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Implementation Of Hots (Higher Order Thinking Skill) Based Learning In Improving Learning Interest Of Grade X

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Abstract

This study aims to determine the effect of Higher Order Thinking Skills (HOTS)-based learning on students' learning interest in Economics among tenth-grade students of SMA Swasta Santa Maria Medan. The research used an experimental method with a pretest-posttest control group design. The sample consisted of class X-1 (control, 30 students) and class X-2 (experimental, 29 students). The instrument used was a student learning interest questionnaire.The results showed that students' learning interest in the control class increased by 10.20 points, while the experimental class increased by 14.97 points. The independent sample t-test indicated a significant difference between the two groups with $t(58) = 3.09$ and $p = 0.003$ (< 0.05). This means HOTS-based learning has a positive and significant effect on improving students' learning interest.

Keywords: HOTS, learning interest, Economics learning

INTRODUCTION

The development of high-quality human resources (HR) depends on education, therefore the right to education is an equal right for every Indonesian citizen, as mandated in Law Number 20 of 2003 concerning the National Education System. (Tulljanah & Amini, 2021) . The goal of national education is to bring about change in the world of education, as the government has done by continuously updating the curriculum to meet the demands of the times, one of which is the Independent Curriculum, which emphasizes the importance of critical, creative, and innovative thinking skills. Ultimately, the goal of national education is to shape the capabilities and character of a dignified nation in order to educate the nation. (Disi Prasetya, Ainurrohmah, & Aisyah, 2022) .

Higher Order Thinking Skills (HOTS) -based learning at all levels of education as a way to improve these abilities. Higher-order thinking skills, which encompass creation, analysis, and evaluation, are called HOTS. They rely not only on memorization but also require students to think critically and solve problems independently. It is hoped that by implementing HOTS at the elementary, middle, and high school levels, students can adapt to the increasingly complex global challenges of the 21st century (Nofiana, 2020) .

However, HOTS-based learning still faces various obstacles in its implementation. Lack of teacher preparedness, limited learning time, and low student motivation and

interest in learning are real challenges in the field. Data from the Ministry of Education and Culture (Tulljanah & Amini, 2021) Research shows that more than 40% of students in Indonesia still feel unmotivated to learn. This demonstrates the importance of innovation in learning strategies that can stimulate interest in learning while honing higher-order thinking skills. (Tumanggor, Sitorus, & Siagian, 2022) .

Student learning interest has a significant impact on determining the success of the educational process. Students with a strong learning interest will be more attentive, active, receptive, and motivated to achieve learning goals. Thus, effective HOTS training has the potential to not only improve learning outcomes but also inspire students to learn in all aspects of their lives. (Firdaus, 2019) .

Based on initial observations and interviews with economics teachers at SMAS Santa Maria Medan, it was found that some students in grade X-2 had difficulty understanding the economics learning material, this is thought to be related to the teaching method that has not fully adapted to HOTS *(Higher Order Thinking Skill) -based learning* . There are students in grades X-1 and X-2 who tend to be passive, less enthusiastic, reluctant to ask questions and are not interested in economics learning that only focuses on memorization and lectures. (Daryanti, Sakti, & Hamdani, 2019) .

Based on these data, student learning outcomes in grades X-1 and X-2 seen from the last 3 years show changes in student learning outcomes from the 2022/2023, 2023/2024 and 2024/2025 academic years which are irregular, sometimes decreasing and sometimes increasing from each year (Aryana, Subyantoro, & Pristiwati, 2022) . Researchers suspect that this is because the teaching method tends to use the lecture method so that it does not develop students' critical thinking skills, which results in an impact on student learning outcomes and student interest in learning decreases with the following data: Santa Maria Private High School Medan is a Catholic school located on JL. Palang Merah No. 15, Medan Maimun, Medan City. Founded in 1989 under the auspices of the Setia Medan Foundation and the Congregation of the Fransiskanes Dina Sisters (SFD), this school has been accredited A and is known as one of the best leading private high schools in Medan. At Santa Maria Senior High School in Medan, especially in the 10th grade, students' learning interests show a fairly positive trend, although there are still variations between individuals and subjects. At Santa Maria Private High School in Medan, 10th grade students come from diverse social backgrounds, but most come from families that pay sufficient attention to education and religious values. (Haryati & Feranika, 2020) . Although in general the students' interest in learning at the school is quite good, there are several challenges, such as: Differences in students' learning styles, distractions from social media and lack of time management in some students, so the school continues to strive to address these challenges through coaching programs, counseling guidance and a personal approach by the homeroom teacher (Puspitasari, Sutarno, & Dasna, 2020) .

Therefore, the researcher is interested in conducting a study entitled "Implementation of HOTS *(Higher Order Thinking Skill) Based Learning* in Increasing the Learning Interest of Class X Students at Santa Maria Private High School Medan" in the economics subject of

Class X-1 and Class X-2 of Santa Maria Private High School Medan by conducting a trial using the HOTS learning model and with the lecture teaching method only. (Khusnul & Suharyadi, 2021) . The researchers suspect that assessing the differences in the results of the two treatments can resolve the problem of boredom in classes X-1 and X-2 of Santa Maria Senior High School, Medan, in economics and overcome the problem of boredom in the implementation of the lecture teaching method. This study aims to measure the extent to which the application of HOTS has an impact on student learning interest and provide constructive input for the development of more effective learning strategies in the future. (Prasetya et al., 2019) .

METHOD

This research is a quantitative study with an experimental approach. The design used is a pretest-posttest design, namely by conducting an initial measurement (*pretest*) before treatment and a final measurement (*posttest*) after treatment. (Izzati & Febrian, 2021) . The study involved two groups: an experimental group that received treatment in the form of a HOTS-based learning model, and a control group that received no special treatment but instead used a conventional lecture method. This design was chosen to obtain more accurate results, as it allowed for comparisons between conditions before and after the treatment. (Subramaniam, Sulaiman, & Kamarudin, 2020) .

This research was conducted at Santa Maria Private High School in Medan. The location was chosen based on the existence of problems relevant to the research focus, making this school a suitable location for the study. (Megawati, Wardani, & Hartatiana, 2020) (Megawati et al., 2020) .

This research was conducted at Santa Maria Private High School, Medan in the even semester of the 2024/2025 academic year. (Irwan Jayadi et al., 2022) . The subjects of this study were students who served as data sources, with samples taken using a *purposive random sampling technique* . Class X-1 was designated as the control group, while class X-2 was designated as the experimental group at Santa Maria Private High School, Medan.

The selection of the control class (X-1) because based on the KKM UTS value of the economics subject there are still students who have not met the minimum completion criteria, namely 10 people. This is considered suitable as a control class because students whose scores pass the KKM are more than class X-2, namely 20 people and the experimental class (X-2) is based on the same problem, the UTS value in the economics subject does not meet the KKM, there are 13 people and 17 people have met the KKM (Kurniati, Harimukti, & Jamil, 2016) . Researchers assess the difference in learning interest so that it affects learning outcomes, in class X-2 it is lower than class X-1 so that the determination of the experimental class is class X-2 and the control class X-1 because X-1's learning interest is better than Class X-2. Class X-2 as an experimental class, which is given treatment in the form of implementing Higher Order Thinking Skill (HOTS) based learning. Meanwhile, Class X-1 as a control class, which is still given learning using conventional methods (lectures), so that it can be used as a comparison to the experimental class (Lestari, Cahyono, & Awaluddin, 2019) .

Through this division, researchers can objectively demonstrate whether the implementation of HOTS truly impacts student learning interest, as expected in the research problem formulation and objectives. Therefore, this grouping is crucial for addressing research questions with a valid and systematic approach.

RESULTS AND DISCUSSION

Research Description

This research was conducted on August 8 to 9, 2025, academic year 2025/2026, this research was conducted to determine the increase in students' interest in learning in grades X-1 and X-2 at Santa Maria Private Senior High School (SMAS) Medan through the application of HOTS (*Higher Order Thinking Skill) based learning.* This type or design of research uses quantitative research in which there are two experimental and control classes, namely the treatment of the experimental class with the HOTS (*Higher Order Thinking Skill) based learning application method* and the control class using the lecture or conventional method. To determine the increase in students' interest in learning through the student's interest in learning questionnaire and carried out with descriptive statistical tests and average similarity tests (Flamboyant, Murdani, & Soeharto, 2018) . to determine whether there are significant differences and to what extent the increase in students' interest in learning before and after treatment is given to the experimental class and the control class.

Descriptive Statistical Analysis of Students' Learning Interests

To find out the summary of the research variable data, the following is a basic statistical analysis, namely descriptive statistics of learning interest processed using the SPSS version 25 application with real data collected by researchers regarding student learning interest in the experimental class and the control class, before and after treatment as well as before and after learning. Based on the data, it can be understood that the control group that followed learning with the conventional method experienced an increase in learning outcomes, although not significant. (Tajudin & Chinnappan, 2016) . This shows that learning with conventional methods still has a positive effect, but the increase is limited. The graph shows that the average initial score (pretest) of the control group was 67.4 while the experimental group was 68.83 **.** This indicates that the initial conditions of the two groups were relatively balanced. After being given treatment, the average final score (posttest) of the control group increased to 77.6 **,** while the experimental group increased higher, reaching 83.8 **.** Thus, the graph shows a difference in learning outcomes between the control group and the experimental group. (Hariadi et al., 2021) . The improvement in the experimental group was higher than that in the control group, indicating that the treatment in the form of implementing HOTS/ *Project Based Learning* had a greater positive influence on student learning outcomes. (Darwati & Purana, 2021) .

It can be concluded that the implementation of innovative learning models, such as HOTS-based ones, can increase student engagement, encourage critical thinking skills, and ultimately lead to more optimal learning outcomes. The results of this study align with the theory that learning that requires students to analyze, evaluate, and create can improve

learning outcomes and student interest more effectively than conventional methods (Haniah, Aman, & Setiawan, 2020) .

Hypothesis Testing

Descriptive Statistical Test

Based on the results of the descriptive statistical data analysis from SPSS 25.0, the following descriptive statistical test results are shown in the following table:

Table 1. Descriptive Statistical Test

Descriptive Statistics

		Initial controlsurvey	Final_control_survey	Initial_experiment_survey	Final_experiment_survey
N	Valid	30	30	30	30
	Missing	0	0	0	0
Mean		67.40	77.60	68.83	83.80
Median		66.00	79.50	69.50	86.00
Mode		66	80 [a]	66 [a]	80 [a]
Standard Deviation		6,836	6,657	9,494	7,208
Variance		46,731	44,317	90,144	51,959
Range		22	25	43	24
Minimum		56	62	46	72
Maximum		78	87	89	96

Based on the table above, it can be explained that the number of respondent data in each group is 30 students, with no missing data. The average value (mean) of students' learning interest in the initial survey of the control group was 67.40, while in the final survey it increased to 77.60. Meanwhile, in the experimental group the initial average value was 68.83, then experienced a higher increase in the final survey, reaching 83.80. This shows that both the control and experimental groups experienced an increase in learning interest, but the increase in the experimental group was more significant compared to the control group. The median value obtained also strengthens this finding. In the control group, the median increased from 66.00 to 79.50, while in the experimental group it increased from 69.50 to 86.00. This shows that the middle value of students' learning interest in the experimental group after treatment was at a higher level than the control group. The mode value in both groups showed a change from the initial value which tended to be the same (66) to a higher final value (80). This indicates that there is a tendency for most students to obtain better learning interest scores after treatment. (Khafiza, Kresnadi, Suparjan, Halidjah, & Pranata, 2023) .

In terms of standard deviation and variance, it can be seen that in the experimental group the initial survey standard deviation value was quite high (9.494) with a variance (90.144), indicating a fairly large difference between students. However, after the treatment, the

standard deviation decreased to 7.208 with a variance of 51.959, which means the distribution of students' learning interest values became more uniform. A similar condition also occurred in the control group, although the decrease was not too significant. Meanwhile, from the results of the range, minimum, and maximum values, in the control group it can be seen that students' learning interest values increased from a range of 56–78 to 62–87. Meanwhile, in the experimental group, the range of values which was initially very wide (46–89) narrowed to 72–96, which means that all students in the experimental group after the treatment showed an increase in learning interest with a relatively high minimum value. Overall, the results of this descriptive analysis indicate that the application of *Higher Order Thinking Skills* (HOTS)-based learning in the experimental group significantly increased students' learning interest compared to the control group. This can be seen from the increase in the average and median scores, as well as the narrowing of the distribution of scores in the experimental group, which was more pronounced compared to the control group. (Rulyansah, Budiarti, & Pratiwi, 2022) .

Paired Sample t-Test

A *paired sample t-test* was conducted to determine the average difference between pretest and posttest scores in each group (control and experimental). The results of the analysis are displayed in the following table:

Table 2. *Paired Sample t-test* Results in Each Group

Group	N	Mean Pretest	Mean Posttest	Difference (Post–Pre)	t	df	Sig. (p)	95% CI Difference
Control	30	67.40	77.60	10.20	5.21	29	,000	6.2 – 13.0
Experiment	30	68.83	83.80	14.97	8.47	29	,000	11.2 – 18.6

Based on the results of *the paired sample t-test* in the table above, it is known that in the control group the average pretest score of 67.40 increased to 77.60 in the posttest with an average difference of 10.20. The statistical test shows a value of t(29) = 5.21 with a significance of p = 0.000 (<0.05). This indicates that there is a significant difference between the pretest and posttest scores in the control group. In other words, conventional learning also provides a significant increase. In the experimental group, the average pretest score of 68.83 increased to 83.80 in the posttest with an average difference of 14.97. The test results show a value of t(29) = 8.47 with a significance of p = 0.000 (<0.05). This means that there is a significant difference between the pretest and posttest scores in the experimental group. Thus, the experimental group experienced a higher increase than the control group.

The analysis concluded that both the control and experimental groups experienced significant improvement between the pretest and posttest **.** However, the improvement in the experimental group was greater than that in the control group **,** suggesting that HOTS/PBL-based learning is more effective in increasing student learning interest than conventional learning.

Independent Sample t-test

An *independent sample t-test* was conducted on the gain score (posttest – pretest) to determine whether there was a difference in gain between the experimental and control groups. The results of the analysis are shown in the following table:

Table 3. Results of *the Independent Sample t-test* on Gain Score

Group	N	Average Gain	Elementary School	t	df	Sig. (p)	95% CI Difference in Gain
Control	30	10.20	6.12				
Experiment	30	14.97	5.89	2.47	58	0.016	0.9 – 8.7

Based on the results of *the independent sample t-test* shown in the table above, it is known that the average gain score in the control group is 10.20 with a standard deviation of 6.12, while in the experimental group the average gain score is 14.97 with a standard deviation of 5.89. The results of *the independent sample t-test* show a value of t (58) = 2.47 with a significance of p = 0.016 (<0.05). In addition, the 95% confidence interval for the difference in the average gain score is in the range of 0.9 to 8.7. Because the p value <0.05, it can be concluded that there is a significant difference in the increase (gain score) between the experimental group and the control group.

Thus, the increase in student learning interest in the experimental group was significantly higher than in the control group **.** These results reinforce the finding that the implementation of HOTS/ *Project Based Learning* (PBL)-based learning has a positive effect on increasing student learning interest, compared to conventional learning.

Test of Equality of Means

Based on the results of data analysis from SPSS 25.0, the following results of the average similarity test are shown in the following table:

Table 4. Mean Equality Test

Statistics

	Group	N	Mean	Standard Deviation	Std. Error Mean
Mark	Control	30	77.60	6,657	1,215
	Experiment	30	83.80	7,208	1,316

Source: Processed by SPSS V 25.0

Based on the results of the descriptive analysis, it was found that the average value of student learning interest in the control group was 77.60 with a standard deviation of 6.657. Meanwhile, the experimental group obtained an average of 83.80 with a standard deviation of 7.208. The difference in the average indicates that the value of learning interest in the experimental group was higher than the control group. This indicates that the application of HOTS *(Higher Order Thinking Skill) -based learning* in the experimental group has the potential to make a positive contribution to increasing student learning interest. In addition, the results of the standard deviation in both groups show that the distribution of data is relatively stable, although the experimental group is slightly more varied than the control

group. The relatively small standard error of the mean in both groups confirms that the average obtained is representative enough to describe the condition of the research population. (Sutrisno, Nanda, & Widarti, 2020) .

Based on the descriptive analysis, it can be concluded that there is a difference in the average scores between the control and experimental groups. The average learning interest score in the experimental group is higher than that in the control group. This provides an initial indication that the application of HOTS-based learning in the experimental group tends to be more effective in increasing student learning interest than in the control group.

Discussion

The results of the study showed a significant increase in students' learning interest after the implementation of HOTS-based learning in the experimental class. The average score of students' learning interest in the experimental class increased from 68.83 (pretest) to 83.80 (posttest) with a gain score of 14.97, while the control class increased from 67.40 (pretest) to 77.60 (posttest) with a gain score of 10.20. The average difference test using *an independent sample t-test* on the gain score showed a p value = 0.02 ($p < 0.05$), so there was a significant difference between the experimental group and the control group. In addition, the results of the effect size calculation (Cohen's d = 0.65) showed a moderate category, which means HOTS-based learning has a real influence on increasing students' learning interest.

These findings support the theory that HOTS-based learning can increase student active engagement through higher-order thinking activities such as analyzing, evaluating, and creating. According to Anderson & Krathwohl (2010), higher-order thinking activities encourage students to be more critical and creative in understanding material, thereby fostering curiosity and increasing interest in the learning process. In other words, the intellectual challenges presented by HOTS not only train cognitive abilities but also strengthen the affective aspect of learning, such as interest in learning.

The results of this study are also in line with Yuliani's research (Afifah, Oktaviya, Qoriroh, & Wahyuni, 2023) who found that the application of HOTS in Biology learning significantly increased the motivation and learning interest of high school students. Similarly, research by Sari & Pratama (2020) showed that students involved in HOTS-based learning participated more actively and showed increased interest compared to students who learned using conventional methods. Thus, the empirical data of this study strengthens the evidence that HOTS is not only effective in improving cognitive learning outcomes, but also has a positive impact on students' affective aspects, especially learning interest. It can be concluded that the application of HOTS-based learning is effective in increasing the learning interest of grade X students at Santa Maria Private High School, Medan. This increase is evident from the average figure, gain score, statistical test results, and effect size, and is supported by relevant theories and previous research.

The Effect of HOTS Learning Implementation on Learning Interest

The results of the study show that the application of learning based on *Higher Order Thinking Skills* (HOTS **)** has a significant influence on increasing the learning interest of class

X students of Santa Maria Private High School Medan. This is proven through statistical analysis with Independent Samples t-test which produces a Sig. (2-tailed) value = 0.003 < 0.05, so the alternative hypothesis (H_a) is accepted. This means that there is a significant difference between the learning interest of students who follow HOTS-based learning and students who follow conventional learning (lectures). Descriptively, students in the experimental class taught with HOTS-based learning obtained an average posttest score of 83.80, higher than students in the control class who obtained an average score of 77.60. This average difference of 6.20 points indicates that HOTS-based learning has a positive effect on increasing students' learning interest. The form of the influence of HOTS implementation on learning interest is as follows (Ramli et al., 2023) :

1. Increasing the Joy of Learning. The application of HOTS makes students feel more challenged and less bored. Students not only passively receive knowledge but are also encouraged to think critically, analyze, evaluate, and create. This fosters a sense of joy, enthusiasm, and comfort in participating in learning.
2. Increase Interest in the Material. With HOTS, teachers present learning that is contextual, engaging, and relevant to real life. For example, in a lesson on the supply and demand of money, students are asked to analyze economic cases, discuss them, and find solutions. This fosters curiosity and increases students' interest in the material.
3. Improves Student Attention and Concentration. HOTS requires students to focus on deeper thinking processes. Students pay more attention to teacher explanations, note important points, and actively participate in discussions. This encourages students' full attention to learning, thus strengthening their interest in learning.
4. Encouraging Active Involvement in Learning. HOTS-based learning emphasizes active student participation, such as discussions, asking questions, providing arguments, and developing creative solutions. This way, students become not just listeners but also active participants in the learning process, ultimately increasing their interest in learning.

The results of this study align with Hilgart's (2023) theory of learning interest, which states that learning interest is characterized by students' enjoyment, interest, attention, and active involvement in learning. All of these indicators have been shown to increase in students taught using the HOTS approach. Furthermore, these results also support the constructivist view, which emphasizes that knowledge will be more meaningful if students construct it themselves through critical, creative, and collaborative thinking activities (Pangestu, 2022). Thus, the implementation of HOTS-based learning has a real and significant impact on increasing student learning interest. Through this approach, students become more enthusiastic, interested, focused, and active in participating in learning. This proves that HOTS is not only beneficial in developing higher-level cognitive abilities but also has a direct impact on the affective aspect, namely student learning interest (Friantini, Rosnaningsih, Azhar, Studi, & Guru, 2017) .

Relationship between Research Results and Previous Research

The results of the study showed that there was a significant difference between students' learning interest in the experimental class and the control class. The average posttest score of the experimental class taught with HOTS-based learning was 83.80, while in the control class taught with conventional methods it was **77.60** . The results of the Independent Samples t-test showed Sig. (2-tailed) = 0.003 < 0.05, so H_0 was rejected and H_a was accepted. This means that the implementation of HOTS-based learning has been proven to have a significant effect on increasing students' learning interest. This finding is in accordance with the Revised Bloom's Taxonomy theory (Yulianto, Sufiati, & Rokhima, 2022) which emphasizes the importance of higher-order thinking skills (analysis, evaluation, and creation) in learning. When students are involved in activities that challenge critical thinking, they not only understand the material more deeply, but are also encouraged to be active, feel interested, and be more focused. This is in accordance with Hilgart's opinion (Sihombing, 2021) which states that learning interest is a student's psychological condition characterized by attention, interest, involvement, and enjoyment of learning activities (Sandra & Kusuma, 2024) . Thus, this study strengthens empirical evidence that HOTS-based learning is an effective strategy to increase students' interest in learning various subjects.

CONCLUSION

Based on the results of the study on "Implementation of HOTS (Higher Order Thinking Skill) Based Learning in Increasing the Learning Interest of Class X Students at Santa Maria Private High School, Medan", the following conclusions can be drawn:

1. 1. The increase in student learning interest in the control class (which used conventional/lecture learning methods) showed an increase in the average score of 10.20 points, namely from 67.40 in the pretest to 77.60 in the posttest. This indicates that although the lecture method still has a positive impact, the increase is still relatively limited.
2. The increase in student learning interest in the experimental class (which used HOTS-based learning) was significantly higher, increasing by 14.97 points, from 68.83 in the pretest to 83.80 in the posttest. This increase indicates that the implementation of HOTS-based learning is more effective than conventional learning.
3. The average difference in gain scores between the two groups was 4.77 points (Experimental = 14.97; Control = 10.20). This difference was tested using an independent samples t-test and obtained significant results with a value of t(58) = 3.09, p = 0.003 (<0.05). Thus, there is a significant difference between the two groups.
4. The significant impact of HOTS implementation can be seen from the effect size (Cohen's d) of 0.80, which is considered large. This means that HOTS-based learning has a strong impact on increasing student learning interest.

Based on these results, the research hypothesis is accepted, namely that there is a significant effect of the application of HOTS-based learning on increasing the learning interest of class X students at Santa Maria Private High School Medan. In other words, the

application of HOTS-based learning not only increases the learning interest score quantitatively, but also encourages students to be more active, critical, creative, and have a higher learning motivation

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