

# Effect of Cooperative Learning Model Type Group Investigation with Animation, Motivation on Students' Conceptual Knowledge Junior High School

Nurbaya Rajagukguk\* Nurdin Bukit Betty Marisi Turnip  
Post Graduate, State University of Medan, Medan, Indonesia

## Abstract

This study aims to analyze whether the conceptual knowledge of students with cooperative learning model type of group investigation with animation is better than the conceptual knowledge of students with conventional learning; To analyze whether the conceptual knowledge of students in the high motivation group is better than the low motivation group of students; And to analyze the interaction between cooperative learning model of group investigation type and motivation in improving student conceptual knowledge. This research is a quasi experimental research with two group pretest-posttest design. Research population of all students of class VIII SMP Negeri 3 Lubuk Pakam T.P. 2016/2017. The sample in this study was taken by cluster random sampling that is as much as 2 classes amounted to 64 people. Class VIII-A as an experiment class taught by cooperative learning model of group investigation type with animation media consists of 32 students, class VIII-B as control class is taught with conventional learning consists of 32 students. The instrument of this research using multiple choice test consisted of 18 questions and motivation in the form of questionnaire consists of 20 items and has been declared valid and reliability. The resulting data were analyzed using two-way ANAVA. The results showed that the conceptual knowledge of students who are taught cooperative learning model of group investigation with animation is better than conventional learning. Student conceptual knowledge in high motivation group is better than low motivation student group. There is an interaction between cooperative learning model of group investigation with animation and conventional learning with motivation in improving student conceptual knowledge.

**Keywords:** Group Investigation, Animation, Motivation, Conceptual Knowledge

## 1. Introduction

Progress of a nation is determined by the quality of human resources. The quality of human resources is highly dependent on the quality of education, Efforts to improve the quality of education in schools must be through learning. New concepts and insights about teaching and learning in schools have emerged and evolved with the rapid development of science and technology (Suryosubroto, 2009).

Learning activities are the scope of education, one of which is learning science. Natural Sciences is one branch of science that big role in life, especially in the field of science and technology is growing rapidly at this time. Physics is part of the natural sciences. Physical learning in junior high as a part of science and technology cluster has a big share in achieving knowledge competence (cognitive), affective and skill (psychomotor). The expected cognitive competencies include understanding concepts, the ability to apply concepts in everyday life, problem-solving skills, analytical and creative thinking skills.

Appropriate learning model can make science learning more fun to attract students' interest and motivation in learning. The main motivation is the motivation that comes from the individual self of the student itself or also called the intrinsic motivation. According to Sardiman (2011) intrinsic motivation is the motive that becomes active or functioning does not need to be stimulated by the outside. Many students do not develop in learning because they do not get the right motivation. If the students get the right motivation, then release the extraordinary power, so that the maximum achievement of learning achievement in the student self. Students who are in the learning process have a strong and clear motivation, will definitely be diligent and successful in learning (Susanti and Nuriyatin, 2015).

Based on the results of discussions with teachers in the field of science studies in SMP Negeri 3 Lubuk Pakam that learning is often used is conventional learning and less use of media. Students become less active and less motivated in learning and even tend to be passive because it is dominated by teachers. As a result, the ability of students is limited to the ability to memorize a set of facts presented by teachers and not lead to understanding the concept of science. It has an impact on the students' conceptual learning outcomes.

Conceptual knowledge will directly improve learning outcomes. Conceptual knowledge is the knowledge that shows the interconnectedness between the basic elements in the larger structure and everything works together (Siregar And Harahap, 2016). Conceptual knowledge consists of three subtypes, knowledge of classification and category, knowledge of principles and generalizations, and knowledge of theory, model and structure (Anderson and Krathwohl, 2015).

One of the learning model that involves the students 'activity to improve the students' conceptual knowledge

is by cooperative learning model of group investigation type. The cooperative learning model of group investigation is a model that does not require students to memorize facts, formulas but a model that guides students to identify topics, plan group investigations, conduct investigations, report and present the results of their investigations. Cooperative learning model of group investigation type involves students in planning topics in learning and continuing the course of investigations based on their planning (Arends, 2013). According to Slavin (2015), cooperative learning model type group investigation is ideally applied in science learning.

Cooperative learning model of this type of group investigation can generate student motivation so that it is more active because in this class study serves as a laboratory where students investigate problems that may be encountered in real life related to learning materials, student activities in learning, students' ability to work together and Mutual respect, because in this learning model democratic procedure is very important. The group investigation model achieves the goal of building knowledge in learners' self-discipline training in research, as well as learning to live in groups (Joyce and Weil, 2011). Internal motivation will result in improved learning ratings and strong memories of information and skills. Four aspects of intrinsic motivation to learn students, namely challenge, curiosity, self control, and fantasy (Jere Brophy, 2010).

The use of instructional media becomes one of the important points in order to support students' interest in learning. Animated media can reduce the lecture method that makes the teacher as a learning center and has a more interactive advantage with students because of the animation of interest. The students' animated display shows images of problems in everyday life so that students can be motivated to think critically in finding answers to problems. The use of learning media in the teaching and learning process can generate new desires and interests, generate motivation and stimulation of learning activities, and even bring psychological influences on students (Arsyad, 2013).

## 2. Method

This study uses quasi experimental method aims to see the effect of cooperative learning model of group investigation type with animation media and motivation to student conceptual knowledge. The population in this study is all students of class VIII SMP Negeri 3 Lubuk Pakam even semester T.P. 2016/2017 consisting of 9 classes amounted to 290 people. Sampling is done by class random sampling. The sample was taken as two classes, one class of experiment which is class VIII-A amounted to 32 students applying cooperative learning model type of investigation group with animation media and one control class that is class VIII-B amounted to 32 students applying conventional learning.

Variable in this research consist of independent variable that is learning by using cooperative learning model of group investigation type with media of animation and conventional learning, moderator variable is motivation, that is student intrinsic motivation, and dependent variable in this research is student conceptual knowledge.

This type of research is quasi experiment, with the research design used is two group pretest-posttest design. Design research with 2x2 factorial design for technical analysis of two way variance (ANOVA).

The instrument used in this research is a student conceptual knowledge test consisting of 18 questions and a questionnaire of intrinsic motivation consisting of 20 statements. In order for the instrument to meet the criteria of good and reliable, then before being used first validated.

## 3. Results

Student's conceptual knowledge on control class and experiment class shown in Table 1.

Table 1. Pretest and Posttest data of students' conceptual knowledge

Class	Average Student Conceptual Knowledge	
	Pretest	Posttest
Experiment	34.37	76.90
Control	34.72	63.54

Based on Table 1, a description of the mean values of conceptual knowledge of pretest and posttest students in the control class and experiment class is as follows: pretest in control class 34.72 and experiment class 34.37. Posttest of control class is 63.54 and experiment is class 76.90

Problem analysis Posttest conceptual knowledge is useful to look at the student conceptual knowledge indicator which becomes difficult for students. Grain analysis of students' conceptual knowledge of each posttest item given to the experimental class and control class can be seen in Table 2.

Table 2. Average Grade of Student Answers on Posttest Questionnaire

No	The Dimension of Conceptual Knowledge	Percentage of Achievements	
		Control	Experiment
1	Classification and category	66.41%	88.28%
2	Principles and generalizations	60.00%	75.00%
3	Theory, model and structure	62.50%	73.61%

Based on Table 2, the percentage of students achieving average scores who answered correctly in the matter of conceptual knowledge of students in the experiment class is higher than the control class.

The highest percentage of achievement for each indicator lies in the classification indicator and category, where the percentage of achievement in the experimental class is 88.28% and the control class is 66.41%. This is because the conceptual knowledge issues that are classified and category indicator classified as easy to solve students because knowledge about classification and category includes classes, categories, divisions, and the specific arrangement in the discipline.

While the lowest percentage of achievement for the experiment class lies in the third indicator, namely theory, model, and structure, where the percentage of achievement in the experimental class is 73.61%. This is because knowledge of theories, models and structures includes knowledge of the various paradigms, epistemology, theories, models used in the disciplines to describe, understand, explain, and predict phenomena. But in the lowest achievement control class is the indicator of principle and generalization where the percentage of achievement is 60.00%, This is because on the issues of principle and generalization include knowledge of certain abstractions that summarize the results of phenomena observation. These abstractions have the greatest benefit in describing, predicting, determining the most appropriate and relevant action or direction to be taken. Data posttest of conceptual knowledge of experimental class and control class are grouped by high motivation group and low motivation can be seen in Table 3.

Table 3. Two-way ANOVA

Student Motivation (B)	Learning model (A)		Average
	Experiment (Group Investigation with Animation) (1)	control (Conventional) (2)	
Low (1)	70,09	62,82	72,81
High (2)	81,58	64,04	66,46
Average	75,84	63,43	

Table 3 shows that the students' conceptual knowledge is based on the level of motivation in the experimental and control classes. In the experiment class it can be seen that the average value of the conceptual knowledge of low motivated students (62.82) is lower than that of highly motivated students (64.04). In the control class the average value of conceptual knowledge of low motivated students (70.09) was lower than that of highly motivated students (81.58).

After the two classes were declared homogeneous, then continued on a two-way ANOVA test. Hypothesis testing in this study using two-way ANOVA to see whether or not interaction between variables studied namely conceptual knowledge and student motivation using SPSS 20.0 is shown in Table 4.

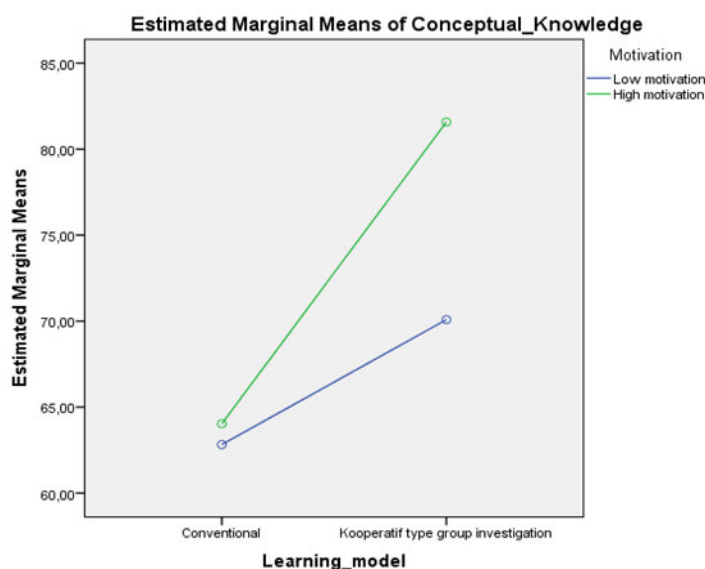
Table 4. Calculation of Two-way ANOVA

Source	Mean Square	F	Sig.
Intercept	299385.587	3185.649	0.000
Learning Model	2375.057	25.272	0.000
Motivation	623.269	6.632	0.012
Learning Model * Motivation	407.695	4.338	0.042

Two-way ANOVA test results using SPSS 20.0 obtained grade significance of 0.000 where this value is smaller than the significant level of 0.05. This shows the model of learning in the experiment class that is cooperative model of group investigation type with animation better than the control class learning model that is the conventional learning model

Part of motivation is obtained significant value equal to 0.012, because significant value  $0.012 < 0.05$ . This shows that the conceptual knowledge of students who have high motivation is better than low motivation. Part of class \* motivation is obtained significantly by 0.042 where this value is smaller than significant value 0.05. This shows that there is an interaction between cooperative type model of investigation group and motivation to student conceptual knowledge.

The graph of the relationship between cooperative model of group type with animation and conceptual knowledge at high motivation level and low motivation can be seen in Figure 1.



**Figure 1.** Interaction Model Learning and Motivation

Figure 1. Shows the interaction results between cooperative learning of group investigation type with conventional learning and high motivation and low motivation.

#### 4. Discussion

##### 4.1. The Effect of Cooperative Learning Model Type Group Investigation with Media Animation Against Student Conceptual Knowledge

Based on the research results obtained the average value of conceptual knowledge of students who are taught with conventional learning model when pretest by 34.72 with a standard deviation of 10.82 while the posttest of 63.54 with a standard deviation of 11.54. The mean value of conceptual knowledge of students taught by cooperative learning type of group investigation with animation media in the experiment class when the pretest of 34.37 with the standard deviation of 10.03 while the posttest of 76.90 with standard deviation 9.15. Thus the conceptual knowledge of students who are taught with cooperative model of group investigation type with animation media is better than the students taught by conventional learning.

Statistically the conceptual knowledge of students taught by cooperative model of group investigation type with animation is better than the students taught by conventional learning. The average value of conceptual knowledge of the experimental class is 76.90 while the mean score for the control class is 63.54. When testing hypothesis with Anava test, obtained F Count of 25,272 and significant at 0,000 and this significance is smaller than significant level  $\alpha = 0,05$ . Then it can be concluded that the conceptual knowledge of students in the experimental class is better than the control class.

The findings of this study are similar to the results of Sahyar and Maris (2016) research indicating that cooperative learning model of group investigation type is better than conventional learning toward conceptual knowledge of SMP physics concept. The Siregar and Harahap (2016) research states that there is an influence of the group investigation (GI) learning model on the conceptual knowledge of the students. The results of Simanjuntak and Siregar (2014) showed that statistically the result of student learning taught by cooperative model of group investigation type is better than the students taught by conventional learning. Astra Research (2015) said that the implementation of collaborative group investigation learning model can improve learning process and learning outcomes. The results of Dewi, et.al (2012) said that the model of group investigation study can be applied to improve the learning outcomes of junior high school students. Putra research, et al (2015) said that there is a significant difference of science learning outcomes between groups of students who follow the learning by using cooperative learning model of group investigation type with interactive multimedia and group of students using conventional learning because the average score of students' Follow cooperative learning model type interactive multilingual interactive investigation group.

##### 4.2. Conceptual knowledge of natural science students who have high motivation better than low motivation

The results of the research analysis conducted by testing the data showed that the significance of motivation obtained 0.012 significance smaller than the significance of  $\alpha = 0.05$  with average conceptual knowledge of students with high motivation greater than with students with low motivation. So it can be concluded that the conceptual knowledge of students who have high motivation better than the conceptual knowledge of students who have low motivation.

The results of this study is similar to Susanti and Nuriatin (2015) there is a significant influence between students' intrinsic motivation on student learning outcomes. The research results Setiawan, et al (2013) states that motivation has a great influence to improve learning achievement of health science courses. Pransiska, et al (2016) stated that there is an influence of motivation on the learning outcomes of junior high school students.

#### *4.3. Interaction Between Model Cooperative Group Investigation Group with Media Animation and Motivation on Conceptual Knowledge*

Students who have high motivation if taught by cooperative model of group investigation type with animation media will gain high conceptual knowledge. Students with low motivation are taught by cooperative model of group investigation type with animation media will obtain low conceptual knowledge as well. Then it can be concluded that cooperative model of group investigation type with animation media interact with motivation in influencing conceptual knowledge.

This is in accordance with the results of research that statistically showed significant interaction between cooperative model type investigation with animation media and motivation in influencing student conceptual knowledge obtained F Counted 4,338 and significant at 0.042 and this significance is smaller than level  $\alpha = 0,05$ . Thus the findings of this study in accordance with the results of research conducted by researchers and in accordance with the theory that cooperative type of investigation group with animation media is one model of learning designed primarily to help students develop conceptual knowledge.

The findings of this study are similar to the results of Aristi's research (2014) shows that there is a statistically interaction between study group investigation model with the motivation to learn in improving the results of physics learning.

## **5. Conclusion**

Conceptual Knowledge of students taught by cooperative learning model of group investigation type with animation better than conceptual knowledge of students taught by conventional learning. The result shows that there is influence of cooperative learning model type of group investigation with animation media to student conceptual knowledge. The conceptual knowledge of students with high motivation is better than the conceptual knowledge of students with low motivation. The results show that there is influence of motivation to student conceptual knowledge. There is an interaction between cooperative learning model of group investigation type with animation and motivation in improving student conceptual knowledge.

## **References**

- Anderson, L.W. & Krathwohl, D.R. 2010. Kerangka Landasan Untuk Pembelajaran, Pengajaran, dan Asesmen. Yogyakarta: Pustaka Pelajar
- Arends, R. I. 2013. Belajar Untuk Mengajar Learning To Teach, Jakarta: Salemba Humanika.
- Aristi, A. 2014. Efek Model Pembelajaran Kooperatif Tipe Group Investigation dan Motivasi Terhadap Hasil Belajar Fisika Siswa MAN Tanjung Balai. Jurnal Pendidikan Fisika. 3 (2): 1-7
- Arsyad, A. 2013. Media Pembelajaran. Jakarta: Raja Grafindo Persada.
- Astra, Wahyuni, dan Nasbei, H. 2015. Improvement of Learning Process and Learning Outcomes in Physics Learning by Using Collaborative Learning Model of Group Investigation at High School. Journal of Education and Practice. 6 (11): 75-79.
- Brophy Jere. 2010. Motivating Students To Learn. New York: Routledge
- Dewi, Iswari, dan Susanti. 2012. Penerapan Model Group Investigation Terhadap Hasil Belajar Materi Bahan Kimia Di SMP. Unnes Science Education Journal. 1 (2): 69-76
- Joyce, B. Weil, M. dan Calhoun, E. 2011. Models of Teaching, Edisi Delapan, Pustaka Pelajar, Yogyakarta.
- Pransiska, Asyhar, dan Asrial. 2016. Pengaruh Model Pembelajaran Group Investigation dan Motivasi Terhadap Hasil Belajar Siswa Kelas VII SMP Dalam Materi IPA Terpadu Pada Materi Asam, Basa, dan Garam. Edu Sains. 5 (2): 27-31.
- Putra, Sudarna, Tegeh. 2015. Pengaruh Model Pembelajaran Kooperatif Tipe GI (Group Investigation) Berbantuan Multimedia Interaktif Terhadap Hasil Belajar IPA. e-Journal Edutech Universitas Pendidikan Ganesha Jurusan Teknologi Pendidikan. 3 (1).
- Risnawati, Yulianti, dan Dwijananti. 2012. Penerapan Group Investigation Pada Pembelajaran Sains Untuk Mengembangkan Karakter Siswa SMP Kelas VIII. Unnes Physics Education Journal (UPEJ). 1 (1): 12-19.
- Sahyar dan Maris, S. 2016. Investigation (GI) Terhadap Hasil Belajar Pengetahuan Konseptual Fisika Pada Tingkat SMP. Jurnal Inpafi. 4 (4):114-123.
- Sangadji, S. 2016. Implementation Of Cooperative Learning With Group Investigation Model To Improve Learning Achievement Of Vocational School Students In Indonesia. International Journal of Learning & Development. 6 (1): 103-91
- Sardiman. 2011. Interaksi dan Motivasi Belajar Mengajar. Jakarta: Raja Grafindo Persada.

- Setiawan, Murti, dan Suriyasa. (2013). Pengaruh Model Pembelajaran Kooperatif Tipe Group Investigation dan Motivasi Belajar Terhadap Prestasi Belajar Mata Kuliah Ilmu Kesehatan Pada Jurusan Pendidikan Jasmani Kesehatan dan Rekreasi Universitas Pendidikan Ganesha Singaraja. *Jurnal Magister Kedokteran Keluarga*. 1 (1): 1-13
- Siregar, E. dan Harahap, M.B. Pengaruh Model Pembelajaran Kooperatif Tipe Group Investigation (GI) Terhadap Pengetahuan Konseptual Siswa SMA Muhammadiyah 2 Medan T.P. 2015/2016. *Jurnal Inpafi*. 4(4): 42-49
- Slavin, R.E. 2015. *Cooperative Learning Teori, Riset dan Praktik*. Bandung: Nusa Media.
- Suryosubroto, 2009. *Proses Belajar Mengajar Di Sekolah*. Jakarta: Rineka cipta.
- Susanti, A. dan Nuriyatin, N. 2015. Pengaruh Motivasi Belajar Siswa Terhadap Prestasi Belajar Matematika Siswa. *Jurnal Pendidikan Matematika STKIP PGRI Sidoarjo*. 3 (2): 151-158