The Effectiveness of Implementing the Ethnoscience-based PBL Model on the Scientific Attitudes of SES Anam Students

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Abstract. This research was motivated by the low scientific attitude shown by fifth grade students at Anam State Elementary School (SES). This research aims to determine the effectiveness of implementing the ethnoscience-based Problem Based Learning (PBL) model to improve the scientific attitudes of fifth grade students at Anam State Elementary School. This research uses a quantitative approach with quasi-experimental methods and a non-equivalent control group design. The sample consisted of 44 class V students, 21 class VA students as the experimental class, and 23 class VB students as the control class, who were selected using purposive sampling. Data collection techniques use questionnaires and observation. Data analysis was assisted by the SPSS program using t statistics by comparing the average N-Gain scores of the two classes. The results of the t test show that the research hypothesis is accepted, which means there is a significant difference in students' scientific attitudes through the ethnoscience-based PBL model. The results of the analysis also show that the ethnoscience-based PBL model is effective in improving the scientific attitudes of fifth grade students at SES Anam. This effectiveness is due to the ethnoscience-based PBL model utilizing the local environment and culture as a learning resource.

Keywords: Problem-Based Learning Model; Ethnosciences; Scientific Attitude; Elementary Students; Pedagogy

1 Introduction

Developing a systematic mindset is one of the dreams of science learning that needs to be considered in elementary colleges. Scientific attitudes need to be cultivated from the beginning to make them authentic scientists. A scientific attitude could be very crucial to examine in essential schools, due to the fact a systematic attitude could be very essential to increase college students' capabilities to solve troubles systematically [1]. Several scientific attitudes that have to be evolved in elementary school college students are admiration for data/statistics, vital wondering mindset, open thinking and cooperation, honesty, and sensitivity to the encompassing environment.

The mindset can be seen as having high interest and extraordinary learning potential, being unable to accept the truth without evidence, being honest, open, tolerant, skeptical, constructive, brave, and innovative [2]. A scientific mindset is a scientist or educator's attitude when faced with scientific problems. The clinical mindset has two meanings: one closer to technology and one closer to science. First, it refers to attitudes toward the direction of science. Second, it refers back to attitudes after analyzing technological knowledge.

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The significance of cultivating a systematic mindset in students can assist in shaping students' character to be extra appreciative of honesty, like simplicity, and be regular in their ideals [3]. The medical mindset shaped in students can determine their fulfillment in attaining completeness in the mastering system and in existence. Growing a systematic attitude in students in the getting-to-know procedure can not be separated from the function of an instructor in selecting a getting-to-know model.

Based on a preliminary study conducting field observations at the Anam State Elementary School, Ruteng District shows that students' scientific attitudes are still low. This can be seen from the students' low level of courage in expressing their thoughts and their lack of curiosity regarding the subject matter being studied. Apart from that, student participation in responding to explanations given by teachers regarding learning material is also still very low. When asked questions that stimulate students' curiosity about the subject matter, students are less enthusiastic in answering the questions. Only a few students were enthusiastic about answering the questions given. This is proven by the existence of students who remain silent when asked by the teacher about the material being studied. An open scientific attitude and collaboration were demonstrated when students held group discussions, where at that time, only a few students were seen actively carrying out discussions. While others just sat quietly, waiting for the discussion to finish.

Another lack of scientific attitude is an objective attitude towards data/facts and an honest attitude. This is proven when students work on questions given by the teacher. Not all students work individually on the questions given based on their knowledge, but some students ask for the results of their friends' work. A scientific attitude in critical thinking is seen when students encounter something new to them. However, not all students can ask teachers or friends about learning material. Many students still keep quiet, listen, and pay attention to their friends when asking questions to the teacher or friends during presentations in front of the class.

Apart from that, Anam Elementary School students need a more scientific attitude, namely a sensitive attitude towards the surrounding environment related to participation in social activities and maintaining the cleanliness of the school environment. This attitude can be seen when students ignore the cleanliness of the school rooms and grounds. In the classroom, there is still a lot of rubbish in the form of paper and plastic snacks that are thrown away haphazardly. Meanwhile, rubbish bins have been provided in the classroom so that students can dispose of rubbish in places. However, some students still deliberately throw their rubbish freely in the classroom. Another thing can also be seen in the flower garden in front of the class, which needs to be better maintained. When asked why their flower gardens were not maintained, most students answered that more of their friends were just watching, which made them too lazy to do it. The garden will only be maintained if the teacher orders them to.

Based on the clinical attitude described by the scholars at SES Anam above, it suggests that the student's medical attitude is still very low. Another component that the author discovered throughout the internship program II at SES Anam is that instructors mainly used the lecture method to turn in clothes. Consequently, teachers have a critical position in improving college students' medical attitudes through mastering fashions. College students' scientific attitudes may progress via an ethnoscience-primarily based PBL version. The ethnoscience-based totally PBL learning version is a gaining knowledge of strategy that allows college students to assume significantly, actively, and analyze independently to remedy issues [4], [5]. The ethnoscience-based totally PBL model may be very powerful as it trains students to find out, exercise essential and analytical thinking, and work together to remedy a hassle, wherein the problem can be received from the surrounding environment or lifestyle, which is intently associated with the student's daily life. Using the encompassing surroundings and nearby tradition as learning

substances and assets can offer direct, trouble-solving-orientated experiences and enhance college students' scientific attitudes.

The ethnoscience-based totally PBL version is a getting-to-know method that allows college kids to practice vital, energetic thinking and learn independently to remedy troubles [6]. The ethnoscience-based totally PBL model is a getting-to-know version that trains students to find out, exercise essential and analytical thinking, and work collectively to solve a problem, wherein the problem can be acquired from the surroundings around the scholars. According to [7], the ethnoscience-based total PBL model is a getting-to-know version that can help college students improve their knowledge and innovative wondering competencies. Ethnoscience-based PBL models can organize student experiences and integrate cultural elements as a way of understanding [8]. The ethnoscience-based PBL model utilizes the local environment and culture as a source of knowledge acquisition by enforcing learning patterns that improve complexity and provide space for the students themselves. as a lively learning topic (student facilities) so it can be assumed. More creative, vital, logical, and independent [4], [9], [10].

Based on the situations cited above, the ethnoscience-based PBL model may be used as a suitable mastering method to be applied to gaining knowledge of processes that may increase/enhance students' clinical attitudes. Growing a scientific mindset in learning sports through an ethnoscience-based PBL version means that at every step of the learning interest, the material is linked to the encompassing surroundings or the authentic know-how of the network as a studying aid.

2 Method

This research is a quantitative approach with a quasi-experimental method. The design applied is not one Equivalent Control Group Design. This work uses a treatment class and a control class as a comparison. The population taken in this research were all SES Anam students, totaling 253 students. Samples were taken from two groups of class V students at SES Anam Ruteng Indonesia for the 2022/2023 academic year.

Construct validity calculations were carried out using the product moment correlation coefficient adjusted to a significance level (α) = 0.5% and degrees of freedom (N-2). With the condition that if > then the question item is said to be valid, and if < then the question item is said to be invalid and must be corrected or discarded. Calculation of test reliability uses the Cronbach's Alpha technique with the condition that if or 0.70 then a test is declared reliable. Next, test the hypothesis using t statistics with a confidence level of 95%.

This speculation trial also uses independent sample t checks, the use of paired sample t checks, and the use of the SPSS application. The N-gain score in this study was completed to determine the level of effectiveness of implementing the ethnoscience-based PBL model on the clinical attitudes of SES Anam Grace V students in thematic learning theme eight: Friendly our environment / sub-topic 2 Environmental change. The N-Gain Score test formula is as follows:

$$g = \frac{Posttest\ Score - Pretest\ Score}{Ideal\ Score - Pretest\ Score} \quad (1)$$

3 Results and Discussion

3.1 Results

This research was conducted at SD Negeri Anam, Ruteng District, and was carried out from April 24 - May 6, 2023. The samples taken in this research were class V students for the 2023/2024 academic year, divided into two study groups with 44 students. The two study groups were class VA, with 21 students as the experimental class, and class VB, with 23 students as the control class. Of the two classes that have been classified, the experimental class in this research uses an ethnoscience-based PBL learning model. Meanwhile, the control class uses a conventional learning model with a scientific approach. The focus of learning in this research is thematic learning on theme 8, Our Friend's Environment/subtheme 2, Environmental Change.

Before conducting the research, the researcher tested the questionnaire instrument at SDI Bung, Ruteng District, Manggarai Regency, which took place on April 7, 2023. After testing the instrument, the researcher then analyzed data to find out to what extent the instrument that had been tested was said to be valid and reliable. Alternatively, not so that it can be used in the data collection process at Anam Elementary School.

The data collection techniques in this research are questionnaires and observation. The questionnaire used in the research aims to see how students' scientific attitudes are before and after being given treatment. Meanwhile, observations are carried out to see and assess students' scientific attitudes during the learning process.

3.1.1 Observation Data

As for the results of observations made by researchers during the learning process in both the experimental class and the control class, the average calculation of scientific attitudes for each of the four indicators (curiosity, cooperation, critical thinking, and sensitivity to the environment) is presented in the table below.

Table 1. Observation Data

Assessment Aspects	Class Average (%)			
	Experiment	**Criteria**	**Control**	**Criteria**
Curiosity	84,50%	Very high	33,30%	Low
Cooperate	91,70%	Very high	77,50%	Height
Critical thinking	92,10%	Very high	44,20%	Currently
Sensitive to the environment	92,90%	Very high	89,10%	Very high

The calculation of data from observations of scientific attitudes in the experimental class and control class presented in the table above can be depicted in the following diagram.

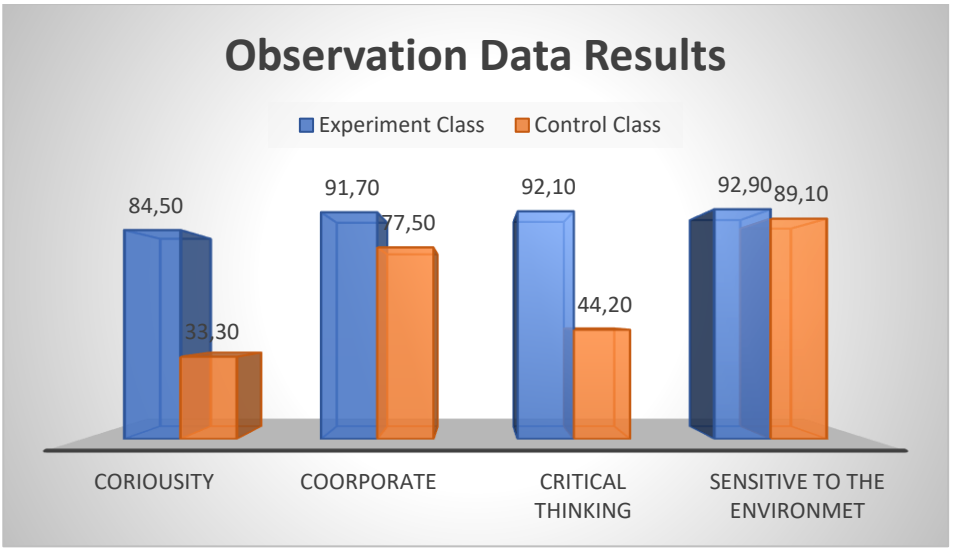

Figure 1. Observation Data for the Experimental Class and Control Class

Primarily based on the calculation of remark information within the table and diagram above, it can be seen that there are variations in the clinical attitudes proven by students. Of the four factors of clinical mindset found, namely curiosity, cooperation, critical thinking, and sensitivity to the environment, inside the experimental elegance, it was very high compared to the manipulated elegance. In the control magnificence, the scientific attitude of interest and critical wondering with every criterion is low and medium. In the meantime, the mindset of operating collectively and being touchy with the surroundings with each criterion is excessive and high. That is because, in the experimental class, the studying technique is achieved using an ethnoscience-based total PBL version. Meanwhile, in the management class, the learning process makes use of a traditional model, particularly a scientific method.

3.1.2 Data From Student Questionnaire Results Before And After Being Given Treatment

A summary of the combined data from student questionnaires before and after being given treatment between the experimental class and the control class is presented in the table below.

Table 2. Combined Results Data Before and After Treatment

Class	**Average value**	
	Before being treated	After being treated
Experiment	71	92
Control	61	62

The combined data from student questionnaires before and after being given treatment between the experimental class and the control class presented in the table above can be depicted in the following diagram.

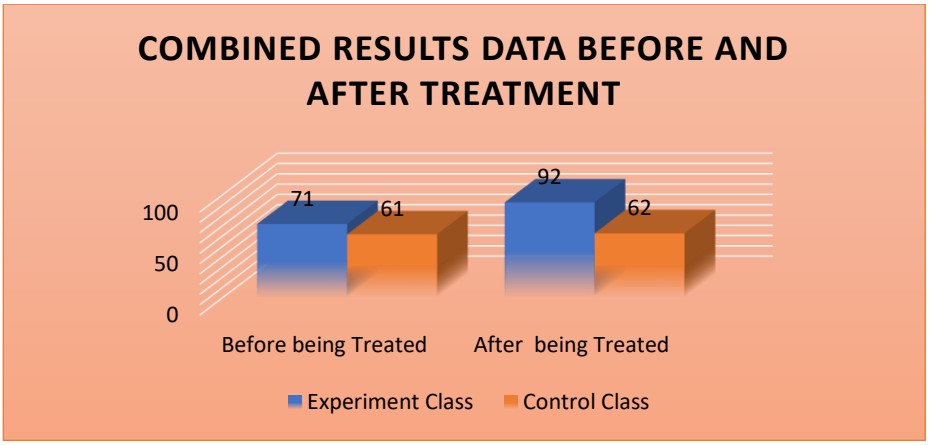

Figure 2. Summary of Questionnaire Results Data Before and After Treatment

Based on the summary of the mixed records from scholar questionnaires before and after being given remedy within the desk and diagram above, there may be visible variations in the medical attitudes proven by using college students earlier than and after being given treatment. Within the experimental elegance, before being given remedy, learning using the ethnoscience-based totally PBL version experienced a substantial boom within the average price of medical attitudes after being given treatment, namely 21%. In the meantime, within the control magnificence, before and after being given learning remedy using the traditional version (scientific technique), the common medical mindset score accelerated by the simplest 1%. So, the application of the ethnoscience-based totally PBL version is effective in enhancing college students' scientific attitudes compared to the use of the conventional version, particularly the medical method. Furthermore, the results of the t-test calculation to test the research hypothesis are presented in Table 3 below.

Table 3. Independent t-test data

	t-test for Equality of Means			
	F	Sig.	t	Sig.
Equal variances assumed	4.115	0.049	7.68	0.00
Equal variances not assumed.			7.86	0.00

From the consequences of the unbiased speculative t-test above, the sig.2-tailed price is 0.000. because sig.2- value-tailed = zero.000 < sig.α = 0.05, then Ho is rejected, and Ha is standard. Thus, it can be concluded that the use of the ethnoscience-based version of PBL is effective in improving the medical attitudes of fifth-grade students at the Anam State Elementary School.

The results of calculating the N-gain score using the SPSS 16.00 software utility showed that the average N-gain score for the experimental class (ethnoscience-based PBL model) was 68.90 or 68.9%. , which falls into the "moderately strong" category. With a minimum N-gain rating fee of 36.36% and a maximum of one hundred. Meanwhile, the average N-gain score for the control class (traditional version) was 0.6908 or 0.691%, which was included in the "useless" class, with a minimum N-gain score of -42.28% and a maximum of 39.53%.

Based on the results of the N-gain score check calculation, the utility of the ethnoscience-based PBL version is pretty effective in improving the scientific attitudes of Anam elementary college students on topic eight Our buddies surroundings / sub-theme 2 Environmental exchange.

3.2 Discussion

The PBL model is included with ethnoscience, namely linking the technology method with cultural know-how determined in the surroundings around students, including knowledge of how to defend the surroundings, caring for range, and knowledge of the water cycle tailored to the learning fabric. Subculture has the ability to be a source of expertise that may be explored to grow college students' enthusiasm for gaining knowledge so that students are immediately involved in finding principles to specific phenomena inside the surrounding environment [4].

The outcomes of research on Anam Essential School show that students have wonderful curiosity about studying, and college students are very enthusiastic in asking questions associated with the findings offered by their pals in front of the elegance. Aside from that, through group discussions, students appear energetic in expressing evaluations and respecting each opinion of their organization friends. This is in line with [11] and [12] statements that asking questions during mastery activities will make students more interested and stimulate them to be more active, critical, and innovative in solving problems.

The software of the ethnoscience-based totally PBL model also has a tremendous impact on college students' attitudes toward the encircling environment. this is because inside the getting to know manner, researchers link the material to Manggarai culture to usually guard and pay attention to the encircling surroundings. the scholars had been visible throughout the pastime of cleansing the lawn in front of the magnificence, they wiped clean it together. apart from that, within the study room or outside the school room there's no seen rubbish scattered round because they constantly throw rubbish inside the places supplied.

The utility of the ethnoscience-based totally PBL getting to know version isstudent middle gaining knowledge of (CTL), wherein college students are the center of the teaching and learning system. via enforcing this ethnoscience-primarily based PBL model, college students may be immediately concerned in discovering ideas and actively locating solutions to the issues they face [10]. This is because in getting to know the usage of the ethnoscience-based PBL model, students can have excessive interest, can paintings collectively, and feature high situation for the surrounding surroundings, due to the fact the troubles given are troubles they come across in normal lifestyles. in addition, related to college students without delay in the remark technique will cause them to be extra vital in their findings. This is in accordance with [12], [13] explanation, which states that at the level of student orientation towards problems, students play an active role in solving problems given by the teacher independently so that students remember that in this learning, it is students who are needed to carry out investigations into problems.

The effectiveness of implementing the ethnoscience-based PBL version is shown in pupil involvement within the getting-to-know method. this is supported by studies carried out using [10], which shows that the effectiveness of the ethnoscience-based totally PBL model is suitable for software in learning so that gaining knowledge of the system does not lose interest speedy for students. Within the identical vein, studies performed using [4]

suggest that ethnoscience-primarily based mastering the usage of the PBL model on colloidal material is effective in improving students' crucial wondering competencies compared to traditional fashions.

The effectiveness of the ethnoscience-based PBL model can not be separated from implementing the planned to gain knowledge of the version. The PBL model integrated with ethnoscience in studying is achieved via paying attention to PBL syntax, particularly pupil orientation to troubles, scholar company towards mastering, carrying out man or woman or organization investigations, developing and providing consequences, analyzing and evaluating hassle fixing results. The ethnoscience-based PBL model becomes more effective in enhancing students' medical attitudes because some sports link neighborhood lifestyles and awareness that expand in the network with studying at school, so studying becomes more interesting, and college students end up more enthusiastic [13].

4 Conclusion

The effectiveness of implementing the PBL version cannot be separated from how the mastering procedure is executed. This is due to the fact that studying using the ethnoscience-based totally PBL version trains college students in various ways to remedy present troubles, as the problems presented are problems that they discover and enjoy immediately in normal life. Mastering that integrates tradition contributes to students' gaining knowledge of reports within the shape of concept patterns, mindset patterns, and conduct styles. Similarly, involving college students immediately in the statement procedure will make them extra essential in their findings.

So, based totally at the evaluation of studies information concerning the effectiveness of the utility of the ethnoscience-primarily based PBL model at the scientific attitudes of Anam state elementary faculty college students, it becomes concluded that the application of the ethnoscience-based PBL model become quite effective in enhancing the medical attitudes of 5th-grade students at Anam fundamental school in thematic learning theme 8 Our pleasant environment or subtheme 2-Environmental alternate.

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