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The Effect of Problem Based Learning (PBL) Based on the Talk Show Method on Students' Critical Thinking Skills

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Abstract: The diverse abilities of students require the use of appropriate learning models and methods in the biology learning process. This research aims to find out how the effect of problem-based learning (PBL) based on the talk show method on critical thinking skills is carried out at the X MIPA class level at MA Negeri 2 Kab. Tasikmalaya. The research method is a quasi-experimental type with a non-equivalent group design. Sampling used a random sampling technique, with class X MIPA 5 as the experimental class and X MIPA 7 as the control class. The results of the study for the analysis of the influence obtained data on the asymp sig value. (2 tailed) of 0.000 <0.05 with the hypothesis decision being accepted. The average analysis of students' critical thinking skills was 75.00 for the experimental class and 57.8 for the control class. The calculation of the percentage of the influence of models and methods on critical thinking skills is 94% with the high category in the experimental class and the control class, with an average score at intervals of 53-82 with a high category and fulfilling the minimum completeness criteria (KKM). Based on the results of the study it was concluded that the use of the problem-based learning (PBL) model based on the talk show method had a positive influence on students' critical thinking skills on environmental pollution material.

Keywords: *critical thinking skills, problem based learning, talk show*

A. INTRODUCTION

Education in the era of society 5.0 has led to changes in the learning process that are quite significant and at the same time a challenge for teaching staff where the concept of learning emphasizes student activity with all the innovations it has. The concept known as human centered means

that humans are in control of all changes that occur by relying on existing innovations (Usmaedi, 2021). Biology as a subject that is quite complex and has a fairly strong relationship with the surrounding environment, is considered to have an opportunity to produce innovations that will have an impact on life. Even so, in the



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process the innovations possessed by each of these students cannot be produced simultaneously as a result of learning biology.

Differences in student characteristics and skills are one of the success factors in the learning process. This is because the diverse character of students is the teacher's biggest challenge in choosing learning concepts that are appropriate to the topic, student character, class conditions, goals and skills to be achieved. One of the student skills that can produce student innovations in the biology learning process is critical thinking skills. This is because critical thinking skills are essential thinking skills and need to be mastered by every student in the era of society 5.0 as a step in realizing innovations that are beneficial for changes in life (Rahmelia, 2022).

Ennis (2011) states that a meaningful way of thinking that is based on a reason, purpose and focuses on making responsible decisions is a critical thinking ability. Therefore, to hone students' critical thinking skills in learning biology, it is necessary to have a learning model that can support the implementation of learning activities. The problem-based learning learning model is a learning model that is considered to be able to improve students' critical thinking skills through decision-making activities based on real problems (Fitriyyah, 2019). Biology learning, which is aligned with the progress of the times and education in the era of society 5.0, makes learning activities student-centered with the teacher as a facilitator, in order to hone students' abilities and activeness. Critical thinking

indicators according to Ennis (2013) are grouped into eight indicators, namely identifying questions, expressing hypotheses, determining an action, considering the use of appropriate procedures, recording observations, interpreting questions, identifying and dealing with irrelevance, and providing definitions.

The use of a learning model that is supported by the talk show learning method is one of the ways that the teacher takes in realizing active learning, and being able to develop all the abilities students have, such as problem solving, critical thinking, communication, and other abilities that can be developed. The talk show method is one of the methods that is considered to be able to improve students' critical thinking skills through a way of learning that involves sharing the topic of matter between students. Therefore, the use of problem-based learning based on the talk show method is used in the biology learning process to improve students' critical thinking skills.

B. MATERIALS AND METHODS

1. Research Samples and Research Locations

This research was conducted in the even semester of the 2022/2023 academic year. The sample of this research is students of MAN 2 Kab. Tasikmalaya class X MIPA 5 totaling 34 students as the experimental class and class X MIPA 7 students totaling 33 students as the control class.

2. Research procedure

This research method is a quasi-experimental (quasi-experimental) with a quantitative approach that uses the experimental class and the control class as the research class. The design used is the non-equivalent group design. The steps in this research are as follows:

a. Prepare learning tools

The learning tools prepared were in the form of learning implementation plans (RPP) on environmental pollution material for the experimental class with the syntax of the problem-based learning model, and lesson plans for the control class with the syntax of the 5M scientific learning model.

b. Create a research instrument

The research instrument used in this study consisted of an assessment instrument for critical thinking skills which consisted of 16 multiple choice questions.

c. Test questions

Test questions were carried out to determine the feasibility of the questions to be used in research, which were tested in class XI MIPA, with a total of 27 students.

d. Question validation

The validation of the questions was carried out by carrying out a series of calculations of the reliability, validity, discriminating power, and difficulty level of the questions.

e. Collection of research data

The collection of research data was taken from data on students' pretest and posttest scores which were collected after filling in the critical thinking skills question sheets.

f. Data analysis

Data analysis used normality test, homogeneity test, Mann-Whitney test, and N-Gain.

g. Drawing conclusions

Drawing conclusions drawn from the decision of the research hypothesis.

3. Data Type

The type of data used in this study is in the form of quantitative data taken by the assessment instrument from the results of the pre-test and post-test of students in the experimental class and the control class.

4. Research Result Data Analysis

Data analysis of students' pre-test and post-test results was used to determine the effect of learning models and methods on critical thinking skills. The multiple-choice questions for critical thinking skills used eight critical thinking indicators to identify questions, put forward hypotheses, determine an action, consider the use of appropriate procedures, record observations, interpret questions, identify and deal with irrelevance, and provide definitions. Pretest and posttest data analysis of students' critical

thinking skills uses the following measurements:

5. Normalitas Test:

$$X^2 = \sum \left(\frac{(fo-fh)^2}{fh} \right)$$

Information:

X2 = Chi Squared

fo = observed frequency

fh = expected frequency

(Budiwanto, 2017).

With the normality test testing criteria where if x2 count is smaller than x2 table, then the data is normally distributed.

6. Homogenitas Test:

$$F = \frac{Vb}{Vt}$$

The criteria for testing homogeneity with the F test where if F count > F table, then the data is not homogeneous, and if F count ≤ F table, then the data is homogeneous (Bustami, 2014).

7. Uji Mann-whitney:

$$U1 = n1n2 + \frac{n1(n1 + 1)}{2} - R1$$

$$U2 = n1n2 + \frac{n2(n2 + 1)}{2} - R2$$

Information:

U1 = Number of rank 1

U2 = Number of rank 2

N1 = Number of samples 1

N2 = Number of samples 2

R1 = Total ranking in sample n1

R2 = Number of rankings in sample n2

(Excellent, 2017)

By testing the hypothesis using the following criteria:

Ho is rejected if the probability < 0.05 with a significance level of 5%. Or Ho is rejected if U count < U table.

Test N-Gain:

$$G = \frac{X_{posttest} - X_{pretest}}{X_{ideal} - X_{pretest}}$$

Where, g > 0.70 = High

0.30 < g ≤ 0.70 = Moderate

g ≤ 0.30 = Low

will be provided during review. They must be provided prior to publication.

C. RESULT AND DISCUSSION

1. Test Questions

The instrument for assessing critical thinking skills before being used in research, tests were carried out first at the school level which is equivalent to the student subject one level above the research subject, namely class XI. The multiple choice questions that were tested amounted to 40 questions, and the results obtained were that there were only 16 items that were suitable for use in research. The results of the analysis of valid items and can be used in research are presented in the following table:

Table 1. Results of Test Test Analysis

validity	Validity Statement	Discriminating Power	Ket. Discriminating Power	Difficulty Level	Ket. Difficulty Level	Decision	No Question End
0.55	Valid	0.4011	Sedang	0.4074	Sedang	Digunakan	1
0.4	Valid	0.41758	Tinggi	0.62963	Sedang	Digunakan	2
0.76	Valid	0.63736	Tinggi	0.5926	Sedang	Digunakan	3
0.3	Valid	0.32418	Sedang	0.37037	Sedang	Digunakan	4
0.3	Valid	0.34615	Sedang	0.6667	Sedang	Digunakan	5
0.33	Valid	0.23626	Sedang	0.1852	Sukar	Digunakan	6
0.4	Valid	0.47253	Tinggi	0.37037	Sedang	Digunakan	7
0.6	Valid	0.48901	Tinggi	0.5926	Sedang	Digunakan	8
0.4	Valid	0.30769	Sedang	0.1481	Sukar	Digunakan	9
1	Valid	0.56044	Tinggi	0.5556	Sedang	Digunakan	10
0.3	Valid	0.26923	Sedang	0.6296	Sedang	Digunakan	11
0.4	Valid	0.40659	Tinggi	0.4814	Sedang	Digunakan	12
0.43	Valid	0.48352	Tinggi	0.5185	Sedang	Digunakan	13
0.6	Valid	0.54396	Tinggi	0.3333	Sedang	Digunakan	14
0.7	Valid	0.62088	Tinggi	0.37037	Sedang	Digunakan	15
0.8	Valid	0.70879	Tinggi sekali	0.5556	Sedang	Digunakan	16

Based on the table above, out of a total of 40 items, only 16 multiple choice questions were obtained which could be used as an instrument for assessing students' critical thinking in research.

These questions represent each of the eight indicators of critical thinking which are integrated with 16 indicators of achievement of competence (GPA). After testing the questions, a pretest and posttest were carried out to measure students' critical thinking skills, before and after being given learning using the PBL model and the talk show method on environmental pollution material.

2. Results of Critical Thinking Skills

Students' critical thinking skills are measured through pre-test and post-test assessments. An analysis of the influence of the learning process on students' critical thinking skills is carried out as follows:

Tabel 2. Test of Normality

	Kelas	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	Df	Sig.	Statistic	df	Sig.
Hasil Belajar Siswa (Keterampilan Berpikir Kritis)	Pretest Eksperimen	.127	34	.181	.972	34	.532
	Posttest Eksperimen	.198	34	.002	.898	34	.004
	Pretest Kontrol	.201	33	.002	.917	33	.015
	Posttest Kontrol	.244	33	.000	.814	33	.000

Based on Table 2, the results of the normality test using SPSS version 25 software obtained the result that the data from the pretest results in the experimental class had a significance value of 0.181, namely the data were normally distributed, while the other data were not normally distributed. The difference in the results of this data analysis makes further data analysis carried out using non-parametric analysis.

Tabel 3. Test of Homogeneity of Variance

		Levene Statistic	df1	df2	Sig.
Hasil Belajar Siswa (Keterampilan Berpikir Kritis)	Based on Mean	3.643	3	130	.015
	Based on Median	2.663	3	130	.051
	Based on Median and with adjusted df	2.663	3	99.406	.052
	Based on trimmed mean	3.496	3	130	.018

The data from the homogeneity test using SPSS version 25 shows a significance value of $0.015 < 0.05$ so that the data is not homogeneous. From the results of the normality test and homogeneity test, each obtained abnormal and inhomogeneous data, so that further analysis used the Man-Whitney test to determine the effect of using the PBL learning model and the talk show method on critical thinking skills.

Tabel 4. Result Mann-whitney Test

Test Statistics ^a	
	Hasil Belajar Siswa (Keterampilan Berpikir Kritis)
Mann-Whitney U	.500
Wilcoxon W	595.500
Z	-7.129
Asymp. Sig. (2-tailed)	.000

Based on Table 4. the results of the Man-Whitney U test analysis obtained the asymp sig. (2 tailed) of 0.000 with a significance value of < 0.05 so that the hypothesis is accepted. This shows that there is a positive influence from the use of problem-based learning based on the talk show method on students' critical thinking skills in environmental pollution material.

Tabel 5. Result N-Gain Test

N-Gain Present	
Kelas	Rata-Rata
Eksperimen	75.00
Kontrol	57.8

Based on the N-gain value data in the experimental class and control class, significant differences were obtained, with the experimental class obtaining the highest average of 75.00 out of a total of 34 students, and the control class with an average pre-test posttest of 57.8 out of a total of 57.8. However, even though the averages of the two classes were different, both of them obtained results that met the minimum completeness criteria and had an increase in the results of critical thinking skills from the pre-test and post-test. Thus, the learning process carried out in both classes is equally able to improve critical thinking skills with different levels of increase.

D. CONCLUSION

The results of the analysis of students' critical thinking skills on environmental pollution material using the problem-based learning model based on the talk show method show that the data is not normally distributed and not homogeneous, by obtaining an asymp sig value. (2 tailed) of 0.000 with a significance value criterion <0.05 declared the hypothesis accepted.

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