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The Effect of Causalytic Learning Model Integrated with Character Values on Creative Thinking Ability of Student

Sri Khairani*[1], Hikmawati[1], Joni Rokhmat[1], Kosim[1]
[1]Physics Education, Faculty of Teacher Training and Education, University of Mataram, West Nusa Tenggara, Indonesia
*Corresponding author e-mail: srikhairani55@gmail.com

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Abstract— The purpose of this study was to investigate how the capacity for creative thinking is affected by the integration of causal learning model with character value learning. Quasi-experiment with untreated control group design and pretest-posttest methodology was the research design used. The research population amounted to 52 people, all of whom were students of class XI IPA SMAN 2 Labuapi. Saturated sampling was used in the research sample, by setting class X1 IPA 1 as the experimental class and class X1 IPA 2 as the control class. The control class received teaching using the traditional learning model, while the experimental class received teaching using the causal learning model combined with character values. The instrument used is a creative thinking ability description test that considers validity, reliability, difficulty level, and distinguishing power. In the experimental class, the average score of creative thinking ability was 83.77, while the control class obtained a score of 74.50. The data of both classes were normally distributed and homogeneous. The polled variance t-test was used at the 5% level to assess the data related to Creative Thinking Ability. 4.813 is the result of the analysis of creative thinking ability. This shows that there is a relationship between their ability to think creatively and the causal model combined with character values.

Keywords— Causalytic Model Integrated to Character Values, Creative Thinking Ability
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1. Introduction

Science, which is essentially an accumulation of information, methods of thinking, and research, includes physics. In order for students to acquire skills, designing experiences that involve thinking abilities including classifying, observing, asking questions, conducting experiments, analyzing facts, speaking, and drawing conclusions. In addition to the lecture method, teachers in the classroom encourage students to do independent learning about ideas, theories or facts. As a result, students can generate their own knowledge by using constructivist methods that encourage the growth of positive attitudes and creative thinking skills (Sari et al., 2020). In addition, the science process involving observation, experimentation, and data analysis encourages students to think critically and creatively towards learning such as curiosity, perseverance, and hard work (Pieter et al., 2024).

The ability to think at a higher level has become an achievement that must be obtained in learning objectives in the development of the learning process in the 21st century (Puti, 2024). Dewantara (2021) asserts that 21st century education requires educators and learners to actively collaborate in providing high-quality teaching. Students need to be prepared to learn and innovate in the 21st century. The objectives of physics education are in line with 21st century standards, which emphasize the development of creativity, collaboration, communication, critical thinking, and problem-solving skills among students (Ibrahim et al., 2020). According to Primamayonita et al. (2020), creative thinking skills are abilities that help a person overcome obstacles, generate solutions, and stay focused on the choices they make. Creative thinking skills in the 21st century not only include the ability to think broadly, but also involve the ability to generate innovative and novel ideas (Hulyadi et al, 2024).

Creative thinking skills are critical for students to have (Jumrodah, 2024). Creative thinking ability is the ability of students to evaluate various possible solutions to physics problems using elements such as fluency, flexibility, originality, and elaboration. Various traits define creative thinking ability. The capacity to think openly is a divergent quality ((Yudia et al, 2023). Applying creativity in generating new ideas in learning can increase active participation and collaboration between students (Saputri et al, 2024).

The results of observations conducted at SMAN 2 Labuapi in the 2023-2024 school year provide an overview of how some teachers still use the lecture method, which is also known as teacher-centered learning, and how the learning process only consists of material explanations and assignments in the form of practice questions that are less interesting for students, inhibits their ability to think creatively. Therefore, a learning model is necessary to facilitate materials delivery and achieve the established goals (Supartin, 2024).

The causal learning model is one of the anticipated teaching tools to support physics teachers at SMAN 2 Labuapi Mataram in fostering original thinking skills. Creative and innovative learning methods can improve higher order thinking skills (Syahrial et al, 2023). The causal and analytical thinking approach serves as the basis for the development and design of the causal learning model. Students are directed to be able to analyze physics phenomena through activities that use causal thinking. Meanwhile,

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students are expected to collect justifications in the form of arguments to explain how the conditions of each causal factor together cause an effect of a physics event through analytical thinking exercises (Rokhmat, 2018).

This is based on several studies by Anshori, Rokhmat, and Gunada (2019), which showed that teaching students to solve problems that have many solutions and are causal in nature can improve their learning creativity through the use of causal learning models. According to Tamami, Rokhmat, and Gunada (2017), students' creativity and problem-solving abilities are enhanced by the scaffolding causal thinking approach. In addition, this method helps the development of causal thinking skills (Rokhmat et al., 2019). According to Mahmudah, Rokhmat, Kosim, & Mustofa (2024), learning using the causalytic model assisted by the go-lab platform integrated with character values can improve creative thinking ability.

2. Method

Quasi-experimental research methodology is employed, utilizing an untreated control group design with pretest and posttest testing.

class	Pre-test	Treatment	Post-test
Experiment	O_1	X	O_2
Control	O_3		O_4

(Setyosari, 2013)

The population in this study consisted of all students of class XI IPA at SMAN 2 Labuapi in the 2023/2024 academic year, which amounted to 52 people. The sampling technique used was saturated sampling, so that XI IPA 1 class was selected as the experimental class and XI IPA 2 class as the control class, with each class having 26 students. The instruments used in this study include syllabus, lesson plans, student worksheets, test grids, creative thinking ability tests. The data collection method in this study uses the test method, which consists of a description form test. The creative thinking ability test consists of 4 description items. Scores were obtained from the post-test based on indicators of creative thinking ability.

According to Rokhmat et al. (2017: 163), the indicators of creative thinking ability (IC) measured consist of four aspects, namely IC-1 fluency thinking, IC-2 flexibility thinking, IC-3 originality thinking, and IC-4 elaboration thinking. Fluency shows how many answers participants produce, flexibility is related to the level of variation or difficulty of the answers presented, originality is shown by the addition of unique answers from participants, and elaboration reflects the ability of participants to develop their ideas.

The creative thinking ability test instrument before being used in research must go through the stages of testing the validity, reliability, difficulty level, and differentiating power of the questions. Data analysis in this study used t-test with a significance level of 5% and degrees of freedom (n1 + n2) - 2.

3. Result and Discussion

3.1. Results

Taking into account the outcomes of each indicator's creative thinking test, IC-1, fluency thinking (fluency), IC-2, flexibility thinking (flexibility), IC-3, originality thinking (originality), and IC-4, detailed thinking (elaboration). Figure 1 shows the percentage of the average score for creative thinking abilities.

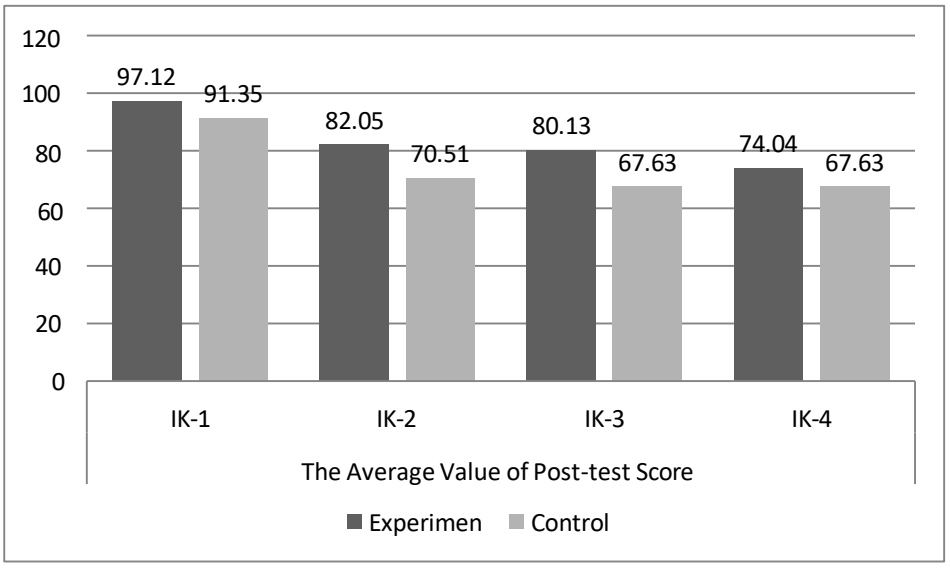


Figure 1 Average Score Indicator of Creative Thinking Ability

It can be seen in Figure 1 that the experimental class for IC-1, IC-2, IC-3, IC-4, is in the good category. The results for the

control class were obtained in IC-1, IC-2, IC-3, IC-4 in the good category. The average pre-test and post-test scores of creative thinking skills can be seen in Figure 2.

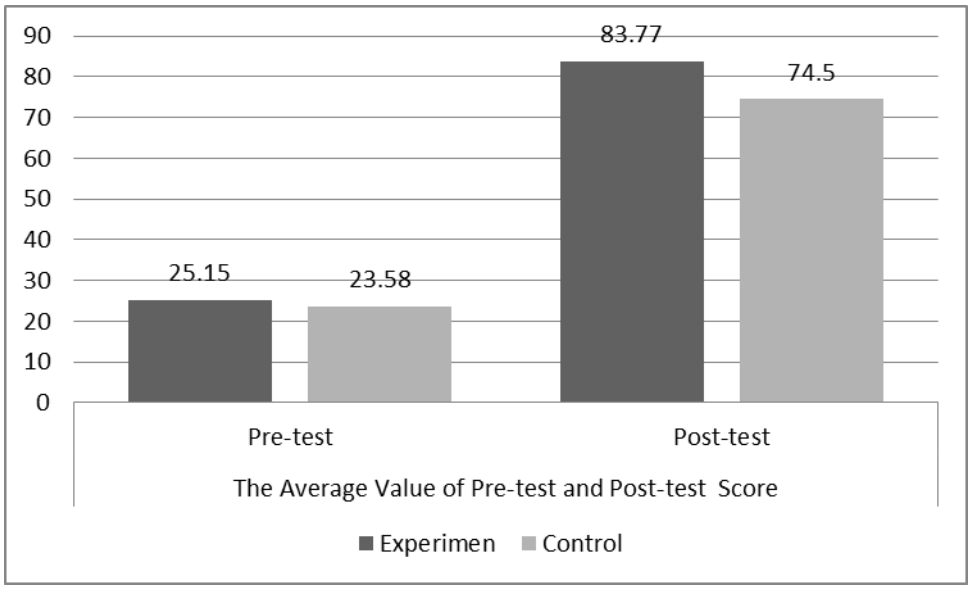


Figure 2 Average Score of Creative Thinking Ability pre-test and post-test

The results of the creative thinking ability hypothesis test at a significant level of 5% using the statistical parameter t-test, namely the polled variance t-test, can be seen in table 1.

Table 1 Hypothesis Test Results of Creative Thinking Ability Data

Class	N	Average	variants	dk	t_{count}	t_{table}
Experiment	26	83.77	41.86	50	2.499	2.008
Control	26	74.50	54.50			

3.2 Discussion

The results of the hypothesis testing indicate that the class XI IPA 1 SMAN 2 Labuapi students' capacity for creative thought is impacted by the causalytic learning model combined with character values. According to the pre-test results, the two classes' capacities for creative thought are deemed equal. This is evident from the average pre-test scores of the two classes, where the experimental class scored 25.15 and the control class scored 23.58 on average. Following treatment, the experimental class's average score was 83.77, whereas the control class's was 74.50. It is evident that the experimental class and control class's average values following the application of the causal learning model integrated with character values are greater than those of the classes before to the application of the model.

A causalytic learning model combined with character values trains indicators of creative thinking abilities more effectively than a traditional learning model. This is demonstrated by the fact that the experimental class's average post-test score on students' capacity for creative thought was greater than the control class's score. The experimental class's average value is 83.77, while the control class's is 74.50. It is evident from the data that the average value obtained indicates that students' capacity for creative thought is impacted by the causal learning model when combined with character values.

This occurs because the causalytic learning model combined with character values can engage students in the learning process to the fullest extent possible, enabling them to produce an effect, identify the causes of the phenomenon on mechanical wave material, and learn how to solve these physics problems. According to earlier research by Anshori, Rokhmat, and Gunada (2019), students' learning creativity can be enhanced by the causal learning model, which trains them to tackle issues that have multiple solutions and are causal in nature.

4. Conclusion

From the results of research conducted at SMAN 2 Labuapi, data analysis, hypothesis testing at a significant level of 5%, and discussion, it can be concluded that the ability to think creatively with the application of causal learning models integrated with character values can be used as an alternative in physics learning. The integrated causalitic learning model of character values influences creative thinking abilities. The causalitic learning model integrated with character values can be an alternative learning model in physics learning at Senior High School.

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