The Effect of Cooperative Learning Model Type NHT and NHT Modified Audiovisual Media on The Learning Achievement Science Viewed from Students' Learning Independence

Nia Wahyu Wijayanti[a], Roemintoyo[a], Tri Murwaningsih[b]

[ab]Sebelas Maret University, Jl. Ir. Sutami, Surakarta, Indonesia
Corresponding email: juniya90@gmail.com

ABSTRACT

The objective of this research was to improve the effect of the learning model on the learning achievement of science viewed from students' learning independence. The learning models compared were cooperative learning model type NHT, NHT modified with audiovisual media and direct learning. The type of research was quasi-experimental research with factorial design 3×3. Population of this research was all students of fifth grade elementary school in Gemolong. The total samples in this research were sixty nine students. The hypothesis test used two-way analysis variant with unbalanced cells. The results show that there was a different significant effect among cooperative learning model type NHT, audiovisual media-modified NHT and direct learning on the learning achievement. Besides that, there was different significant effect among students who have high, medium, and low learning independence. However, there wasn't an interaction between learning model and learning independence on the learning achievement of science. Based on data analysis, cooperative learning model type NHT modified with audiovisual media is the most effective. This learning model are hopefully able to contribute the better learning achievement of science in the future.

Keywords: Independence Learning, Learning Achievement, Learning Models

1 INTRODUCTION

In this era, science and technology develop quickly, so the government prepares qualified human resources. The government seeks to make smart society by education, to know the succes level of the science, one of them seen from the students achievement in natural science learning (IPA).

Based on the observation result in the fifth grade of elementary schools in the gemolong district, students achievement in natural science learning are too low, one of the materials that has low scores is in the water cycle, it is caused the teacher just using direct leraning model that the teacher becomes the center of learning. Students often hear verbal information from the teacher, so the students are passive upon learning the natural science, it results in the low students' learning motivation when the students' self- motivation is low, it will make the student's score low in Natural Science.

The problem above becomes a reference of the teachers to use appropriate learning model, teachers have to be capable of impelementing many models of learning, so they can choose the appropriate learning models for their students. Cooperative learning is one of learning models that can make student active. One of the cooperative learning models is Numbered Head Together (NHT). Hamdani (2011: 89) said about the characteristic of NHT. NHT is the kind of learning model that groups the students, every student is given number, than the teacher calls randomly, so students can prepare themself perfectly.

However, this learning model has some weaknesses. The weakness of NHT learning model is the density of concepts that are given, resulting in the unability of students to acquire the material taught, the clever students tend to predominate and the weak students become inferior and passive, and they tend to copy their work because of their inadequate comprehension about the material. The alternative solution to overcome such weakness, is that NHT model should be modified with audio visual media. Hernawan (2007;7) reveals that based on the research result, information that is conveyed through audio visual media will be more strongly memorized than through auditody or audio media only Another factor that influences the learning achievement is learning independence. Learning independence is an active learning activity driven by intention and motives to acquire a competence in order to overcome a problem, and is developed with the acquired knowledge or competence (Mudjiman, 2009).

The aim of this research is to improve the effect of implementing learning models by knowing 1) the different influence among the cooperative learning models type NHT, modified NHT and direct learning on the science learning achievement. 2) the different influence among the high, medium and low learning independence on the students' learning achievement of science. 3) the interaction among the learning models and the learning independence towards the students' learning achievement of science.

2 MATERIAL AND METHOD

2.1 Material

a. NHT Model

Trianto (2010:82), Number head together is a type of cooperative learning which is specially designed to give influence on the patterns of student's interaction, and comes out as an alternative to traditional class structure.

Huda (2011:130) said that NHT is a variant of group discussion which has the same implementation technique as a gruoup discussion. Firstly the teacher asks the students to sit in groups. Each member is given number. When it is done, the teacher calls out a number to present the resuilt of his discussion. The teacher doesn't tell the number that will present the next discussion result. So, it is done on and on until all numbers are called. This random call will ensure all the students' involvement in the discussion.

b. Audiovisual Media

Semenderiadis (2009:68) reveals that: Audiovisual media play a significant role in the education process, particularly when used extensively by both teacher and children. Audiovisual media provide children with many stimuli, due to their nature (sounds, images). They enrich the learning environment, nurturing explorations, experiments and discoveries, and encourage children to develop their speech and express their thoughts. Next, Sadiman (2006:10) stated that audio visual media is no more seen as just an audiotory equiptment for teachers to teach, but serves more as message media from the message conveyor (teachers, writer, book ublisher, etc) to the message recipent (students).

c. Direct Learning Model

Direct learning model is a teaching approach which is specially designed to support the student's learning process, which is related to declarative knowledge and a well-structured procedural knowledge with gradual, step-by-step patterns of activity (Trianto, 2011: 29). Direct learning according to Kardi in Trianto (2007:30) can be in the form of lectures, and demonstrasi, training or practices.

d. Learning independence

Learning independence is an active learning activity which is driven by intention or motives to acquire a competence in order to overcome a problem, and is developed by the acquired knowledge and competence (Mudjiman, 2009).

Brookfield (2000:130-133) stated that learning independence is self-awareness, which is generated by oneself, learning ability to reach goals. Children with learning independence can be seen from their learning activity, they learn without commands, with their own innitiatives. To know well whether a student has learning independence it is necessary to the characteristic of students with learning independence.

e. Natural Science Learning Achievement

Mulyono (2003:37) stated that learning achivement or the result of learning obtained by the students after going through the learning actvity. Nasution (2010:17) stated that learning achivement is a perfectness reached by someone in thinking, feeling and executing. Ghufron, (2010:17) stated learning achievement obtained by the student or after learning activity is done, which is in the form of number or letter point.

Based on the above arguments, it can be concluded that learning achievement of natural science is the learning outcome reached by the student in a certain period of science learning process, which is stated in te form of perfect point.

2.2 Methods

This research was carried out in State Elementary school in the district of Kalijambe in the first semester in the academic year of 2015/2016. The type of research is quasi experimental research. The population of this research is the students of the fifth grade. The sampling the use research is two-staged random sampling. While the the factorial design f this research is represented in table 1.

Table 1. Structureof Research

Learning Models	Students learning independence		
	High (b1)	Medium (b2)	Low (b3)
NHT modified with audiovisual media	A1b1	A1b2	A1b3
NHT	A2b1	A2b2	A2b3
Direct Learning	A3b1	A3b2	A3b3

In this research there are two free variables, which are learning models and students' learning independence and one determining variable is students' learning achievement. To collect the data the researcher use test and questionnary method. The test method is used to collect data of the natural science learning achievement. While the questionarry method is used obtain data about students learning independence. Before class is treated, first it is necessary to hold a prerequisite test of students preliminary achievement with lilliefors test and homogenized test variant using the Barlett method. Furthemore, preliminary balanced test is conducted using one way analysis variant with different cell to know whether sampels on group of experiment one, group of experiment two and controlling group derives from a balanced students preliminarry learning achievement. While the data analysis technique the learning achievement using two-way analysis variant with different cell and subquent anava test using scheffe method (Budiyono, 2013:168-177).

3 FINDINGS AND DISCUSSION

The result of this normality and homogenized test for the preliminiary data of student's achievement are obtained from samples that derive from normally-distributed population, and the same variant population. Therefore, the balance test is carried out to identify whether the population of the three learning models; NHT, audiovisual media modified NHT or direct learning have the same preliminary achievement in a balanced condition.

Next, the hypothetical test, using two-way analysis variant with different cell. The summary of the two-way analysis variant with different cells is represented by Table 2.

Table 2. The Summary of Two-way Analysis Variant with Different Cells

Source of Variant	SS	df	MS	F	Ft	Decision
Major Effect:						
A (row)	929,027	2	464,51	5,25	3,15	Ho is rejected
B (column)	3099,76	2	1549,88	17,50	3,15	Ho is rejected
A B (interaction)	78,9808	4	19,75	0,22	2,53	Ho is accepted
Error	5313,31	60	88,56			
Total	9421,09	68	-			

Table 2 shows that H_{OA} is rejected, meaning that there are different influence on each category of the learning models towards the student's achievement of science learning. Besides, H_{OB} is rejected, meaning that the influence of each category of independent learning is existing on the science learning achievement. While H_{OAB} is not rejected (accepted) meaning that there is no interaction between the learning models and independent learning of the students.

Then, the Test Result of the Two-way Analysis Variant should be found its its marginal and cell average as found in Table 3 below.

Table 3. The Summary of the Average Point of Each Cell

Groups of Treatment	Independence			Marginal Average	Many Sample
	High (b_1)	Medium (b_2)	Low (b_3)		
Modified NHT (a_1)	87,63	75,00	69,57	77,40	25
NHT	78,82	66,67	63,33	69,61	23
Direct (a_2)	77,17	69,57	61,13	69,29	21
Marginal Average	81,20	70,41	64,68	72,10	

The result of the two-way analysis variant with unbalanced cells indicates that H_{OA} is rejected. Therefore further test needed to be done to analyze, using Scheffe to identify which of them have significant different average point. In the following, the summary of average test result among rows as shown in Table 4.

Table 4. The Summary of the Test Result of the Double Comparison between Rows

H_0	F_{obs}	$2F_{0,05;}$	Decision
$\mu_{1.} = \mu_{2.}$	2,866	1,680	H_0 is rejected
$\mu_{1.} = \mu_{3.}$	2,912	1,680	H_0 is rejected
$\mu_{2.} = \mu_{3.}$	0,112	1,680	H_0 is accepted

According to Table 4 and marginal average in table 3, it can be concluded that learning model of NHT with audiovisual media modification result in better learning achievement than direct learning model and NHT learning model has the same achievement as the direct learning model. The research result shows that NHT model with modified audiovisual is developed from the NHT according to Auliya Silfiana (2015) and therefore there is a significant difference of the students' learning achievement. Those who attend classes with audio visually-modified have better achievement than those with conventional learning model. The significant difference shows that the implementation of NHT with the audiovisual modification influences the result of students' achievement.

Next, from the Two-way analysis variant result, H_{OB} is rejected, so that it requires a comparison test of the average point among its columns. It means that there is an influence between the learning independence and the students' learning achievement. Double comparison test for finding out which of the three categories of independent learning in this research gives the different average of learning achievement.

Table 5. The Summary of Double Comparison Test Result among Columns

H_0	F_{obs}	$2F_{0,05;2;60}$	Decision
$\mu_{1.} = \mu_{2.}$	3,969	1,680	H_0 is rejected
$\mu_{1.} = \mu_{3.}$	5,933	1,680	H_0 is rejected

$\mu_{2.} = \mu_{3.}$	2,020	1,680	H_0 is rejected

According to Table 5 it can be concluded that students with high learning independence has better learning achievement that those with medium and low learning independence. Those with medium learning independence have better learning achievement that those with low learning independence. High leaning independence students are active, curious, and involved in their development of knowledge. They are energetic in accomplishing their tasks even for challenging ones, and are inclined to make the best efforts in performing them.

This is in line with the research finding of Ayuningtyas (2012 that reveals the higher the level of learning independence, the better the learning achievement will be. This is due to the fact that with higher independence of learning, they are more diligent and active during the ongoing process of learning. Besides, they are self-motivated and choose their own strategy to understand and find their own reference, so that this has positive impact for their achievement. Unlike those with medium learning independence they tend to be passive and rarely active in discussion but still they still can see that difficulties are challenges. While those with low learning independence are inclined to be passive in group discussions, and they have difficulties they are facing.

The last, from the result of two-way analysis variant, HOAB is not rejected as it does not influence any of the learning models on the students' learning achievement, so it not necessary to conduct a double comparison post anava. So it can be concluded there is a correlation between learning models and the learning independence towards the students' learning achievement of science.

4 CONCLUSION

Based on the research result and discussion, it can be concluded as follows: (1) There is a different influence between learning model with modification of audiovisual media, NHT and the direct learning. Learning model with the modification of audiovisual media has better learning achievement than NHT learning model and direct learning model.NHT learning model has the same result of learning achievement as the direct learning model. (2) There are differences influences among high, medium and low learning independence. Students with high learning independence have better learning achievement that hose with medium and low learning independence. Students, with medium learning independence have performed better achievement than those with low learning independence. (3) There is no interaction between the learning models and the learning independence.

The researchers suggest that the process of science learning in the classroom result in better learning achievement, they are expected to have more creative and innovative methods in developing various learning models aimed at better learning activity. One of the learning models is the one with modification of audiovisual media. Besides, it is going to be much better if a teacher can identify the students' learning independence so they find it easier to adjust their characteristic with their learning model and learning materials.

ACKNOWLEDGEMENT

The writer really shows a sincere gratitude to all parties that support the efficiency and effectiveness of this research.

REFERENCES

Annis Deshinta Ayuningtyas. 2012. *Eksperimentasi model pembelajaran kooperatif tipe think pair share (TPS) dan Two Stay-Two Stray (TS- TS) pada Materi Persamaan garis Lurus Kelas VIII SMP Negeri di Kota Yogyakarta ditinjau dari Kemandirian belajar siswa*. Surakarta: UNS.

Auliya Silfiana. 2015. *Pengaruh pembelajaran NHT dan STAD menggunakan media audiovisual Terhadap hasil belajar IPA siswa kelas VIII SMP Muhammadiyah 1 Surakarta*. UMS: Surakarta.

Budiyono. 2013. *Statistika Dasar untuk Penelitian*. Surakarta:UNS Press Brookfield, Stephen. 2000. *Belajar dan Pembelajaran*. Jakarta: Rineka Cipta.

Ghufron, M. Nur & Rini Risnawati, S. 2012. Gaya Belajar. Yogyakarta: Pustaka Belajar.

Hamdani. 2011. *Strategi Belajar Mengajar*. Bandung: CV Pustaka Setia.

Hernawan, Asep Herry. 2007. *Media Pembelajaran Sekolah Dasar*. UPI Press. Bandung.

Huda, Miftahul. 2011. *Cooperative Learning: Metode, Teknik, Struktur dan Model Penerapan*. Yogyakarta: Pustaka Pelajar.

Mudjiman H. 2009. Belajar Mandiri. Surakarta: UNS.

Mulyono, Abdurrahman. 2003. *Pendidikan Bagi Anak Berkesulitan Belajar*. Jakarta: Rineka Cipta

Nasution. 2010. *Manajemen Mutu Terpadu*. Jakarta: Ghalia Indonesia.

Sadiman, Arief. (2006). *Media Pendidikan: Pengertian, Pengembangan dan Pemanfaatannya*. Jakarta: Raja Grafindo Persada.

Semenderiadis, Themistoklis. 2009. *Using audiovisual media in nursery school within the framework of the interdisclipinary approach*. Europa: Synergies.

Trianto. 2007. *Model-model Pembelajaran Inovatif Berorientasi Konstruktivistik*. Jakarta: Prestasi Pustaka.

Trianto. 2010. *Mendesain Model Pembelajaran Inovatif Progresif*. Jakarta: Kencana.

Trianto. 2011. *Model-model Pembelajaran Inovati Berorientasi Konstruktivistik*. Jakarta: Prestasi Pustaka.