest*	Treatment	*Posttest*
Experiment	*O*	X_E	O
Control	*O*	-	O

(Source: Sugiyono, 2015)

Remarks:

X_E : Learning treatment by applying *a problem-based learning* model
\- : Untreated class
O : *Pretest* and *Post-Test* experimental class and control class

Data Collection Techniques

Test techniques

The test technique in this study uses *pretest* and *posttest* where the type of test is in the form of multiplechoice tests, while the instruments used are in the form of multiplechoice test questions.

Documentation

In this study, researchers will use photos, records of the process of conducting pretest and posttest tests in class X. This technique is carried out, because it is considered necessary and contributes as reinforcing data, because the form is physical, for example like test results in class, which is in the form of documents.

Research Procedure

This research procedure consists of three stages, including the preparation stage, the implementation stage and the final stage.

Preparatory Stage

1) Prepare teaching modules, Learning Implementation Plans
2) Developing research instruments in the form of pretest and posttest questions to measure students' critical thinking skills according to Bloom's taxonomy or six cognitive domains, namely: C1: Remembering, C2:

Understanding, C3: Applying, C4: Analyzing, C5: Evaluating, C6: Creating.

The test instrument for students' critical thinking skills before being used is analyzed first to find out:

1 The validity of the questions

The validity of the question is the suitability between the question and the material that has been taught. The equation used for the validity of multiple-choice items (Arikunto, 2010) is:

$$r_{xy} = \frac{n\sum xy - (\sum x)(\sum y)}{\sqrt{\{n\sum x^2 - (\sum x)^2\}\{n\sum y^2 - (\sum y)^2\}}}$$

Remarks:

x : Score Item/Question Item
n : Number of Respondents
y : Total Score
y^2 : Number of squares of question item scores
r_{xy} : A correlation number that expresses the validity of the problem.

Source: 2023 data processing by *researchers (SPSS version 26)*

Based on the results of the validity test using SPSS version 26 with the *Pearson Product Moment* test obtained from 20 question points, the result for an invalid item is item number, 13. So out of the 20 questions made, there was 1 invalid question item, so the invalid data was deleted.

a) Question Reability

A reliable instrument that, when used multiple times to measure the same object, will produce the same power. Instrument reliability is a requirement for testing instrument validity because reliability is an instrument that can be trusted to be used as a data collector because the instrument already good. If asked if it is true in accordance with reality, then no matter how many times it is taken, the result will still be the same. The question items have been tested validly followed by reliability testing *of Cronbach's Alpha* technique greater than $r_{critical}$ *product moment* at a significant level of 5% then it can be said items of reliable research instruments (Arikunto, 2010). Reliability test in this study using *SPSS software application version 26*.

Cronbach's alpha formula:

$$r_{11} = \left(\frac{k}{k-1}\right)\left(1 - \frac{\sum \sigma_b^2}{\sigma_t^2}\right)$$

Source: Arikunto (2010)

Description:

r_{11} : Instrument reliability
K : Number of question items
$\sum \sigma_b^2$: Number of grain variants
σ_t^2 : Total variance

The instrument criteria are said to be reliable if, the reliability coefficient > 0.60 (Sugiyono 2010). To interpret the alpha coefficient (r11) according to (Arikunto 2010) categories are used:

Between 0.800 and 1.00 : very high
Between 0.600 and 0.800 : height
Between 0.400 and 0.600 : enough
Between 0.200 and 0.400 : low
Between 0.000 and 0.200 : very low

Table 3.3 Reliability Test Results

Reliability Statistics	
Cronbach's Alpha	N of Items
.706	20

Source: Processing by researchers 2023 (SPSS version 26)

Based on the reliability test above, the calculation results obtained, that the value of *Cronbach's Alpha* on the variable The effect of applying the *problem-based learning* model is 0.706 and the variable is said to be reliable and can be used in research because of the value of "*Cronbach's Alpha* 0.706 > 0.600". (Sugiyono 2010).

In the implementation stage the researcher gave treatment to the experimental class by applying the problem-based learning model and to the control class by applying the problem-based learning model. The material presented during the treatment was Unity in Diversity. After completing all the study materials, both classes were given a final test to see students' critical thinking skills.

4. Final Stage

In this stage the researcher analyzed the scores to see students' critical thinking skills.

5. Data analysis techniques

A statistical analysis is usually used to test whether a hypothesis is rejected or accepted. In this study, the data obtained was in the form of quantitative data, so it had to be analyzed using statistical equations using the IBM SPSS version 26 software application program. The statistical tests used were the initial ability test of the sample, homogeneity test and normality test.

6. Prerequisite Analysis Test

To analyze the data obtained in this study, a prerequisite analysis test was carried out which aims to test the feasibility of testing the hypothesis. The prerequisite test in question is:

Normality Test

This normality test is to find out or test whether the independent variable and the dependent variable or both in the regression model have data that are normally distributed or not. This means that a good regression is data that is normally distributed. This normality test uses the Kolmogorov-Smirnov test formula, with the criteria used. If the significance value is <0.05, the conclusion is not normally distributed, if the significance value is > 0.05, the data is normally distributed. Normality testing can be done using the help of the IBM SPSS version 26 software program.

Homogeneity Test

Homogeneity test is used to show that two or more groups of sample data come from populations that have the same variation. The homogeneity test was applied to the pre-test and post-test of the experimental group and the control group. To measure the homogeneity of the variance of the two data groups, the F test formula is used as follows:

$$F = \frac{The\ Largest\ Variant}{The\ Smallest\ Variant}$$ *Source: Sugiyono (2013)*

The significant level used is a = 0.05. The homogeneity test uses SPSS with criteria used to conclude that if F is greater than F in the table, it has a homogeneous variant. However, if F is greater than F in the table, then the variance is not homogeneous.

IV. Results

1. Research Site Overview

This research was conducted at SMA Negeri 1 Kupang, Jalan Cak Doko No. 59, Oetete, Oetete Village, Oebobo District, Kupang City. SMA Negeri 1 Kupang is one of the favorite schools and driving schools in Kupang City, East Nusa Tenggara Province.

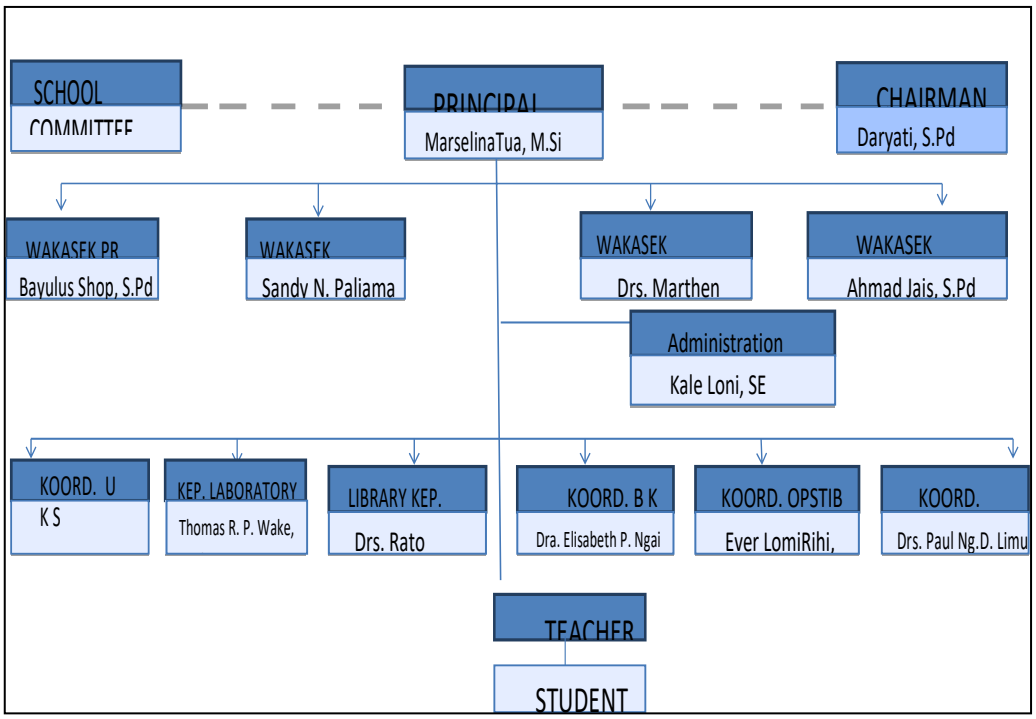
1. School Identity:
    1. School Name : SMA Negeri 1 Kupang
    2. NPSN : 50304931
    3. Education Level : High School
    4. School Status : State
    5. School Address : JL. CAK DOKO NO. 59

    RT/RW: : 14/4
    Postal Code : 85110
    Village : Oetete
    Subdistrict : Oebobo
    District/City : Kupang City
    Province : Prov. East Nusa Tenggara

Country : Indonesia
Geographical Position :-10 Latitude 123 Longitude

2. Supplementary Data:
   School Establishment Decree : Ministry of Education and Culture of the Republic of Indonesia No. 0236/1973
   Date of Establishment Decree : 1950-11-15
   Ownership status : Local Government
   Operational License Decree : 422/SMAN 1/278/09/2020
   Date of Operational License Decree : 2020-09-07
   Special Needs Served : None
   Account Number : 02001.07.000202-3
   BANK Name : BANK NTT
   KCP/Unit Branch : CAPEM MAYOR
   Account in Name : SMA NEGERI 1 KUPANG
   MBS : Yes
   Land Size (m2) : 1
   Area of Non-Owned Land (m2) : 150000
   Taxpayer Name : SMA NEGERI 1 KUPANG
   NPWP : 001245877922000
3. School Contact:
   Phone Number : 380821684
   Fax Number : 380821684
   Email : infosman1.kupang@gmail.com
   Website : http://www.sman1kupang.sch.id
4. Periodic Data:
   Holding Time : Combination
   Willing to accept the boss? : Willing to Accept
   ISO Certificate : 9001:2000
   Power Source : PLN
   Electric Power (watts) : 33000
   Internet Access : Telkom Speedy
5. Other Data:
   Principal : Dra. Old Marselina.,M.Si
   Data Collection Operator : YOSEFINA LERY AFRIN
   Accreditation : A
   Curriculum : Curriculum 2013 and Curriculum Merdeka
6. Vision, Mission and Goals:
   Vision:
   "Realizing school citizens who have a Pancasila Student Profile, literate, quality and competent towards the era of global competition"
   Mission:
   1) Improving faith, devotion, and noble morals of all school residents through the learning process and various religious activities.
   2) Creating a clean, beautiful, shady, comfortable and safe school environment.
   3) Cultivating basic literacy (literacy, numeracy literacy, scientific literacy, digital literacy, financial literacy, and civic literacy) through a HOTS-based, ICT-based learning process with various approaches and learning models.
   4) Developing the character of students through intracurricular, extracurricular activities and the Pancasila Student Profile Strengthening Project.
   5) Cultivate a positive culture of learning agreement and reflection as part of the learning process.
   6) Motivate and facilitate school residents with various competency improvement activities and social emotional intelligence.
   7) Establish cooperation with various government and private agencies, business entities, alumni, communities to work together to develop schools.
7. Organizational Structure of SMA Negeri 1 Kupang.

Table 4.1 Organizational Structure of SMA Negeri 1 Kupang



Source: Administration of SMA Negeri 1 Kupang.

Based on the school organizational structure above, each field has its own role. The organizational structure of the school is made so that all parties who join it will interact with each other in carrying out roles in accordance with the positions they have. The organizational structure of the school is very helpful in achieving the vision and mission that already exists in the school.

8. The State of Teachers and Students
   a. Teacher's Circumstances
      The overall condition of SMA Negeri 1 Kupang teachers is 94 people. There are 32 male teachers and 62 female teachers.
   b. Circumstances of Learners
      The condition of students at SMA Negeri 1 Kupang, in total, amounted to 1495 people. Where it consists of 666 students and 829 female students. The following data details are seen in the following table;

Table. 4.2 Student Jumalah Table

No	Class	L	P	Sum
1	X	209	257	466
2	XI	247	287	534
3	XII	210	285	495
Total		666	829	1495

Source: Administration of SMA Negeri 1 Kupang

Based on the table above, it can be seen that overall the students of SMA Negeri 1 Kupang amounted to 1495 people consisting of class X totaling 466 people, class XI totaling 534 people, and class XII totaling 495.

Referring to research in the field that has been carried out by researchers, and to describe the results of research as the main reference, the research data that has been collected and analyzed by researchers, including documentation data and test results are described as follows:

2. Analysis Test Results

In this study, there are four (4) prerequisite tests conducted to determine students' critical thinking skills, namely (Normality Test, Homogeneity Test), Hypothesis Test (t-Test Independent Sample t-test). Before conducting the testing phase, researchers present descriptive analysis data. The purpose of this descriptive

analysis is to make descriptive, drawing, or painting systematically, factually and accurately regarding the facts, properties and relationships between the phenomena investigated (Nazir, 1988).

Table 4.3 Results of Descriptive Analysis

Descriptive Statistics						
	N	Range	Minimum	Maximum	Mean	Std. Deviation
Pre-Test Experiments	36	35	50	85	65.69	9.270
Post-Test Experiments	36	30	70	100	86.11	7.938
Pre-Test Control	36	35	45	80	65.28	8.276
Post-Test Control	36	30	65	95	79.72	8.102
Valid N (listwise)	36					

Source:: Data processed by researchers with ibm SPSS software version 26.

After completing the elaboration of the descriptive analysis table, the researcher then conducts the testing stage of the data that has been obtained. Here are the testing steps.

Normality Test

The normality test aims to test whether the data is normally distributed or not. Meanwhile, the criteria for making normality test decisions are significant values, then the data is distributed normally, otherwise if the value is significant, the data $\geq 0,05$ is $\leq 0,05$ not normally distributed (Sugiyono, 2013). The normality test used is the *Kolmogorov-Smirnov test.*

Researchers use the help of *IBM* SPSS *version 26 software* in data processing on data normality tests that have been obtained by researchers on both groups (experimental class and control class) in the field. The results obtained by the researchers show that the data is normally distributed.

Table 4.4 Normality Test Results (Kolmogorov-Smirnov)

Tests of Normality							
		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Class	Statistics	Df	Sig.	Statistics	Df	Sig.
Kemampuan_Berpikir_Kritis_Siswa	Pre-Test Experiments	.113	36	.200*	.960	36	.220
	Post-Test Experiments	.132	36	.113	.952	36	.121
	Pre-Test Control	.126	36	.165	.960	36	.221
	Post-Test Control	.132	36	.119	.955	36	.148
*. This is a lower bound of the true significance.							
a. Lilliefors Significance Correction							

Source: Data processed by researchers through ibm software (SPSS version 26)

Based on the table showing the results of the nomality test above assisted by *SPSS version 26* shows the level of significance values obtained from the experimental class, namely 0.200 and 0.113 while in the control class 0.165 and 0.119, so that it can be concluded by looking at the basis for decision making in the normality test of the four test results, has a GIS value of > 0.05, so that the data It is said to be normally distributed.

Homogeneity Test

The homogeneity test carried out aims to determine whether a data variance from two or more groups is homogeneous (the same) or heterogeneous (not the same). For the significant level used is Or the level of the sig value > 0.05, then the data is homogeneously $\alpha = 0,05.$ distributed and if the sig value is < 0.05, then the data is not homogeneously distributed. Data processing researchers use the help of *IBM SPSS software version 26* in data processing on homogeneity tests obtained in the field. So that it can show the results of the data are homogeneously distributed in the experimental class and control class with the following values:

Table 4.5 Homogeneity Test Results

Test of Homogeneity of Variance					
		Levene Statistic	df1	df2	Sig.
Kemampuan_Berpikir_Kritis_Siswa	Based on Mean	.379	3	140	.768
	Based on Median	.329	3	140	.804
	Based on Median and with adjusted df	.329	3	137.877	.804
	Based on trimmed mean	.359	3	140	.783

Source: Data processed by researchers with ibm SPSS software version 26

Based on the homogeneity test output table above, it can show that the significance value that has been obtained in both classes, namely the experimental class and the control class, is 0.768. So it can be concluded by looking at the basis of decision making in the homogeneity test, the results of the two classes have a sig value level of 0.768 > 0.05, then the data is homogeneously distributed (same).

Independent Sample t test results

Independent sample t-test is a hypothesis test that aims to determine whether there is a significant difference between two independent samples. This t-test was assisted by *ibm SPSS software version 26.*

Table 4.6 Independent Sample t test results

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Kemampuan_Berpikir_Kritis_Siswa	Equal variances assumed	.000	.987	3.366	66	.001	6.580	1.955	2.677	10.483
	Equal variances not assumed			3.360	64.585	.001	6.580	1.958	2.668	10.491

Source: Data processed by IBM SPSS software researcher version 26.

Based on the results of the hypothesis test with an independent sample t-test test from the output table (table 4.6) above, a value of t = 3.366 was obtained with a value of Sig. (2-tailed) of 0.001 < 0.05, then Ho was rejected, Ha accepted. So it can be concluded that there is a significant difference in the application of the *problem-based learning* model to the critical thinking skills of experimental and control class students, meaning that There was a significant increase in learning after applying the *problem-based learning* model to the experimental class. So it can be concluded that there is a significant difference between the application of the *problem-based learning* model to students' critical thinking skills, so that the hypothesis proposed is proven.

Table 4.7 Mean values

Group Statistics					
	Class	N	Mean	Std. Deviation	Std. Error Mean
Kemampuan_Berpikir_Kritis_Siswa	Post_Eksperimen	36	86.11	7.938	1.323
	Post_Kontrol	32	79.53	8.168	1.444

Source: Data processed by ibm SPSS software researcher version 26

Based on the output results in table 4.7, it is shown that students' critical thinking skills in the experimental class posttest have a mean or average value of 86.11, and the control class post-test has a mean or average value of 79.53, This means that the critical thinking ability of students in the experimental class is higher.

Based on the formulation of the problem in this study, it is to test whether there is an effect of the application of the *Problem Based Learning* learning model on the critical thinking skills of grade X students, so that the results can be Research and discussed as follows:

This research is by applying the *Problem Based Learning* learning model to students' critical thinking skills on Bhineka Tunggal Ika material. During the learning in the experimental class and the control class, students seemed very excited in discussing the given problem and following the steps in the model *Problem Based Learning* according to the learning process provided by the teacher with Bhineka Tunggal Ika material. The weakness of this *Problem Based* Learning learning model requires a lot of time, Learning with this model requires interest from students to solve problems, if students do not Having this interest, students tend to be reluctant to try, and this learning model is suitable for learning that demands problem-solving skills.

Based on this research conducted by researchers who can affect students' critical thinking skills with the application of the *Problem Based Learning* learning model. This can be seen from several tests that have been conducted to see if there is a significant influence of the application of the *Problem Based Learning* learning model on critical thinking skills students in class.

The results of the experimental class normality test, have a significance value level of >0.05, namely 0.200 and 0.113 in the control class of 0.165 and 0.119, from the results of the normality test, by looking at the basis for decision making Those in both classes have a GIS value level of > 0.05, so the data is said to be normally distributed. Then, after the data is declared normally distributed, a homogeneity test is carried out. In the homogeneity test for both classes, namely the experimental class and the control class, it was 0.768. So that it can be concluded by looking at the basis of decision making in the homogeneity test, the results of the two classes have a sig value level of 0.768 > 0.05, then the data is distributed homogeneous (equal).

The results of hypothesis analysis using independent sample t-test showed Sig. (2-tailed) values of 0.001 < 0.05, then Ho was rejected, Ha was accepted, so it can be concluded that there is a significant difference between The mean critical thinking ability of experimental and control class students, meaning that the results of the *post-test* critical thinking skills show that the average score of achievement obtained in students The experimental class was higher than the control class students, namely the experimental class posttest 86.11 and the control class *posttest* 79.53 so that there were significant differences in critical thinking skills, it was concluded that there was an influence of the application of the *problem-based learning* model on the critical thinking skills of grade X students of SMA Negeri 1 Kupang.

This is in line with the results of Nurhayati's research, (2020) which examines the Effect of *Problem Based Learning* Models on Critical Thinking skills on students' higher-order thinking skills. The results obtained from the normality test (Kolmogorov-Smirnov test) are sig values of 0.081 (>0.05) which shows sample data come from normally distributed populations and homogeneity tests (Levene Test) which is 0.322 (>0.05) which shows the posttest value is uniform and the significance value of the t test is 0.000 (< 0.05) Which means that there is a significant influence between the application of the problem-based learning model. So that it can show that there is an influence of *problem-based learning* learning models, critical thinking skills and higher-order thinking skills of students.

Based on the results of teacher observations or direct observations on student activities that there is an influence of *problem-based learning* on indicators of critical thinking skills in experimental classes in table 4.8 below:

Table 4.8 The effect of *the Problem Based Learning* model on Critical thinking indicators.

Problem Based Learning Indicators	**Critical Thinking Indicators**	**Description**
Student orientation to the problem	- *Elementary Clarification* (Provides a simple explanation)	In the first phase there is an influence of *PBL* syntax on critical thinking indicators based on the given problem of "identifying individual identity and group identity", students are so active In providing simple explanations, identify or formulate questions or problems into Bhineka Tunggal Ika material correctly and correctly.
Organizing students to learn	- *Basic Support* (Building basic skills)	In the second phase, there is an influence of *PBL* syntax on critical thinking indicators that there are students who can cooperate in discussion methods. And able to make a decision on a problem to produce a correct and appropriate conclusion in giving reasons.
Guiding individual and group investigations	- *Inference*	In the third phase there is the influence of *PBL* syntax, on critical thinking indicators, so that learners are able to make decisions on a problem to produce correct and appropriate

		conclusions in giving reasons.
Develop and present work	- *Advance clarification* (provides further explanation)	In the fourth phase and indicators, there are students who do not explain a problem correctly but are wrong in giving reasons for the material bhineka tunggal ika.
Analyze and evaluate the problem-solving process	- *Strategy and* tactic	In the fifth phase, there is an influence of *PBL* syntax on critical thinking indicators, namely students are able to use strategies in solving problems and conducting analysis appropriately and correctly.

(Source: Analyzed by researchers 2023)

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Based on the results of the description above, the syntax of problem-based learning and critical thinking indicators in the experimental class have an influence on the experimental class with *the problem-based learning* model. Especially the indicator provides simple explanations, builds basic skills, concludes, and manages strategies and tactics very well compared to other indicators. So that the relationship with the steps or syntax of the *problem-based learning* model, the first phase is orientation to students where students are given problems to actively think about the given problem. This can encourage students to be able to better provide simple explanations, build basic skills using strategies and solve given problems. This is in line with the findings of Kurniahtunissa, (2016) in his research that by conducting phases in *the problem-based learning* model active involvement of students in solving problems so that students can have excellent critical thinking skills.

Furthermore, research by Farisi, *et.al* (2017) that *the problem-based* learning model can improve students' critical thinking skills because this learning model uses problems that are often encountered students in everyday life. Then students are encouraged to be actively involved in solving the given problem together with group mates. The goal is that students can apply what is abstract. Furthermore, in Kurniahtunissa's research, (2016) that in the *problem-based learning* model students are given the opportunity to process and find their own strategies, solutions and draw conclusions to the problem presented so that it is aligned with the process in critical thinking skills. This encourages students to practice continuous critical thinking skills. The material taught uses the PBL model, namely bhineka tunggal ika. Problems are given related to unity in diversity presented in LKPD then students are asked to identify problems, understand problems, assign and using solving strategies, solving problems using those strategies until drawing conclusions. Furthermore, the results of the discussion were presented in front of the class.

Based on the results of the discussion above, it can be concluded that there is an influence on the experimental class by applying a *problem-based* learning model so that in the learning process it can improve students' critical thinking skills In problem solving compared to the control class.

V. Conclution

Based on data obtained from the results of research discussions on the Effect of the Application of the Problem Based Learning Model on the critical thinking ability of grade X students of SMA Negeri 1 Kupang, it can have an influence Students' critical thinking skills and can be concluded as follows:

1 In the experimental class with the significance value of the normality test, namely 0.200 and 0.113 while the control class is 0.165 and 0.119 by looking at the basis of decision making in the normality test of both classes It has a GIS value of > 0.05, so the data is normally distributed.
2 The homogeneity test for both classes, obtained values of 0.768 > 0.05 by looking at the existing decision-making basis, in the homogeneity test the data was homogeneously distributed (the same).
3 In the t-test using the independent sample t-test formula from the output table above, the value of t = 3.366 with a value of Sig. (2-tailed) of 0.001 < 0.05 can be concluded that there is a significant influence on the application of the problem-based learning model on the critical thinking skills of grade X students of SMA Negeri 1 Kupang.

Based on the objectives of the research above, to determine the effect of the application of the problem-based learning model on the critical thinking ability of grade x students of SMA Negeri 1 Kupang, it can be described that there is an influence of problem-based learning syntax towards student critical thinking, namely student orientation to problems, organizing students to learn, guiding individual and group investigations, and analyzing and evaluating the problem-solving process in experimental classes, so that the learning process can improve students ' critical thinking skills in problem solving compared to other PBL syntax..

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