Indonesian Journal of Technical and Vocational Education Training

The Influence of the Index Card Match Type Cooperative Learning Model on the Learning Outcomes of Vocational High School Students

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Abstract: This research aims to determine the effect of the Index Card Match Type Cooperative Learning Model on the Learning Outcomes of DPIB Basic Principles at State Vocational School 1 Percut Sei Tuan. This research method is a Quasi-Experimental design. This method is used to measure variables before and after to see the causal relationship of the phenomenon under study. Based on the research results, the use of the Index Card Match Type Cooperative Learning Model has a better impact on learning outcomes in the cognitive domain of DPIB Basic Principles on Building Statics elements. This is proven by research results which show that the average cognitive learning outcomes of students who were taught using the Index Card Match Type Cooperative Learning Model was 73.06, higher than the average learning outcomes of students who were treated with the Direct Instruction model, namely amounting to 61.94. This is also reflected in the research data, the t test results show a t value of 3.73 compared to the t table value of 1.670 (t value > t table). Based on these differences, both theoretically and proven by statistical analysis carried out in this research, it can be concluded that the Index Card Match Type Cooperative Learning Model has a significantly different influence on student learning outcomes on DPIB Basic Principles in Building Statics Elements for class students X DPIB Skills Program State Vocational High School 1 Percut Sei Tuan.

Keywords: index card match, cooperative learning, learning outcome, vocational high school.

INTRODUCTION

Education is a change in the attitudes and behavior of a person or group of people in an effort to mature humans through teaching and learning efforts, training, actions and educational methods. Based on Law no. 20 of 2003 states that education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have religious spiritual strength, self-control,

personality, intelligence, noble morals, and the skills needed by themselves, society, and the nation. and country.

Percut Sei Tuan 1 State Vocational High School is a state formal educational institution located in Deli Serdang Regency, North Sumatra, with the address Jl. Pool No. 3, New Memories, Percut Sei Tuan District. This school has been established since 1955 until now. Percut Sei Tuan 1 State Vocational High School offers 14 skills programs, including Design, Modeling and Building Information (DPIB), where students are taught basic skills in building techniques starting from planning, drafting, calculations and understanding building materials. Graduates of the Building Modeling and Information Design (DPIB) skills program are expected to be able to become drafters, architects and estimators. In the Building Modeling and Information Design (DPIB) expertise program, there is one subject, namely Basics of Building Modeling and Information Design, where in this subject there are several elements, including Elements of Building Statics Calculations.

The basics of modeling design and building information are productive subjects in the DPIB expertise program. Students are required to have knowledge and skills regarding the basic subjects of modeling design and building information, which will become students' future provisions and can be applied in the world of work. So that students can become more productive and achieve quality graduates. As for learning outcomes from building static calculation elements, students are expected to be able to understand the elements of building structures, calculate force balance in building structures and calculate member forces in simple frames.

Based on observations and interviews conducted on September 20 2023, with subject teachers on building statics calculation elements in the material on force balance calculations on building structures in class the building structure is not yet optimal. This can be seen from one of the students' daily scores on the material which is still below the expected standard. Apart from that, the results of interviews with teachers stated that the facilities and infrastructure were insufficient so that it was not possible to develop learning models.

Based on interviews with teachers of the Basics of Modeling Design and Building Information subject at the Percut Sei Tuan 1 State Vocational High School as well as observations made, it is known that the teacher uses the Direct Instruction Model in the learning process. This model usually involves lecture methods, question and answer, and giving assignments, where the teacher explains the material and students listen and take notes (Herianto and Wijaya, 2018). The lecture method is interaction through verbal explanations from the teacher to students regarding concepts, principles and facts, which ends with a question and answer session (Peranginangin et al., 2020).

In the learning process, teachers use ebooks sent via WhatsApp group. If there is little material, the teacher writes it on the blackboard when learning begins. If there is a lot, the material is sent at night via WhatsApp. The teacher also sends videos of calculation questions so that students can repeat them if they don't understand. However, many students ignore these materials and videos because they consider them boring. This problem shows the need for innovation in learning approaches to create a more interesting learning environment and increase student interest and learning outcomes. One model that can be applied in a fun teaching and learning process is the Index Card Match Type Cooperative Learning model. Cooperative learning model Index Card Match type is a method used in learning to find pairs of cards where the card contains one question and one answer. This model can be used in the teaching and learning process so that students will be active in learning.

Haruna & Darwis (2020) define Index Card Match as a learning strategy that follows a general pattern, consisting of a series of activities that serve as a guide to achieving effective learning goals. To find out whether students really achieve the existing learning outcomes, look at the student learning outcomes. Index card match is a learning method in which students match question and answer cards, encouraging active participation. Students are involved in paying attention, asking, listening, moving to find

pairs of cards, solving problems, and being enthusiastic, allowing active participation in the group.

Meanwhile, Rambe (2018) formulated the advantages of the Cooperative Index Card Match Type model, including 1) Fostering a sense of joy in teaching and learning activities; 2) The material presented attracts more students' attention; 3) Can create an active and enjoyable learning atmosphere; 4) Can improve student learning outcomes in achieving the level of learning completeness; and 5) The assessment is carried out jointly between observers and players. Meanwhile, the disadvantages of the Index Card Match Type Cooperative model according to Leni & Suripah (2022) include 1) Students need quite a long time to complete assignments; 2) The preparation process requires a long procedure; 3) Teachers need to invest more time

Furthermore, Susanti (2022) formulated the characteristics of the Index Card Match Type Cooperative learning model, namely 1) This method uses cards; 2) Cards are divided into two containing one question and one answer; 3) This method is carried out in pairs; 4) Each pair reads the questions and answers. According to Suarim & Neviyarni (2021), learning is a process that takes place in the implementation of various types and levels of education. This means that success or failure in achieving educational goals really depends on the learning process undertaken by students, both at school and in the family environment. Hamalik (2019) defines learning objectives as referring to the achievement of various learning outcomes which show that students have experienced a learning process. These learning outcomes include knowledge, skills, and changes in attitudes that students are expected to achieve.

According to Sari (2019), learning outcomes are changes in behavior shown by students after experiencing learning activities. This change in behavior depends on the material studied by students. The changes in learning outcomes can be in the form of: 1) Verbal information, 2) Intellectual skills, 3) Cognitive strategies, 4) Motor skills, 5) Attitude. Meanwhile, Mulyadi (2022) stated that learning outcomes are the essence of individual or collaborative efforts with the help of other people to achieve changes in behavior. Then Mahardika (2021) said that learning outcomes are the skills possessed by students after experiencing the learning process. According to Wurjanti (2023) learning outcomes are the final achievement of the learning process. This achievement was followed by corrective action. Changes in behavior are an indicator of successful learning outcomes.

Wati and Kusmariyatni (2021) stated that learning outcomes are significant achievements in the learning process, which can be identified through increased grades in each subject exam as well as the demonstration of a positive attitude. From the teacher's perspective, the act of teaching ends with an evaluation of learning outcomes, while for students, learning outcomes indicate the end of a lesson after reaching the peak of the learning process. Overall, learning outcomes reflect improvements in learning that can be observed through increased learning achievement and the application of good attitudes, which emerge through the interaction between the learning and teaching processes.

Nugroho (2019) stated that the cooperative learning model was chosen because its essence combines both teacher and student approaches and both have the same focus in learning. This is a group learning method organized by the teacher to complete a specific task. This method is very structured because the teacher regulates group formation, material to be discussed, discussion stages, and the final product that must be produced by students.

Silberman (2017) defines that Index Card Match is a learning model used to overcome obstacles in learning through the activity of matching or looking for pairs of cards containing questions and answers. In this strategy, students are expected to learn actively and participate in the learning process. Students are asked to try to find the answer and find the appropriate pair of cards (Hadrann & Yulia, 2019). This research aims to determine the influence of the Index Card Match Type Cooperative Learning Model on

Learning Outcomes in the DPIB Basics Subject at State Vocational High School 1 Percut sei Tuan.

METHODS

This research method is Quasi Experimental. Quasi Experiment is a research method used to look for certain treatments. This research is experimental, carrying out this research involved two treatment classes. In this research, the design used was Control Group Pretest-Posttest. Where this design is divided into two groups, then given a pretest to find out whether there are differences between the experimental group and the control group in the initial situation.

After testing the instrument for class XI DPIB-1, of the 40 questions there were 36 valid questions and 4 invalid questions. In the distribution of test data on the test difficulty index for the DPIB Basics of Building Statics elements, there are 6 questions in the easy category, 25 questions in the medium category and 9 questions in the difficult category.

Based on the distribution of test discriminatory power data from the results of my calculations, 14 questions were in the good category, 6 questions were in the fair category, and 12 questions were in the very good category. According to the distribution of reliability test trial data, based on the correlation calculation of the DPIB Basics test reliability index, the Building Statics element is included in the very high category.

So that the research data obtained can be used in statistical analysis in hypothesis testing that applies the product moment correlation formula, it is necessary to fulfill the analysis requirements first. The analysis requirements test was carried out to ensure that the research data had a normal distribution and homogeneity. The normality test on research data was carried out using the Lilliefors formula. The test criteria are if the calculated F is smaller than the F table at a significance level of 5%, then the research data is considered homogeneous.

After the data has been tested for normality, the next step is to test its homogeneity. The homogeneity test is carried out to determine variations in the population, namely to determine whether the research data is homogeneous or not, using the F test formula.

RESULTS

TABLE 1. *Data Normality Test Results*

Class	Data	N	L_o	L_{table}	Conclusion
Model ICM	*Pre-test*	32	0,136	0,156	Normal
	Post-test		0,142	0,156	Normal
Model DI	*Pre-test*	32	0,143	0,156	Normal
	Post-test		0,149	0,156	Normal

Testing for normality of research data was tested using the Liliefors test, in this case what was tested was the null hypothesis which stated that the sample came from a normally distributed population. After that, proceed with the homogeneity test.

TABLE 2. *Data Homogeneity Test Results*

Data Variance	F_{count}	F_{table}	Conclusion
Pre-test	1,4177	1,835	**Homogen**
Posttest	0,5467	1,835	**Homogen**

Based on research carried out at the Percut Sei Tuan 1 State Vocational High School, DPIB Class Data obtained from 32 students who took the pre-test obtained the lowest score of 33, the highest score of 61, the average pre-test result was 46.09 and the standard deviation was 9.44. To see student scores, interval classes are used, the number of students who have learning outcome scores, and relative frequency, namely the number of percent of learning outcome scores as presented in the table below,

TABLE 3. *Pre-Test Frequency Distribution Data in the Experimental Class*

No	Interval		Frekuency	Percentage
1	33	38	6	19%
2	39	44	2	38%
3	45	50	5	16%
4	51	56	5	16%
5	57	62	4	13%
	Total		**32**	**100%**

Furthermore, the data obtained by 32 students who took the post-test obtained the lowest score of 61, the highest score of 94, the average post-test result was 73.06 and the standard deviation was 10.13. To see student scores, interval classes are used, the number of students who have learning outcome scores, and relative frequency, namely the number of percent of learning outcome scores as presented in the table below,

TABLE 4. *Post-Test Frequency Distribution Data in the Experimental Class*

No	Interval		Frekuency	Percentage
1	61	66	8	25%
2	67	72	11	34%
3	73	78	6	19%
4	79	84	3	9%
5	85	90	2	6%
6	91	96	2	6%
	Total		**32**	**100%**

DISCUSSION

Based on the results of calculations using the F test regarding the pre-test and post-test scores from the DPIB Basics of Building Statics elements, the F value in the pre-test was

1.4177 and in the post-test 0.5467. This value is compared with the F_{table} value, with dk1 = 31 and dk2 = 31, the Ftable value is 1.835. From the results of these calculations it was found that the Fcount value was smaller than the F_{table} value ($F_{count} < F_{table}$), namely in the pre-test 1.4177 < 1.835 and in the post-test 0.5467 < 1.835. This shows that both data, pre-test and post-test, have homogeneous data variance. This means that the two classes sampled in this study can represent other classes.

After analyzing the data requirements in the form of a normality test and homogeneity test, the conclusion was obtained that the two groups (experimental and control) had a normal and homogeneous distribution. Based on these results, data analysis can be continued using the t-test. In summary, the t-test carried out on post-test data from both classes obtained the results,

$$t = \frac{73,0625 - 61,938}{12} \ (1) \quad \frac{}{2 + \frac{1}{32}} = \frac{11,25}{3,0122}$$

$$t = 3,7 \ (2)$$

At the significance level $\propto$ = 0.05 and dk = n1+n-2 = 32+32-2= 62 via the ttable distribution table, namely 1.670, for complete details, see the attachment. Thus, t_{count} = 3.73 and t_{table} 1.670 ($t_{count} > t_{table}$) so Ha is accepted and H0 is rejected. It can be concluded that the use of the Index Card Match learning model has a superior influence on the learning outcomes of DPIB Basics in Building Statics elements for class

CONCLUSION

Based on the research results, the use of the Index Card Match type cooperative learning model has a better influence on the learning outcomes of the DPIB Basics of Building Statics elements in the cognitive domain. This can be seen from the research results which show that the average student learning outcomes in cognitive abilities taught with the ICM learning model is 73.06, higher than the average learning outcomes for students treated with the Direct Instruction learning model, which is 61.94. This can also be seen from the research data using the t-test, the value of t-count = 3.73 and t-table = 1.670 ($t_{count} > t_{table}$).

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