DIFFERENCES BETWEEN LEARNING MODELS AND STUDENTS' COGNITIVE STYLES ON STUDENTS' LEARNING OUTCOMES IN THE GEOGRAPHY SUBJECT AT STATE SENIOR HIGH SCHOOL 59 JAKARTA

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Abstract

This study aims to determine: (1) whether there are differences in geography learning outcomes through the Numbered Heads Together (NHT) learning model and the Student Teams Achievement Division (STAD) model. (2) whether there are differences in geography learning outcomes between students who have used the NHT learning model and have a Field Independent (FI) cognitive style with students who have used the NHT learning model and have a Field Dependent (FD) cognitive style. This study was conducted at SMA Negeri 59 Jakarta in October 2024 – June 2025. The method used in this study is an experimental method with a posttest only control design. Based on data analysis with the Mann-Whitney test, $p = 0.572 > 0.05$ was obtained. It can be concluded that there is no statistically significant difference between the learning outcomes of students who were treated using the NHT learning model (XI-7) and the STAD model (XI-5). Furthermore, based on data analysis with the Mann-Whitney test, $p = 0.951 > 0.05$ was obtained so that the difference in geography learning outcomes between students who have used the NHT learning model and have a FI cognitive style with students who have used the NHT learning model and have a FD cognitive style, namely students with Field Independent (FI) and Field Dependent (FD) cognitive styles also did not show a significant difference in learning outcomes.
Keywords: Cooperative Learning Model, Cognitive Style, Geography Learning Outcomes

Abstrak

Penelitian ini bertujuan untuk mengetahui: (1) apakah terdapat perbedaan hasil belajar geografi melalui model pembelajaran Numbered Heads Together (NHT) dan model Student Teams Achievement Division (STAD). (2) apakah terdapat perbedaan hasil belajar geografi antara peserta didik yang telah menggunakan model pembelajaran NHT dan memiliki gaya kognitif Field Independent (FI) dengan peserta didik yang telah menggunakan model pembelajaran NHT dan memiliki gaya kognitif Field Dependent (FD). Penelitian ini dilaksanakan di SMA Negeri 59 Jakarta pada bulan Oktober 2024 – Juni 2025. Metode yang digunakan dalam penelitian ini adalah metode eksperimen dengan posttest only control design. Berdasarkan analisis data dengan uji Mann-Whitney diperoleh $p = 0,572 > 0,05$. Dapat disimpulkan bahwa tidak terdapat perbedaan yang signifikan secara statistik antara hasil belajar siswa yang diberi perlakuan menggunakan model pembelajaran NHT (XI-7) dan model STAD (XI-5). Selanjutnya, berdasarkan analisis data dengan uji Mann-Whitney diperoleh $p = 0,951 > 0,05$ sehingga perbedaan hasil belajar geografi antara siswa yang telah menggunakan model pembelajaran NHT dan memiliki gaya kognitif FI dengan siswa yang telah menggunakan model pembelajaran NHT dan memiliki gaya kognitif FD yaitu siswa dengan gaya kognitif Field Independent (FI) dan Field Dependent (FD) juga tidak menunjukkan perbedaan hasil belajar yang signifikan.
Kata kunci: Model Pembelajaran Kooperatif, Gaya Kognitif, Hasil Belajar Geografi

INTRODUCTION

Education plays a vital role in shaping the nation's future generation as mandated in Law of the Republic of Indonesia Number 20 of 2003 concerning the National Education System, Article 3 of which states that national education functions to develop abilities and shape the character and civilization of a dignified nation in order to enlighten the nation's life. The law also states that national education aims to develop the potential of students to become people who believe in and are devout to God Almighty, have noble character, are healthy, knowledgeable, capable, creative, independent, and become democratic and responsible citizens. The target of education is human beings. Education aims to help students develop their human potential.

The process of educating students can be carried out, among other things, through geography lessons, as geography is a subject directly related to the physical and social. Learning geography is a subject that demands students' cognitive abilities. In accordance with this understanding, it is not surprising that many students complain when given geography lessons, as they are preoccupied with memorization and note-taking. This results in minimal interest in geography lessons. Every geography teacher must accept and address this reality as a challenge that must be addressed.

Low geography learning outcomes are a common problem. Students often perceive geography as a subject that involves rote memorization, making it less engaging. This is especially true for students at State Senior High School 59 Jakarta. Many students are reluctant to participate in geography lessons, offering numerous excuses for not attending. They consider learning geography less enjoyable because it requires reading, leading to passive classroom activities. This lack of interest in geography may be due to students not fully mastering the concepts, coupled with varying cognitive learning styles.

To increase student engagement, innovation in the learning process is necessary. One way to improve the quality of geography learning is through innovation in learning models. A learning model is considered relevant if it helps students achieve educational goals. In practice, the models teachers implement in class typically focus solely on explanations that align with the curriculum material, without incorporating meaningful learning into the delivery.

Every human being is endowed with reason and the ability to create and innovate. Just as in learning, creating a conducive atmosphere is essential so that students no longer feel anxious or afraid to participate, and no longer feel obligated to participate, but rather feel comfortable and enjoyable. One way to achieve this is by implementing an appropriate learning model. The use of an appropriate learning model can increase the efficiency and effectiveness of the learning process.

In this case, teachers fail to recognize that the use of varied and appropriate learning models can impact the learning process. Learning models play a role in geography instruction. Using a

variety of learning models will help students avoid boredom and gradually develop an interest in geography.

Recently, many models have been developed by experts. One of them is the cooperative learning model. This model is not entirely new, as it involves students working together as a team to complete group tasks to achieve a common goal.

Cooperative learning is a learning model that can actively engage all students. There are many variations of cooperative learning models, including Numbered Heads Together (NHT) and Student Teams Achievement Division (STAD). These learning models involve interaction between teachers and students, and between students.

A learning model may not be suitable for all students, as each student is unique. One such difference is cognitive style. Cognitive style refers to how people acquire information and use strategies to respond to a task. It's called a style, not an ability, because it refers to how people respond to information and solve problems, not the best approach.

Cognitive style is a student's unique way of learning, including how they receive and process information, their attitudes toward it, and their habits related to the learning environment. Cognitive styles are divided into two categories: Field Independent (FI) and Field Dependent (FD).

Therefore, the researcher wants to examine the differences in cognitive learning outcomes through learning models and cognitive styles carried out by geography teachers which can provide better effects on students' geography learning outcomes, especially at SMA Negeri 59 Jakarta and indirectly a teacher can determine suitable and varied learning models for students.

LITERATURE REVIEW

According to Suprihatiningrum[1], learning outcomes are a performance indicated by an acquired ability. Learning outcomes are essentially behavioral changes encompassing cognitive, affective, and psychomotor domains. Learning outcomes can be used to determine abilities, development, and educational success. Learning outcomes reflect students' mastery of knowledge and skills. Learning outcomes are often considered a reflection of a school's quality. Through these learning outcomes, teachers will determine whether the models, methods, and media used are appropriate.

According to Purwanto[2] cognitive learning outcomes are behavioral changes that occur within the cognitive domain. The learning process involving cognition encompasses activities ranging from receiving external stimuli through the senses, storing and processing them in the brain into information, and then recalling that information when needed to solve a problem.

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[1] J. Suprihatiningrum, *Learning Models* (Ar-Ruzz Media, 2012).
[2] Purwanto, *Evaluasi Hasil Belajar* (Pustaka Belajar, 2011).

According to Kurniawan[3] Cognitive learning outcomes are those related to memory, thinking, or intellectual abilities. In this domain, learning outcomes consist of seven hierarchical levels. These seven cognitive learning outcomes include knowledge, understanding, application, analysis, synthesis, evaluation, and creativity.

According to Hastari[4] the NHT learning model can be summarized as a method that places students in small groups with varying ability levels and genders. Learning should emphasize cooperation within the group, mutual respect for the opinions of other members or groups, motivating group members, and encouraging them to ask questions and express their opinions. This cooperation within the group will ultimately measure a group's success in achieving its shared goals.

There are many types of cooperative learning models, one of which is Numbered Heads Together (NHT). According to Anita[5] the role of the NHT learning model in the learning process is as follows: (a) Conveying learning objectives clearly; (b) Placing students heterogeneously in small groups; (c) Conveying tasks that students must complete, both individual and group tasks; (d) Monitoring group work; (e) Evaluating learning outcomes

According to Slavin in Rusman[6], the main idea behind STAD is to encourage students to encourage and help each other to master the skills taught by the teacher.

According to Ketika in Syamsu[7], STAD is the most researched variation of cooperative learning, and is the best model for encouraging students to encourage and help each other to master the skills taught by the teacher.

According to Wulandari[8], the STAD model is a learning model that can stimulate student activity to express opinions, ideas, and concepts in learning. The steps of the STAD learning model according to Wulandari[9], are: (a) Forming groups of four heterogeneous members (mixed according to achievement, gender, ethnicity, etc.); (b) The teacher presents the lesson; (c) The teacher gives assignments to the group to be done by group members; (d) The teacher gives quizzes or questions to all students; (e) Providing evaluations; (f) Conclusions.

According to Slameto[10], FI is a cognitive style of someone who tends to express an image

[3] Deni Kurniawan, *Pembelajaran Terpadu Tematik* (Alfabeta, 2019).

[4] Marwinda Hastari, "Penerapan Metode Numbered Heads Together (NHT) untuk Meningkatkan Hasil Belajar Mata Diklat Teknik Penggunaan Suhu Rendah di SMK Negeri 1 Pandak" (Universitas Negeri Yogyakarta, 2012).

[5] Lie Anita, *Mempraktikan Cooperative Learning Diruang-Ruang Kelas* (Grasindo, 2000).

[6] Rusman, *Learning Models: Developing Teacher Professionalism* (Rajawali Pers, 2012).

[7] F. N. Syamsu et al., "The Effectiveness of the STAD Learning Model on Mathematics Learning Outcomes in Spatial Geometry," *International Journal of Elementary Education* 3, no. 3 (2019): 346–52.

[8] I. Wulandari, "STAD (Student Teams Achievement Division) Type Cooperative Learning Model in MI Learning," *Papeda Journal* 4, no. 1 (2022).

[9] Wulandari, "STAD (Student Teams Achievement Division) Type Cooperative Learning Model in MI Learning."

[10] Slameto, *Belajar Dan Faktor-Faktor Yang Mempengaruhinya* (Rineka Cipta, 2003).

free from the background of the image, and is able to distinguish objects from their surrounding context more easily, view the surrounding situation more analytically, and is able to face tasks that require analytical distinctions. Meanwhile, FD is a cognitive style of someone who accepts something more globally and has difficulty separating themselves from a group and in social orientation tends to be sensitive.

RESEARCH METHODS

This study used an experimental method with both groups given treatments to test the effectiveness or differences of a treatment. The study implemented a treatment and analyzed the data to obtain results and conclusions.

This research experiment used the Posttest Only Control Group Design method. In this design, subjects were selected and divided into two classes, then both classes were given treatment. At the end of the study, both classes were given a post-test to measure the degree of change in each group.

Table 1. Research Design

Class	Treatment	Post-test
XI-5	X1a	T1
XI-7	X1b and Y	T2

Source: Researcher data, (2025)

Information:

X1a   : Treatment given to class XI-5 using

STAD model

X1b   : Treatment given to class XI-7 using

NHT model

Y   : Looking for information related to cognitive styles in grades XI-7

The first group, namely class XI-5, is a group that was given treatment with the Student Team Achievement Division (STAD) learning model and the second group, namely class XI-7, is a group that was given treatment with Numbered Head Together (NHT) and cognitive style.

Data collection techniques in this study included observation, tests, and questionnaires. The observation section was used to determine the implementation of the learning model. The observation sheet contained an assessment of the implementation of the learning model steps by the observer. In the testing section, the test method was used to collect learning outcomes in geography for both experimental classes. Each experimental class used multiple-choice questions via Google Forms. The questionnaire section was used to determine elements of students' cognitive styles using

a Likert scale via Google Forms.

After the data was collected, data analysis techniques were carried out. In this study, the data analysis used descriptive statistical analysis methods. Descriptive statistics are techniques related to the collection and presentation of data to provide relevant information according to Walpole[11]. The function of descriptive statistics is to provide an overview or description of the object being studied through data obtained from a sample or population according to Sugiyono[12]. Descriptive data analysis methods involve the analysis, description, and summary of various conditions or situations based on the collected data, such as the results of interviews or observations about the problem being studied in the field.

RESULTS AND DISCUSSION

This research process was conducted over 5 meetings in both experimental classes. The initial meeting was an introduction to the material, conveying the learning objectives, indicators of the material to be delivered and specifically in class XI-7 the researcher distributed a questionnaire to determine the FI and FD cognitive styles via Google Form as well. The second meeting presented and explained the content of the material on disaster mitigation and explained the flow or mechanism of the NHT and STAD learning models that would be carried out in the next meeting. In the third and fourth meetings the researcher conducted treatment (treatment) of the NHT learning model in class XI-7 and the STAD learning model in class XI-5. Then, in the fifth or final meeting the researcher conducted a post-test to both experimental classes to see if there were differences in learning outcomes after using the learning models and conducted an evaluation of the teaching and learning activities and gave appreciation to all students in both classes.

Table 2. Post Test Recapitulation

FREQUENCY DISTRIBUTION	Post-test	
	XI-5	XI-7
Lowest Value	33	23
The highest score	100	100
Mean	84	88.15
Median	93.33	93.33
Mode	96.67	93.33
Standard Deviation	19.97	18.11

Source: Researcher data, (2025)

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[11] R. E. Walpole, *Introduction to Statistics* (Gramedia Pustaka Utama, 1995).
[12] Sugiyono, *Educational Research Methods: Quantitative, Qualitative, and R&D Approaches* (Alfabeta, 2009).

The table above shows that there is a difference in scores after being given treatment. Class XI-5 which has used the STAD learning model shows an average of 84. Meanwhile, class XI-7 which has used the NHT learning model shows an average of 88.15. For the lowest score of the two classes shows a difference, namely 33 in class XI-5 and 23 in class XI-7. For the highest score and median of both classes show the same results. Although the average in class XI-7 is higher than class XI-5, in the mode and standard deviation section of class XI-5 is higher than class XI-7. This shows that using the NHT learning model shows higher results than using the STAD learning model.

Table 3. Results of the Normality Test for the Two Classes

Tests of Normality

	Class	Kolmogorov-Smirnova			Shapiro-Wilk		
		Statistics	df	Sig.	Statistics	df	Sig.
Mark	XI-5	.282	36	<.001	.747	36	<.001
	XI-7	.291	36	<.001	.597	36	<.001

a. Lilliefors Significance Correction

Source: Researcher data, (2025)

Based on the results of the normality test displayed through two statistical methods, namely Kolmogorov-Smirnov and Shapiro-Wilk, for class value data, both classes XI-5 and XI-7, showed a significance value (Sig.) <0.001 in both test methods. This value is significantly smaller than the conventional limit of $\alpha = 0.05$, so it can be concluded that the data distribution in both classes is not normally distributed and has not met the normality assumptions required in parametric analysis. Therefore, further data analysis uses non-parametric tests.

Table 4. Results of the Mann-Whitney Test Related to Learning Outcomes with the Two Learning Models (Non-Parametric)

Ranks

	Class	N	Mean Rank	Sum of Ranks
Mark	XI-5	36	35.13	1264.50
	XI-7	36	37.88	1363.50
	Total	72		

Test Statistics

	Mark
Mann-Whitney University	598,500
Wilcoxon W	1264,500
Z	-.564
Asymp. Sig. (2-tailed)	.572

a. Grouping Variable: Class

Source: Researcher data, (2025)

Based on the above test on the differences in learning outcomes based on the applied learning model, it shows that the Mann-Whitney U value is 598.500 with a Z value of -0.564 and a significance value of Asymp. Sig. (2-tailed) = 0.572. This significance value is greater than the significance level of 0.05, so it can be concluded that there is no statistically significant difference between the learning outcomes of students treated using the NHT learning model (XI-7) and the STAD model (XI-5). Although the average rank value of class XI-7 (37.88) is slightly higher than XI-5 (35.13), the difference is not strong enough to be declared statistically significant. This shows that both cooperative learning models have relatively equal effectiveness in improving student learning outcomes, at least in the context of the class and material tested in this study.

In this study, the researchers also wanted to determine the geography learning outcomes of students with FI or FD cognitive styles in grades XI-7 who had used the NHT model. The following is a summary of the results:

Table 5. Recapitulation of Cognitive Style Questionnaire and Learning Outcomes of the Two Cognitive Styles

FREQUENCY DISTRIBUTION	COGNITIVE STYLE RESULTS	
	FI	FD
Number of Students	29	7
Lowest Value	23	40
The highest score	100	100
Mean	89	87
Mode	93	93
Standard Deviation	17.74	20.99

Source: Researcher data, (2025)

The table above shows that of the 36 students who filled out the cognitive style questionnaire, most of them had a Field Independent (FI) cognitive style (29 students) and 7 students had a Field Dependent (FD) cognitive style. From the lowest value indicator, the FI cognitive style was lower than the FD. For the highest value and mode indicators, the FI cognitive style had the same value as the FD. For the average (mean) indicator, the FI cognitive style was greater than the FD.

Table 6. Results of the Normality Test of Post-Test Scores Based on Cognitive Style

Tests of Normality

	G.KOG	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
NILAI_POST_TEST	FI	.261	29	<,001	.585	29	<,001
	FD	.422	7	<,001	.633	7	<,001

a. Lilliefors Significance Correction

Source: Researcher data, (2025)

Based on the results of normality tests presented using two statistical methods, Kolmogorov-Smirnov and Shapiro-Wilk, it can be concluded that the data distribution in most groups did not meet the normality assumptions required in parametric analysis. This normality test was conducted on two data categories: the scores for two cognitive styles (FI and FD).

For cognitive style-based data, both FI and FD showed a significance value (Sig.) <0.001 for both test methods. This value is significantly smaller than the conventional limit of $\alpha = 0.05$, so it can be concluded that the data distribution in both classes is not normally distributed. Therefore, further data analysis used non-parametric tests.

Table 7. Mann-Whitney Test Results Post-Test Scores Based on Cognitive Style (Non-Parametric)

Ranks

	G.KOG	N	Mean Rank	Sum of Ranks
POST_TEST_VALUE	FI	29	18.55	538.00
	FD	7	18.29	128.00
	Total	36		

Test Statistics[a]

	POST_TEST_VALUE
Mann-Whitney University	100,000
Wilcoxon W	128,000
Z	-.061
Asymp. Sig. (2-tailed)	.951
Exact Sig. [2*(1-tailed Sig.)]	.969[b]

a. Grouping Variable: G.KOG

Source: Researcher data, (2025)

Based on the above test on the differences in learning outcomes based on the applied cognitive style, it shows that the Mann-Whitney U value is 100,000 with a Z value of -0.061 and a significance value of Asymp. Sig. (2-tailed) = 0.951. This significance value is greater than the significance level of 0.05, so it can be concluded that there is no statistically significant difference between the learning outcomes of students who have FI and FD cognitive styles. Although the average rank of students who have FI cognitive styles (18.55) is slightly higher than students who have FD cognitive styles (18.29), the difference is not strong enough to be declared statistically significant.

Students with a Field Independent (FI) cognitive style exhibit distinctive cognitive tendencies in how they process, understand, and organize information. Students with a Field Independent cognitive style tend to thrive in learning that emphasizes analysis, independence, and logical structure. However, special attention is needed to develop social aspects and teamwork to ensure their learning outcomes are not only high academically but also balanced interpersonally.

Meanwhile, students with a Field Dependent (FD) cognitive style tend to achieve better learning outcomes in social, structured, and collaborative learning environments. They perform optimally when there is interpersonal support, but need coaching to improve their independence and critical thinking skills to balance various academic challenges. This style makes FD students more sensitive to social interactions and teacher direction, and more comfortable learning in groups

than independently. FD students typically rely on external assistance when learning, such as teacher guidance or group work, and have a high interpersonal tendency.

From the discussion above, it can be concluded that the NHT and STAD learning models do not show significant differences in influencing learning outcomes. The NHT (Numbered Heads Together) learning model can be strongly associated with the Field Independent (FI) and Field Dependent (FD) cognitive styles and is even relevant if you want to optimize the strength of FD while simultaneously training the social side of FI students. Differences in learning outcomes between students with FI and FD cognitive styles do not show significant differences. Both cognitive styles cannot be said to be better or worse, because each has advantages and disadvantages depending on the learning context, assignments, and environment.

CONCLUSION

1. The Numbered Heads Together (NHT) and Student Teams Achievement Division (STAD) learning models showed relatively equivalent results in improving student learning outcomes. Although the average post-test score in the class using the NHT model was higher than the STAD class, the Mann-Whitney U test results showed that the difference was not statistically significant ($p = 0.572 > 0.05$).

2. Students with Field Independent (FI) and Field Dependent (FD) cognitive styles also showed no significant differences in learning outcomes. This is demonstrated by the Mann-Whitney U test ($p = 0.951 > 0.05$). Each cognitive style has its own advantages that can be optimized in the learning process, depending on the learning approach used.

3. Students with a Field Independent (FI) cognitive style tend to excel in learning that demands analytical skills, independence, and logical thinking structures, but require development in social aspects and teamwork. Conversely, students with a Field Dependent (FD) style do better in collaborative and interpersonal learning environments, but require coaching to enhance their independence and critical thinking skills. Thus, each cognitive style has advantages and challenges that need to be accommodated through appropriate learning models.

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