



THE EFFECT OF THE IMPLEMENTATION OF THE DISCOVERY LEARNING MODEL AS A STRATEGY TO IMPROVE HIGHER-ORDER THINKING SKILLS OF STUDENTS IN CLASS XI SOCIAL ON ECONOMIC LEARNING AT EAST JAKARTA SENIOR HIGH SCHOOL

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Abstract

This study aims to improve the Higher-Order Thinking Skills of students using the Discovery Learning model at the high school level in economic learning. The method used in this study is Quasi-experimental with Pretest-Posttest Non Equivalent Control Group Design. The population of this study is all students of SMA Negeri 50 Jakarta and SMA Negeri 59 Jakarta. Samples of this study were students of Class XI Social 1 and XI Social 2 at SMA Negeri 59 Jakarta and Class XI Social 1 and XI Social 4 at SMA Negeri 50 Jakarta, where Class XI Social 1 at SMA Negeri 59 and SMA Negeri 50 Jakarta used as a control class using conventional learning models and Class XI IPS 2 and XI IPS 4 at SMA Negeri 59 and SMA Negeri 50 Jakarta as experimental classes using Discovery Learning models. The research instruments used were pretest and posttest of Higher-Order Thinking Skills. The results showed that the data were normally distributed and homogeneous. The results of parametric statistical analysis is done by the technique of data analysis One-Tailed T Test (Right Side) with Independent Sample T-Test. For the value of N-Gain score data is normally distributed and homogeneous, then the One-Tailed T Test (Right Side) with an Independent Sample T-Test N-Gain. The results showed that (1) Higher-Order Thinking Skills of learners between classes that use the Discovery Learning model (experimental class) is higher than Higher-Order Thinking Skills of learners who use the conventional learning model (control class). This is evidenced by the results of hypothesis testing with One-Tailed T Test (Right Side) $t_{count} > t_{tabel}$ value is $4.265 > 1.656$ and Sig. (1-tailed) of 0.000. Because $0.000 < 0.05$ so it can be stated that H_0 is rejected and H_a is accepted. (2) The improvement of Higher-Order Thinking Skills of learners between classes that use the Discovery Learning model (experimental class) is higher than the Higher-Order Thinking Skills of learners who use the conventional learning model (control class). This is evidenced by the results of hypothesis testing with a One-Tailed T Test (Right Side) obtained by Sig. (1-tailed) amounted to 0.0125. Because $0.0125 < 0.05$ so it can be stated that H_0 is rejected and H_a is accepted.

Keywords: Discovery Learning Model, Conventional Learning Model, Higher-Order Thinking Skills.

INTRODUCTION

Success in the 21st century depends on the degree to which an individual develops the right skills to master the forces of speed, complexity, and unpredictability. The complexity of the world is increasing and requires humans to analyze every situation logically and solve problems creatively. To face these changes, the field of education must equip students with various competencies to face problems that may arise. In the 21st century, learners are required to not only acquire knowledge but also learn skills that help them synthesize, generate knowledge, and master thinking skills to deal with many situations that arise in the

real world. Such thinking skills are more commonly described as Higher-Order Thinking Skills. Higher-Order Thinking Skills as a cognitive dimension of 21st century skills that require complex thinking are described in the context of education as the three highest levels in Bloom's taxonomy of analyzing, evaluating, and creating (Gottschling, Krieger & Greiff, 2022).

Higher-Order Thinking Skills are the ability to apply knowledge, skills, and values through reasoning and reflection to solve problems, make decisions, innovate, and successfully create. Higher-Order Thinking Skills as the level of thinking required to shape the generation of the 21st century have the potential to compete globally with the intelligence, creativity, and innovation required. Higher-Order Thinking Skills are also considered as a kind of thinking pattern that requires more mental activity that requires the active involvement of The Thinker to tolerate doubts, find knowledge and solve problems in innovative ways.

Education today should focus on fostering and developing Higher-Order Thinking Skills where learners can train themselves to face the demands of increasingly modern times. Currently problem solving has been highlighted as an important skill in schools that needs to be introduced into learners ' learning as a process to stimulate their Higher-Order Thinking Skills. Schools as the education sector need to include Higher-Order Thinking Skills questions to encourage learners to think deeply and more critically.

Thus educating 21st century learners facing complex real life problems often requires complex solutions. Higher-Order Thinking Skills can be developed through teaching and learning. Higher-Order Thinking Skills involve an individual's ability to apply, develop, and enhance knowledge in a thinking context. For learners, learning Higher-Order Thinking Skills will strengthen the mind and guide them in generating more alternatives, actions, and ideas. It can also nurture learners ' critical thinking, help generate a wealth of ideas and develop problem-solving skills for their lives.

In fact, although Higher-Order Thinking Skills as an essential thinking ability, it is proven that higher-Order Thinking Skills of learners in Indonesia have not been fully developed ideally. This is reinforced by PISA data (Programme of International Student Assessment) can be seen the low position of Indonesia from year to year in the following table:

Tabel 1. PISA Data (Programme of International Student Assessment) 2000-2018

Year	Indonesia Average Score	International Average Score	Indonesia Ranking	Number Of Participating Countries
2000	393	500	38	41
2003	395	500	38	40
2006	393	500	50	57
2009	383	500	60	65
2012	382	500	71	72
2015	403	500	64	72
2018	396	500	74	79

Source: Taken and Processed Authors of The PISA Report

Based on Table 1 showing PISA data, it can be seen that Indonesia's ranking achievement is still below average compared to the average international score of 500 and is always at the lowest PISA measurement level globally, these results have been constant since the first PISA was carried out in 2000 until the PISA assessment in 2018. This indicates that the quality of education in Indonesia is still lagging behind other participating countries. Furthermore, based on these data, it can be described that Indonesian students are only able to understand simple scientific knowledge. In other words, Indonesian students have not achieved Higher-Order Thinking Skills (HOTS) and are still far behind compared to other Organization for Economic Cooperation and Development (OECD) countries.

Higher-Order Thinking Skills that are still relatively low are also reinforced by survey data from TIMSS (Trends in International Mathematics and Science) in the following table:

Tabel 2. TIMSS Data (Trends in International Mathematics and Science) 1999-2015

Year	Indonesia Ranking	Number Of Participating Countries
1999	34	38
2003	35	46
2007	36	49
2011	38	42
2015	44	49

Source: Balitbang Kemendikbud

Based on Table 1.2, TIMSS survey data shows that Indonesia always ranks low even every activity shows a declining ranking starting from 1999 ranked 34th, in 2003 ranked 35th, in 2007 ranked 36th, in 2011 ranked 40th, and in 2015 to rank 45th.

Based on the initial facts in the field, the researchers obtained a list of values from the Mid-Semester Assessment Results (PTS) of the even semester of the 2022/2023 Higher-Order Thinking Skills of Class XI social students at East Jakarta Senior High School for economic learning, which is still relatively low, can be seen in tables 3 and 4 below:

Tabel 3. Data Value Mid-Semester Assessment of Economic Learning Class XI Social at East Jakarta Senior High School

Class	Total	KKM	Number Of Students Getting Grades	
			Above KKM (>75)	Under KKM (<75)
XI IPS 1	36	75	8	28
XI IPS 2	36	75	11	25
XI IPS 3	35	75	14	21
Total	107		33	74

Source : Teacher Secondary Data (2022)

Based on these data we can know that of the 107 students who are divided into 3 Social Studies classes as many as 74 students or 69.16% of students obtain values below the minimum completeness criteria (KKM) which is 75 in economic learning, while the rest for students who managed to obtain values above KKM only as many as 33 students or 30.84% of students. This shows that the value of students in this class is very low which indicates that students have Higher-Order Thinking skills are low. Because learners still use the problem type LOTS but still get a low score.

Tabel 4 Data Value Mid-Semester Assessment of Economic Learning Class XI Social at East Jakarta Senior High School

Class	Total	KKM	Number Of Students Getting Grades	
			Above KKM (>75)	Under KKM (<75)
XI IPS 1	34	75	1	33
XI IPS 2	36	75	6	30
XI IPS 3	40	75	8	32
XI IPS 4	39	75	10	24
Total	149		25	119

Source : Teacher Secondary Data (2022)

Based on these data we can know that of the 149 students who are divided into 4 classes as many as 119 students or 80% of students obtain scores below the minimum completeness criteria (KKM) which is 75 in economic learning, while the rest for students who managed to obtain scores above KKM only as many as 25 students or 16.77% of students. This shows that it shows that the value of students in this class is very low which indicates that students have Higher-Order Thinking skills are low. Because learners still use the problem type LOTS but still get a low score.

From this problem shows, the condition of learners is not involved and facilitated in critical thinking activities so that Higher-Order Thinking Skills of learners to solve problems do not develop. The learning approach should be able to improve the Higher-Order Thinking Skills of learners. In line with these problems, Almalki, Ibrahim dan Elfeky (2022) show that solutions that can be done to hone Higher-Order Thinking Skills of learners are one of them by developing a learning model whose application is in line with increasing Higher-Order Thinking Skills. Adjusting to the needs and demands of current competencies, educators are expected to apply learning using learning models that support the creation of Higher-Order Thinking Skills. The expected learning model is an innovative learning model in line with the view of constructivism theory so that it actively forms learners to carry out activities, actively think, formulate concepts and give meaning to the things being studied. One of the learning models that is in line with the view of constructivism theory and can improve Higher-Order Thinking Skills is Discovery Learning.

The steps of the discovery learning model are designed to increase the involvement of learners actively and deliberately in learning activities. Some of the typical activities found in Discovery Learning which include exploring and solving problems to create, combine, and generalize knowledge, are learner-

centered (student-centered) and combine new knowledge with previous knowledge. This activity supports the improvement of Higher-Order Thinking skills of learners, namely analyzing, evaluating, and creating (Wiono & Meriza, 2022). When learners understand what they are learning and can construct their own knowledge, they will have the opportunity to acquire comprehension skills at the level of Higher-Order Thinking Skills, a level that achieves the ability to apply knowledge to solve problems. In the other words, the ability to understand will give rise to problem-solving abilities. On the other hand, problem-solving skills will build Higher-Order Thinking Skills as well.

LITERATURE REVIEW

Higher-Order Thinking Skills

According to Pratiwi and Mustadi (2021), Higher-Order Thinking Skills are not skills for memorizing, recognizing, or repeating. It deals with problem solving, critical thinking skills, creative thinking skills, reasoning, and decision making. One of the features of learning Higher-Order Thinking Skills is that it allows learners to think divergently. This involves several possibilities, alternative answers, and various thoughts.

Brookhart (2010) describes the definition of Higher-Order Thinking Skills are divided into three categories: (1) the definition of Higher-Order Thinking Skills in terms of transfer, (2) the definition of Higher-Order Thinking Skills in critical thinking, and (3) the definition of Higher-Order Thinking Skills In problem solving.

The first category is Higher-Order Thinking Skills in terms of transfer, Brookhart (2010) defines Higher-Order Thinking Skills as learners ' skills to be able to transfer. "Being able to think " means that learners can apply the knowledge and skills they develop during learning into new contexts. "New " here means an app that learners have never thought of before, not necessarily something universally new. Higher-Order Thinking Skills as transfer is understood as the ability of learners to relate their learning to other elements beyond those they are taught to associate with it. Anderson dan Krathwohl (2001) describe in Higher-Order thinking Skill as a transfer covering the "top end" of Bloom's taxonomy, namely the skills of analyzing, evaluating, and creating.

The second category of Higher-Order Thinking Skills in terms of critical thinking is defined as the thinking ability of learners who can apply wise judgment or produce reasoned criticism. Higher-Order Thinking Skills in terms of critical thinking has the purpose of teaching equip learners to be able to reason, reflect, and make the right decisions.

The third category is Higher-Order Thinking Skills in terms of problem solving is defined as the ability of student participants to be able to identify and solve problems in their academic work and life. This

includes solving the problems set for them (the kind of problem solving we usually think about in school) and solving new problems that they define themselves, inventing something new as the solution. In this case, "being able to think" means that learners can solve problems and work creatively. Brookhart (2010) revealed that Higher-Order Thinking Skills are at the top three intellectual levels in Bloom's taxonomy, namely analyzing (C4), evaluating (C5), and creating (C6). Higher-Order Thinking Skills include problem solving, creative thinking, critical thinking, debating skills, and judgment skills.

Based on the theories mentioned from the experts above, it can be concluded that Higher-Order Thinking Skills are thought processes at a high level that are able to stimulate learners to have the ability to interpret, analyze previous information and are not monotonous. In this case Higher-Order Thinking Skills as the use of an expanded mind to meet new challenges so as to encourage learners to seek and explore information using the available facts effectively and appropriately to find its structure and relationship as an attempt to solve the problem.

Discovery Learning Model

Discovery learning is a learning model that is oriented to the maximum activity of students in the learning process, the direction of maximum activity in the learning process, developing a critical attitude, and students' confidence in what they find in the discovery process (Rahmayanti, 2021).

Discovery learning is a model to develop the way students learn by discovering themselves, investigating themselves, so the results obtained by students will be faithful and durable in memory. With discovery learning, learners can learn analysis and try to solve their own problems so that the habit will be transferred in community life (Hosnan, 2014).

Nurdin, Hanafy dan Mustami (2019) stated that discovery learning is a learner-centered learning process, teachers do not need to present all information to them. Teachers only need to adjust the learning atmosphere that supports the discovery process for learners. The material presented is not in the form of information but learners are given the opportunity to search and find information from the lessons learned. Discovery learning encourages learners to develop their intellectual potential. By finding relationships and patterns of lessons, learners can more easily understand the structure of the material being studied. Learners ask several questions, construct hypotheses, conduct investigations and experiments, analyze data, and provide explanatory evidence.

In the application of the discovery learning model in the classroom, there are several processes that must be carried out in the development of learning in general as follows (Priansa, 2019): (1) Stimulation, (2) Problem Statement, (3) Data Collection, (4) Data Processing, (5) Verification, (6) Generalization.

Based on the notions mentioned above, it can be concluded that discovery learning is a learning model that provides opportunities and involves the active participation of learners to independently explore,

find knowledge independently during the learning process, learn to use critical and creative thinking skills, and try to apply them in problem solving.

METHODS

The research method used is quantitative research methods. Implementation of this study will use experimental methods. The study was conducted for one month. At the initial meeting of each class used one hour of lessons to do the pretest and at the last meeting of each class used one hour of lessons to do the posttest. The treatment given to the experimental group using the discovery learning model, while in the control group using conventional learning models. The Instrument used is a test consisting of pretest and posttest to determine the difference and improvement of Higher-Order Thinking Skills between the experimental class and the control class. Experimental method in this study using Quasi Experimental with a Pretest-Posttest Nonequivalent Control Group Design. Data analysis using IBM Statistics version 24. Nonequivalent Control Group Design with the following research patterns:

Tabel 5 Pretest-Posttest Nonequivalent Control Group Design

Experiment	O ₁	X	O _a
Control	O ₃	-	O ₄

Source: Data Processed by Author (2023)

RESULTS AND DISCUSSION

Higher-Order Thinking Skills of Learners Between Classes That Use The Discovery Learning Model (Experimental Class) is Higher Than Higher-Order Thinking Skills of Learners Who Use Conventional Learning Models (Control Class)

One-Tailed T Test (Right Side) with Independent Sample T-Test was conducted to determine whether the Higher-Order Thinking Skills of students between classes using the Discovery Learning model (experimental class) is higher than the Higher-Order Thinking Skills of students using the conventional learning model (control class). The following test results output Independent Sample T-Test:

Tabel 6 Independent Sample T-Test Output Results for HOTS

		<i>Independent Samples Test</i>								
		<i>Levene's Test for Equality of Variances</i>		<i>t-test for Equality of Means</i>						
		<i>F</i>	<i>Sig.</i>	<i>t</i>	<i>df</i>	<i>Sig. (2-tailed)</i>	<i>Mean Difference</i>	<i>Std. Error Difference</i>	<i>95% Confidence Interval of the Difference</i>	
									<i>Lower</i>	<i>Upper</i>
<i>HOTS</i>	<i>Equal variances assumed</i>	.229	.633	4.265	143	.000	8.598	2.016	4.613	12.583
	<i>Equal variances not assumed</i>			4.261	141.791	.000	8.598	2.018	4.609	12.587

Source: Data Processed by Author (2023)

Based on Table 4.1, it can be seen that the basis of decision making in the One-Tailed T Test (Right Side) is to compare t_{count} with t_{tabel} . Based on the above data, it is known that t_{count} is 4.265 and then determines t_{tabel} with a significant level of 5% or 0.05. The basis for decision making in the One-Tailed T Test (Right Side) is to compare t_{count} with t_{tabel} . Then look for t_{tabel} in the distribution table t with the terms $df: (n_1+n_2) - 2 = 75 + 70 - 2 = 143$, so with $df = 143$ according to t_{tabel} is 1.656. From the calculations obtained, the results of the hypothesis test with a One-Tailed T Test (Right Side) $t_{\text{count}} > t_{\text{tabel}}$ or $4.265 > 1.656$ then H_0 rejected and H_a accepted. In this case t_{count} is in the region of acceptance of H_a and reject H_0 then the hypothesis $H_a: \mu_1 > \mu_2$ is acceptable. Therefore, it can be concluded that the Higher-Order Thinking Skills of students between classes that use the Discovery Learning model (experimental class) is higher than the Higher-Order Thinking Skills of students who use the conventional learning model (control class).

Based on the table of Independent Samples T Test with the help of SPSS 24.0, it can be seen that the T-test results of two independent samples give the value of $t = 4.265$ with $df: (n_1+n_2) - 2 = 75 + 70 - 2 = 143$ and the significance of Sig. (2-tailed) with the T-test is 0.000. Because in testing the hypothesis of this study by using a One-Tailed T Test (Right Side) then used the value of Sig. (1-tailed) . According to Uyanto (2006) to test the hypothesis of One-Tailed T Test value of Sig. (2-tailed) must be divided by two. To get the value of Sig. (1-tailed) then the value of Sig. (2-tailed) divided by two so that $\frac{0,000}{2}$ is obtained the value of Sig. (1-tailed) is 0.000. Because $0.000 < 0.05$ then based on decision-making criteria H_0 rejected and H_a accepted. So it can be concluded that the Higher-Order Thinking Skills of students between classes that use

the Discovery Learning model (experimental class) is higher than the Higher-Order Thinking Skills of students who use the conventional learning model (control class).

The Improvement of Higher-Order Thinking Skills of Learners Between Classes That Use The Discovery Learning Model (Experimental Class) is Higher Than The Higher-Order Thinking Skills of Learners Who Use The Conventional Learning Model (Control Class)

Hypothesis testing for N-Score Gain using Independent Sample T-Test with One-Tailed T Test (Right Side). The One-Tailed T Test (Right Side) was conducted to determine whether the improvement of Higher-Order Thinking Skills of students between classes using the Discovery Learning model (experimental class) was higher than the Higher-Order Thinking Skills of students using the conventional learning model (control class).

Tabel 7 Independent Sample T-Test Output Results for N-Gain Score

<i>Independent Samples Test</i>										
		<i>Levene's Test for Equality of Variances</i>		<i>t-test for Equality of Means</i>						
		<i>F</i>	<i>Sig.</i>	<i>t</i>	<i>df</i>	<i>Sig. (2-tailed)</i>	<i>Mean Difference</i>	<i>Std. Error Difference</i>	<i>95% Confidence Interval of the Difference</i>	
									<i>Lower</i>	<i>Upper</i>
<i>N-Gain</i>	<i>Equal variances assumed</i>	,301	,584	2,273	143	,025	,10279	,04522	,01340	,19219
	<i>Equal variances not assumed</i>			2,274	142,584	,024	,10279	,04520	,01344	,19214

Source: Data Processed by Author (2023)

Based on Table 7, the results obtained the value of Sig. (2- tailed) amounted to 0.025. Because in testing the hypothesis of this study by using a One-Tailed T Test (Right Side) then used the value of Sig. (1-tailed). To get the Sig. (1-tailed) then the value of Sig. (2-tailed) must be divided by two so that $\frac{0.025}{2}$ obtained the value of Sig. (1-tailed) is 0.0125. Because of the value of Sig. (1-tailed) < significance level ($\alpha = 0,05$), then H0 is rejected and Ha is accepted. It can be concluded that the improvement of Higher-

Order Thinking Skills of students between classes that use the Discovery Learning model (experimental class) is higher than the Higher-Order Thinking Skills of students who use the conventional learning model (control class).

CONCLUSION

The purpose of this study is to determine how the influence of the implementation of the Discovery Learning Model as a strategy to improve Higher-Order Thinking Skills of students in Class XI IPS on economic learning at East Jakarta Senior High School. The objects in this study were students of Class XI IPS SMA Negeri 59 Jakarta and students of Class XI IPS SMA Negeri 50 Jakarta for the 2022/2023 academic year. The data taken in this study is the primary data where researchers take their own data by conducting experiments at school and provide pretest posttest. The samples used in this study were 145 students who were divided into 36 students of Class XI IPS 1 and 36 students of Class XI IPS 2 SMAN 59 Jakarta and 34 students of Class XI IPS 1 and 39 Students of Class XI IPS 4 SMAN 50 Jakarta. Data analysis techniques in this study using statistical analysis application IBM Statistics version 24. Based on the results that have been obtained and described, it can be concluded as follows:

1. Higher-Order Thinking Skills of learners between classes that use the Discovery Learning model (experimental class) is higher than Higher-Order Thinking Skills of learners who use the conventional learning model (control class).
2. The Improvement of Higher-Order Thinking Skills of learners between classes that use the Discovery Learning model (experimental class) is higher than the Higher-Order Thinking Skills of learners who use the conventional learning model (control class).

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