

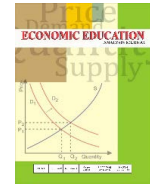


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The Effect of Applying Active Learning Model Type Index Card Match on Students' Higher Order Thinking Skills (HOTS)

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Abstract

This study aims to determine the effect of applying active learning model type index card match on students' higher order thinking skills. The type of this study is quasi-experimental research. The quasi-experimental design used was a nonequivalent control group design. The population in this study were all Class XI Social Sciences students at Public High School 2 Tilatang Kamang for the 2021/2022 academic year. Sampling in this study used simple random sampling technique of 52 respondents. The data analysis technique used Two-Way ANOVA with the SPSS version 22 program. The data collection method used test, questionnaires, and observation sheet. Based on the results of the research and data analysis, it can be concluded that the higher order thinking skills of students who are taught with the index card match learning model are significantly higher than those taught using the conventional learning model, the higher order thinking skills of students who have high learning activities is significantly higher than students who have low learning activities, and the index card match learning model and learning activities do not interact with each other in influencing students' higher order thinking skills, which means that the two factors do not simultaneously exert their influence.

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INTRODUCTION

Higher-order thinking skills are soft skills that students must train and have from an early age as a provision for life in order to be able to meet the demands in the world of work. This ability plays an important role in the educational process because it can affect the thinking ability of students to a higher level. High Order Thinking Skills is the capacity to think in ways other than remembering, restating, and referring without processing, but rather the capacity to think critically about information, be imaginative, and find solutions to problems (Aningsih, 2018).

High Order Thinking Skills will occur when a person associates new information with information that is already stored in his memory, namely by relating it back and developing the information to achieve a goal from a situation that is difficult to solve (Kurniati, 2014: 62). To upgrade students' higher order thinking skills, it is necessary to pay attention to the indicators of higher order thinking. The indicators of high-level thinking skills used are relevant to the context of education in Indonesia which refers to the revised Bloom taxonomy including analyzing (analyze), evaluating (evaluate), and creating (create), Anderson (2015: 120-133).

The application of the index card match model is able to make students' high-level thinking skills (HOTS) increase, especially in Fiqhi learning (Jumania, 2019). However, some findings also show that index card match as a learning model does not have a significant effect on students' high order thinking skills but is more effective on student learning outcomes in learning Mathematics class XI Science at YLPI High School (Wahyuni, 2015).

Students' higher-order thinking skills can be achieved if there is a learning model that supports the learning process. The role of learning models in the world of education is considered very important to achieve the desired learning objectives achieved optimally.

The definition of a learning model is a conceptual framework that describes a system-

atic approach to structuring learning experiences to achieve specific learning objectives and serves as a guide for learning designers and teachers in making and implementing the learning process (Trianto, 2012: 53).

One of the active learning models that can hone students' high order thinking skills is by applying the ICM type active learning model. This learning model is a flashcard search model (card pair) that allows students to take part in the learning process and be able to review the teaching materials that have been previously learned in a fun way.

Through this learning model students are expected to learn and understand concepts using this teaching strategy by searching on index cards, which are divided into question-and-answer cards (Sumayana, Y. 2015). Each student is given the opportunity to choose one card that contains a question, then the student is asked to find another card with the correct answer related to the question given. This learning model contains elements of games that have the potential to make students happy while participating in the learning process (Vinda Trinovia 2013).

Fun learning process will affect the speed of students in understanding the material provided. One way to create fun learning is by applying active learning model of index card match type. The index card game has so far been believed to be able to improve students' higher-level thinking skills through activities to find card pairs (Maskuroh, 2017). The index card game requires students to work together in completing the game, where students need to learn independently while the teacher acts as a facilitator.

Another factor that triggers the emergence of students' higher-level thinking skills is student learning activities. If the process of delivering information from educators is well received by students, student learning activities are considered effective. The indicators of student learning activities are visual activities, oral activities, listening activities, writing activities, drawing activities, motor activities, mental activities, and emotional activities

(Diedrich, 2012: 172). Furthermore, optimal learning activities are able to activate and improve students' thinking abilities, including their ability to think to a higher level.

Through optimal learning activities, it is expected that students' higher order thinking skills will also increase. Learning activities have a positive effect on students' ability to think at a higher level in ecosystem learning in class X Science Students at Public High School 7 Banjarmasin (Mardiningsih, M., & Saliyem, S. 2017). However, some findings also state that student learning activities do not fully affect students' higher order thinking skills but rather have more influence on students' mathematics learning outcomes (Annisa F., & Marlina, M., 2019: 1047-1054). With the application of the active learning model type index card match and supported by previous findings in the teaching and learning process in class, it is hoped that there will be changes in students towards the better. The intended change is that students become more happy to take lessons and are interested in the material being taught so that learning activities become more optimal and improve students' higher order thinking skills.

The development of the curriculum requires students to have the ability to think at a high level in facing the era of globalization with the rapid development of technology. It is very important for students to have high order thinking skills. Assessments in the form of tests can be used to hone students' thinking skills, and are influential in determining stu-

dents' thinking skills.

Many studies show that students in Indonesia have low HOTS skills compared to other countries, one of the factors that cause this is that students are not continuously trained to have high-level thinking skills, so that students are able to understand the material studied properly, it is necessary for teachers to optimize assessment techniques in the form of tests that can be used to hone students' thinking skills in this case HOTS.

Initial observations showed that students' HOTS were still in the low category, this happened because the learning process did not facilitate students to hone their thinking skills, where the learning process that took place at Public High School 2 Tilatang Kamang tended to be teacher centered. Learning is more likely to communicate in one direction so that the information obtained by students is only fixated on what is delivered (Sembiring, R. B. 2013).

Teachers do not provide opportunities for students to actively participate in developing higher order thinking skills that allow them to be trained in problem solving. As a result, students are less active and tend to be lazy to think independently so that they do not improve their thinking skills to a higher level and will certainly have an impact on unsatisfactory learning outcomes. Table 1 is the acquisition of students' economic scores as learning outcomes in economics subjects in Class XI Social Sciences students at Public High School 2 Tilatang Kamang.

Table 1. Economic Score and Percentage of Complete Semester II Exams, Class XI Social Sciences Students at Public High School 2 Tilatang Kamang Period 2021/2022

Class	Total Students	Complete		Not Finished		KKM
		Total	%	Total	%	
XI IPS 1	26	10	38.46	16	61.53	75
XI IPS 2	26	12	46.15	14	53.84	75

Source: State Vocational High School 2 Tilatang Kamang, 2022

Higher order thinking skills (HOTS) are the output of student learning outcomes. As we know, the assessment of learning outcomes focuses more on students' higher order thinking skills (HOTS) (Kemendikbud, 2017). The acquisition of student learning outcomes that are less than the Minimum Completeness Criteria (KKM) shows that students' HOTS are still in the low category.

Referring to Table 1, it is clear that the value of students' economics subjects as learning outcomes in Class XI Social Sciences students at Public High School 2 Tilatang Kamang is quite satisfying, but there are still a number of students occupying positions at the KKM threshold (Minimum Completeness Criteria) namely class XI Social Sciences 1 as many as 16 people (61%), and class XI Social Sciences 2 as many as 14 people (53%). When viewed from the level of completeness percentage, each class still has not reached the specified target limit of 75%. This shows that the economic learning outcomes obtained by students in each class have not reached the KKM.

In achieving support for students' absorption of a lesson, three pillars of successful learning are initiated, namely learning methods, learning strategies and learning model. Learning methods are a good choice for teachers to improve teaching. The learning method is very appropriate to be used as a connecting step for interactions between teachers and students to achieve learning objectives with the correct learning mechanism (Afandi et al. 2013).

From the findings of the facts above it identifies that the process of student learning activities is still not effective, where teaching and learning activities are currently being implemented by teachers still using conventional learning models. Among the many factors described above, the authors chose internal factors in the form of learning activity variables and learning models in the form of Index Card Match (ICM) as factors that determine the high order thinking skills of Class XI Social Sciences students at Public High School 2

Tilatang Kamang.

Based on the justification given, there are several variables that can affect the high order thinking skills achieved through student learning outcomes. For that reason, the author is interested in studying how much influence the use of active learning model type index card match, learning activities, on high order thinking skills of students. From the background that has been described above, researchers are interested in conducting research on "The Effect of Applying Active Learning Model Type Index Card Match on Students' Higher Order Thinking Skills (HOTS)".

METHODS

Index Card Match method was carried out in class XI Social Sciences 1 while the conventional method was carried out in class XI Social Sciences 2. Both classes were given KD 3.1 material, namely implementing analyze the concept and method of calculating national income at XI Social Sciences students at Public High School 2 Tilatang Kamang.

Quasi-experimental is a type of research that has a control group, using the Nonequivalent Control Group Design. The experimental and control groups were each given treatment. Sugiyono (2013), suggested that the experimental and control groups in this design were not choose randomly.

The purpose of this study was to determine the extent to which the effect to applying the active learning model of the index card match type and learning activities on student's higher order thinking skills. The population in this study were 52 students. The sample selection used simple random sampling technique with class XI Social Sciences 1 as the experimental class with a total of 26 students, and class XI Social Sciences 2 as the control class with a total of 26 students.

The first meeting in this experimental class began by carrying out pretest activities, then continued with the researcher first explaining the learning material, namely national income in outline as an introduction to lear-

ning, then the researcher divided the students into two large groups, namely group A and group B, where group A is the group that owns the cards containing questions while group B owns the cards containing answers based on the results obtained by students after working on pretest questions that have been distributed at the beginning of the meeting. The researcher then took out the pieces of cards containing the questions and answers that had been prepared and mixed the two sets of cards and shuffled them several times so that they were completely mixed. The researcher gave one index card to each student and explained that the activity was carried out in pairs, some students got question cards and others got answer cards.

However, students are not only directed to match question cards and answer cards, but each pair will test other pairs with questions and answer keys owned by each pair. The researcher gave instructions and directed students to look for partner cards, if they had found a partner then the researcher asked students to sit close together and not tell what was on the card to other pairs. After all the matched pairs sat close together then the researcher asked each pair to read aloud the questions they got in turn and challenged other students to provide answers accompanied by logical explanations. During the activity, the researcher provides guidance or direction to students who are having difficulty and corrects the results of card matching. At the end of the learning process, the researcher and students conducted reflection activities regarding the learning activities that had been carried out at the meeting by making conclusions.

The determination of the experimental class and the control class was based on consideration of the XI class student score data obtained during the initial observation and based on directions and input from the homeroom teacher for class XI Social Sciences 1 and XI Social Sciences 2. The research was conducted at Public High School 2 Tilatang Kamang by using a multiple-choice written test instrument which of course by paying attention to

the aspects of writing question items must be in accordance with the rules for writing HOTS items, which include cognitive levels (L3 Reasoning) for levels C4, C5 and C6 to obtain student learning outcomes in determining students' higher order thinking skills. It should be noted that difficult problems given are not necessarily included in the HOTS problems category if the solution does not require reasoning aspects. As we know that HOTS questions can measure higher-order thinking skills, such as thinking skills that go beyond recall, restate, or refer without processing.

Data analysis was performed by descriptive analysis, normality and homogeneity test. Hypothesis testing used Two-Way Anova test. The data analysis process was carried out by using the SPSS version 22 program.

RESULTS AND DISCUSSION

This research was described by student learning outcomes in the cognitive domain to see the extend of student's higher order thinking skills. Description of the data obtained from the experimental class showed the average Pretest was 55.65 and when the Posttest increased to 84.08. In the control class, the average Pretest was 50.00 then the posttest increased to 62.31. Furthermore, the analysis prerequisite test is carried out in Table 2.

Based on the "Test Statistics" output, it is known that the Asymp. Sig. (2 Tailed) value of $0.000 < 0.05$. So, it can be concluded that "hypothesis accepted". Thus, it can be said that there is a difference in students' higher order thinking skills between the experimental class (index card match) and control class (conventional). Because there is a significant difference, it can be said that "there is an effect of using the index card match learning model on students' higher order thinking skills".

Then the homogeneity test was carried out in Table 3. The results of the variance in the two samples were the same or homogeneous, with 95% confidence the sig value was $0.230 > 0.05$. In other words, the variances for the two samples are the same/ homogeneous.

Table 2. Normality Test Results

Test Statistics ^a	
High order thinking skills	
Mann-Whitney U	50.000
Wilcoxon W	401.000
Z	-5.315
Asymp. Sig. (2-tailed)	.000

a. Grouping Variable: Class
b. Not corrected forties

Source: Processed Primary Data, 2022

Table 3. Homogeneity Test Results

Test of Homogeneity of Variance					
		Levene Statistic	df1	df2	Sig.
Higher order thinking skills	Based on Mean	1.476	1	50	.230
	Based on Median	1.021	1	50	.317
	Based on Median and with adjusted df	1.021	1	48.025	.317
	Based on trimmed mean	1.418	1	50	.239

Source: Processed Primary Data, 2022

Table 4. Two-Way ANOVA Test

Variable	Type III Sum of Squares	Df	Mean Square	F	Sig.	Description
Model	3071.035	1	3071.035	79.254	.000	There is a difference
Activity	3193.471	1	3193.471	82.414	.000	There is a difference
Model * Activity	35.031	1	35.031	.904	.346	No interactions

a. R Squared = .838 (Adjusted R Squared = .827)

Source: Primary Processed Data, 2022

For decision making in the study the authors conducted a hypothesis test. Hypothesis testing in this study used a Two-Way ANOVA test. Based on the results of the Two-Way ANOVA calculation, the R Squared value was 0.838, meaning that the learning model and learning activity variables explained students' high order thinking skills of 83.8%. The results of testing the hypothesis can be seen: (1)

The high order thinking skills of students who are taught using the index card match type active learning model are significantly higher than those taught by conventional learning models. This can be seen from the F value of 79,254 with a value of (Sig. < a) or (0.000 < 0.05); (2) The high order thinking ability of students who have high learning activity is significantly higher than students who have

low learning activity. This can be seen from the F value of 82,414 with a value of (Sig. < a) or (0.000 < 0.05); (3) There is no interaction between learning models and learning activities on students' high-level thinking skills. This can be seen from the F value of 0.904 with a value of (Sig. > a) or (0.346 > 0.05).

The students' high order thinking skills (HOTS) index card match learning model is higher than the conventional learning model, it can be seen that the index card match as a learning model has an impact on students' high order thinking skills, as shown by the results of the Two-Way ANOVA test used in hypothesis testing.

Where the value of the Two-Way ANOVA test at a significance level of 0.05 obtained a sig value of $0.000 < 0.05$, which means that the application of the index card match learning model has an impact on the high order thinking skills of Class XI Social Sciences students at Public High School 2 Tilkam. This shows that the index card match learning model has improved students' higher-order thinking skills. Besides that, it can also be observed from the overall posttest scores obtained by students that the use of ICM as a learning model results in a higher posttest score of 84.08 than the use of conventional learning models of 62.31.

Solekhah, et al (2020), stated that the index card matching learning model can be a stimulant or trigger for self-motivation in learning and is not only able to improve students' high order thinking skills but also increase their enthusiasm for learning. Not only that, the learning model in the form of searching for index cards or looking for pairs of these cards requires the active participation of students during the learning process. This is in line with the opinion (Maskuroh, 2017), that activities that involve students finding pairs of cards in an index card game can help and develop their thinking skills to a higher level.

Students with high order thinking skills (HOTS) with high learning activity are higher than those with low learning activity, it can be seen that learning activities affect students

high order thinking skills. From the findings of the Two-Way ANOVA test it is clear that learning activities have an influence on students' higher order thinking skills.

The results of the Two-Way ANOVA test at a significance threshold of 0.05 yielded a sig value of < 0.05 , which indicates that high learning activity has an effect on the high order thinking skills of students in Class XI Social Sciences students at Public High School 2 Tilatang Kamang. This proves that high level learning activities make students' abilities in higher order thinking better.

Researchers categorized students from the experimental class and the control class into two groups, namely groups of students with high learning activity and groups of students with low learning activity, as seen from the results of distributing observation sheets about learning activities. The average learning outcomes showing the higher-order thinking skills of each group are determined based on this series of activities.

In the experimental class, the average learning result for the group of students who had high learning activity was 93 and the average for the group of students who had low learning activity was 74. As a result, there was an average difference of 19 points between the two groups. While in the control class, the average learning result for the group of students who had high learning activity was 74 and the average for the group of students who had low learning activity was 59.

As a result, there was an average difference of 15 points between the two groups. Therefore, it can be concluded that students with high learning activity have higher order thinking skills compared to students who have low learning activity.

One of the active learning models that can increase student learning activity is the index card match (ICM) model. Index card match is a type of active learning which is part of reviewing strategies (repetition strategy). As stated (Siberman, 2009:249), taking time to reflect on what has been learned is the only sure way to ensure that the lesson sticks

in the mind. Increased student learning activity is usually accompanied by an increase in their thinking skills. This is reinforced by the opinion of Yuli and Asmawati (2007) in Hamdani (2019) that higher order thinking is a constant action to evaluate something that is seen as truth or support to obtain further conclusions that are appropriately referred to as supporting evidence.

There is no interaction between learning models and learning activities on students' High Order Thinking Skills (HOTS), it can be seen that there is no interaction between the index card match as learning model and learning activities on students' high order thinking skills. Because there is no interaction between the index card match learning model and learning activities on high-level thinking skills of Class XI Social Sciences students at Public High School 2 Tilatang Kamang, the Two-Way ANOVA test score at a significance threshold of 0.05 produces a sig value of $0.0346 < 0.05$.

The absence of this interaction can be seen in the diverse backgrounds of students, both in terms of abilities, learning styles, and even learning activities. Before being given treatment with the ICM learning model, it turned out that these students were thought to come from students with middle to lower abilities with a kinesthetic learning style and low learning activity. Furthermore, the absence of interaction is caused by the reality of economics learning in the field, where teachers have not been trained in applying active and innovative learning models and only rely on direct instruction learning models on economics subjects, which causes students to be inactive during the learning process. Economics teachers are accustomed to using direct instruction or lecture models, thereby reducing the level of enthusiasm of students when asked to construct their own knowledge in the learning process.

Therefore, it is important for a teacher to first look at the background of each student in determining the right learning model, so that optimal learning is created. The above opinion

is in line with the findings of Mustofa's research (2017), the calculation results show that H_0 is accepted because $F_{AB} < F_{table}$ which is $0.9504 < 3.1716$.

This shows that the ICM model and learning activities have no effect on student's mathematics learning outcomes. Also supported by the research of Adiningsih, K., & Ariyanto, M. P. (2017) that there is no interaction between learning strategies in terms of students' activeness in learning mathematics. This explanation leads to the conclusion that there is no reciprocal relationship between the use of index card matches as a learning model and learning activities on students' high order thinking skills in subjects applied in Class XI Social Sciences students at Public High School 2 Tilatang Kamang.

CONCLUSION

Based on the results of the study, it can be concluded that: (1) high order thinking skills of students who are taught with the index card match learning model are significantly higher than those taught with conventional learning models; (2) high order thinking skills of students with learning activities high significantly higher than students with low learning activity; (3) there is no interaction in the use of Index Card Match as a learning model with learning activities in determining students' High order thinking skills.

The implications of the research above are as follows: (1) a learning model is needed that can spur students' initial abilities that have an impact on improving their thinking skills. One of the active learning models that can hone students' higher order thinking skills is by applying the Index Card Match (ICM) type active learning model. Through this learning model, students are required to master and understand concepts through index card searches, so that they can improve their high-level thinking skills on the subject matter provided by the teacher; (2) It is necessary to develop innovative and creative learning that can foster enthusiasm and strengthen students' un-

derstanding of the material being studied. Innovative learning is certainly needed in a very pleasant classroom condition, so that students can grow and develop as they should. The teacher's effort to achieve the learning objectives is by implementing an active learning model. Learning with this type of ICM requires students to work together and help each other in pairs to solve the questions obtained and match with the answers. Each pair will throw their questions to other pairs and also answer questions from other pairs.

By working together, it is expected to increase students' sense of responsibility and motivation to learn in a fun way so that students are not bored and active in the learning process; (3) It is important for a teacher to first look at the background of each student in determining the right learning model, in order to create optimal learning.

The limitations of the research are at the first meeting students had difficulty finding partners. It takes a long time for students to find partners and arrange seats. Even though they had been told beforehand about the procedures for finding a partner. In order for the obstacles that occurred at the first meeting to be resolved immediately, the researchers explained the procedures for implementing the ICM in detail so that they would not experience any more difficulties.

The suggestions that can be shared are: for teachers through the application of the index card match learning method it is hoped that it can improve teacher performance in terms of classroom learning and can be used as a reference in efforts to improve the quality of learning and as an alternative in teaching economic material that is more enjoyable and easy for students to understand. For further researchers, it is recommended to apply index card match as learning model with other variables on different learning materials.

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