



The Effectiveness of Group Investigation (GI) Learning Models and Team Quiz on Learning Outcomes and Cooperation Character on Nervous System Materials

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Abstract

The purpose of this study is to reveal the effectiveness of the Group Investigation and Team Quiz learning models on learning outcomes and the character of cooperation on the material of the nervous system. The Research using Pre-Experimental Design with One Group Pretest Posttest Design. The study population was all students of Grade of XI IPA SMAN 16 Semarang. The study uses the saturation sampling technique. Research data in the form of cognitive, affective, psychomotor learning outcomes, cooperative character values, activities, student and teacher responses. Cognitive learning results are obtained from classical completeness. The results showed that students' classical completeness was 86.66%. N-gain results of 100% of students are in the criteria of being medium and high. The value of the character of student cooperation in good and very good criteria is 96.2%. Affective learning outcomes are very good criteria with a value of 87%. Psychomotor learning outcomes are highly skilled criteria with a value of 82.88%. The conclusion of the research is the application of the Group Investigation and Team Quiz Learning Model effectively to the learning outcomes and the character of student cooperation on the nervous system material at SMAN 16 Semarang.

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INTRODUCTION

Learning is a complex process that happens to everyone and lasts a lifetime. One sign that someone has learned something is a change in behavior in him. These behavioral changes involve both changes that are knowledge (cognitive) and skills (psychomotor) as well as those concerning values and attitudes (affective). These changes should occur as a result of interaction with the environment through the teaching and learning process. Where the teacher gives the only source of learning, even though the task, role and function in the teaching and learning process is very important. Learning outcomes often referred to as "scholastic achievement" or "academic achievement" are efficiency and the results achieved overall through the learning process in schools are presented in the form of numbers or values based on tests (Andrini, 2016).

Based on the results of interviews and observations, in the Biology Grade of XI learning activities at SMA Negeri 16 Semarang, it is known that biology teachers are still the center of learning so students are less active and attitudes to cooperate between students in the learning process are still lacking. Then the data obtained from the teacher that completeness of student scores on the material of the nervous system TA 2018/2019 <60%.

In the 2013 curriculum, teachers are asked to create creative learning and attract students' attention, so that students feel happy and motivated in following the teaching and learning process. So that teaching and learning activities are not teacher-centered, and students can work together, then a student-centered learning model must be applied and make students more active in the teaching and learning process. Ministry of National Education (2003) said Cooperative Learning is a learning strategy through small groups of students who work together to maximize learning conditions to achieve learning goals. So the Cooperative Learning Model is expected to be able to increase the activity and attitude of cooperation between students so that the learning process is student-centered.

Based on the background that has been described, the researcher intends to collaborate on the learning model of Group Investigation and Team Quiz. Isjoni (2012) explained that Group Investigation is a form of cooperative learning model that actively involves students. This learning model allows students to actively contribute from the beginning to the evaluation stage in learning. Students will also actively construct their knowledge in the form of group work, by investigating the topics they get. Hamruni (2012: 176) says that the Team Quiz method is a learning strategy that will enhance teamwork and also the responsible attitude of students for what they learn in a fun and non-frightening way, namely in the form of quizzes. Both learning models are expected to increase activeness, enhance cooperative attitude, and learning will be student-centered. It is hoped that if student activity and cooperative attitudes among students have been realized, then student learning outcomes will also rise to meet the KKM or beyond it.

The effectiveness referred to in this study is the achievement of learning objectives after the application of the Group Investigation and Team Quiz Learning Model. Learning is said to be effective if the cognitive learning outcomes (N-gain) of students rise with moderate and high criteria reaching 80%, the percentage of the number of students who surpass KKM (75) reaches $\geq 80\%$, and the percentage of students working attitudes attains 70% with criteria good and or very good

RESEARCH METHOD

The study was conducted at SMAN 16 Semarang. Research using Pre-Experimental Design with One Group Pretest Posttest Design. The study population was all students of Grade of XI IPA SMAN 16 Semarang. The study uses the saturation sampling technique. Research data in the form of cognitive, affective, psychomotor learning outcomes, cooperative character values, activities, student and teacher responses. Cognitive learning results are obtained from classical completeness calculations and N-gain tests.

Affective, psychomotor learning outcomes, cooperative character values, student activities, student responses, and teachers were analyzed descriptively qualitatively. In the implementation of learning the researchers applied the two models to the Nervous System material in humans Grade of XI MIPA

RESULTS AND DISCUSSION

The results of research on the application of the Group Investigation (GI) and Team Quiz Learning Model to the learning outcomes and the character of cooperation on the material of the nervous system in the form of student learning outcomes data are the results of student cognitive competence learning outcomes, student affective learning outcomes and student psychomotor learning outcomes. Other data obtained are data responses of students and teachers to the learning of the nervous system material.

Cognitive Learning Outcomes

Cognitive learning outcomes were obtained from the posttest scores of the two experimental classes which were then averaged. Before the posttest is held at the end of the meeting, students are given a pretest at the beginning of the meeting with the aim of knowing the students' initial abilities.

Table 1. Student cognitive learning outcomes

<i>Posttest Value</i>	Total Students	%
Students complete	91	13,44%
Students do not complete	14	86,66%

Table 1 shows that the classical completeness scores of students when the posttest occurred. The amount of change in students' understanding of the nervous system material can be determined through the N-Gain test. The N-Gain test results can be seen in Table 9.

Table 2. N-Gain Test Results (105 students)

Category	Total Students	%
Low N-Gain	0	0
Medium N-Gain	57	54,28
High N-Gain	48	45,72
Medium dan High N-Gain	105	100

Table 2 shows that the results of the N-cognitive learning outcomes were obtained from the students' Posttest scores. Classical completeness achieved by students after the application of the Group Investigation and Team Quiz Learning Model in the nervous system material was 86.66% (Table 1), whereas in the 2018/2019 school year the students' classical completeness in the nervous system material was less than 60%. In addition, the N-gain test results of 100% of students are in the medium, and high criteria (Table 2). Students discover the concept of nervous system material through the process of investigation, problem solving, and quizzes so that students are more active in learning and their learning outcomes increase. The results of this study are in line with previous research which states that the application of the learning model of group investigation has an effect on improving student learning outcomes (Trismanita et al., 2014). And also, in line with previous research which states that learning using Team Quiz learning strategies has an influence on student learning outcomes (Kusumawardani et al., 2018).

In this study, there were 11 out of a total of 105 students whose learning outcomes had not yet reached KKM, namely A3, A8, A33, B18, B19, B20, C3, C9, C24, C30, and C32. This can be influenced by several factors. Based on the analysis of student responses, it is known that all students agreed to use Model Group Investigation with Team Quiz to facilitate learning of the nervous system. However, all students whose learning outcomes have not yet reached the KKM have the value of cooperative character below the

class average of each aspect. Student learning outcomes are known to be low despite being treated. Model Group Investigation with Team Quiz is Cooperative Learning. According to Slavin (2015) cooperative learning is a learning model where students work in small groups helping one another in learning subject matter. Because in Cooperative Learning requires cooperation with each other in order to get maximum results in learning, then if the character of student cooperation in learning is not good, it might affect learning outcomes, especially cognitive learning outcomes. The KKM cannot be exceeded by these students may also be due to lack of interest in learning in biology subjects so that learning outcomes are always low. Factors that influence learning outcomes include internal factors (factors within students) and external factors (factors from outside students). Internal factors consist of physiological (student health) and psychological aspects (intelligence, positive attitude, talent, interests and motivation), while external factors such as environmental conditions around students are social and non-social environment (Rijal & Bachtiar, 2015). N students gain at low criteria as much as 0%, medium criteria as much as 54.28 and high criteria 45.72%.

Affective Learning Outcomes

Affective domain learning outcomes are used to determine student attitudes during the learning process. Affective learning outcomes measured include five aspects, namely discipline, courtesy, responsibility, honesty and cooperation. Assessment of student attitudes is carried out through observations made by observers in 3 meetings. Data on affective domain learning outcomes can be seen in Table 3

Table 3. Affective Learning Outcomes

Aspect	Class Average	
	Score (%)	Criteria
Discipline	86,8	Very good
Polite	89,5	Very good
Responsible	87,2	Very good
Cooperation	84,5	Very good

Table 3 shows that the polite aspects had the highest percentage with very good criteria. Although the aspects of discipline, responsibility, and cooperation have a percentage below the polite aspects, but all three aspects are already in very good criteria too. The assessment of students' attitudes is carried out through observations made by observers in three meetings. Indicator aspects of the discipline are students carrying biology tools and books. Aspect indicator. Indicators of polite aspects are students stretching their fingers before asking questions, asking in polite language, giving opportunities to other friends to ask / argue. Indicators of aspects of responsibility are students working on discussion tasks according to instructions, including literature sources, gathering discussion results. Indicators of honest aspects are students not seeing the results of other group discussions, conveying what literature sources are obtained, conveying what are the results of discussions, while indicators of aspects of cooperation are students involved in giving opinions in discussions, involved giving solutions in discussions, helping friends who have difficulties in discussion. All of these aspects have very good criteria

Psychomotor learning outcomes

Psychomotor learning outcomes are used to measure student skills during the learning process. Assessment is done during presentations both in groups and in front of the class. The assessment is done through an observation sheet by the observer in 3 meetings. Data on student psychomotor learning outcomes can be seen in Table 4.

Table 4. Psychomotor learning outcomes

Aspect	Class Average	
	Score (%)	Criteria
Posture	82,5	Very Skilled
Describe the material clearly and loudly	84,4	Very Skilled
Describe neatly and precisely	83,7	Very Skilled
Submission of material	82,7	Very Skilled
The ability to conclude the results of the discussion	81,1	Very Skilled

Table 4 shows that although the five psychomotor aspects have different percentages, they are still on the same criteria, which is very skilled. Psychomotor learning outcomes obtained from observations during three meetings by the observer. Evaluation of psychomotor learning outcomes includes posture, displaying material clearly and hard, describing coherently and precisely, delivering material, the ability to conclude the results of the discussion. The psychomotor domain can be assessed through clear speaking skills at presentations and body position processing skills (Pratiwi & Nurwachid, 2013). During the presentation, students explained the results of the investigation and the results of the quiz that had been obtained clearly so that they could be heard by students who were sitting in the back. Students also involved question and answer during the presentation. The use of group investigation can improve good communication skills, learn to respect the opinions of others, and can increase participation in learning process (Fatimah, 2018). The Team Quiz Learning Model is a strategy that can increase students' learning responsibilities in a pleasant and non-threatening and boring environment (Zaini et al., 2008). Through the group investigation model students have more opportunities to participate, such as explaining and improving their abilities (Khafid, 2010). Even though the five psychomotor aspects have different percentages, they are still on the same criteria, namely very highly skilled with a value of 82.88% (Table 4).

The value of the character of student cooperation

The value of the character of student cooperation is used to measure the level of student cooperation after being given treatment. Observation assessment is done when students work in groups. Observation was carried out by the observer for 3 meetings. Observation data of five aspects for 3 meetings can be seen in Table 5.

Table 5. The value of the character of student cooperation

Aspect	Class Average	
	Score (%)	Criteria
Give opinions	83,65	Very Good
Perform tasks according to group agreement	84,92	Very Good
Help friends who are struggling groups	82,93	Very Good
Respect and accept group decisions	85,31	Very Good
Appreciate the opinions of group friends	88,65	Very Good

Table 5 shows that although the five different percentage aspects are still on the same criteria which is very good. The value of the cooperation character obtained is 96.2% of students who are in good and very good criteria. This shows that students are very good at doing cooperation in groups when teaching and learning activities. And 3.8% of students are in pretty good criteria. So there are no students who have a bad cooperative attitude when grouping in learning activities using the group investigation and Team Q learning model

Students Activity Questionnaire

In addition to observations by observers, student activity is also measured by a questionnaire filled out by each student in 3 classes. Data on the average results of filling out questionnaires by students can be seen in Table 6.

Table 6. Data Results Average Questionnaire Filling

Statement	Class Average	
	Score (%)	Criteria
If there is an opportunity, I ask questions at the beginning of learning about the lessons that will be discussed.	97,85	Very Active
If there is an opportunity, I give my opinion and respond to the question of the friend / teacher.	95,71	Very Active
I found a problem in the subject matter today, so the question arises in me	95,95	Very Active
I provide opinions in the discussion.	96,19	Very Active
I was actively involved in solving the problem in the discussion group.	97,14	Very Active
I provide a solution in the resolution of the problem.	95,71	Very Active
I am giving an explanation based on my perspective to solve the problem in the discussion	96,42	Very Active
If there is an opportunity, I explain the results of the group discussion	96,19	Very Active
If there is an opportunity, I submit the question in the discussion	98,09	Very Active
note the conclusions of the lesson material	97,14	Very Active

Table 6 shows that although the ten statements of students have different percentages, they are still on the same criteria, which is very active

Students Responses

Student statement questionnaire data is used to determine student interest in learning using the Group Investigation Learning Model and Team Quiz. Data on the average results of filling out questionnaires by students can be seen in Table 7

Table 7. Data Results Average Student Response Questionnaire

Statements	Class Average	
	Score (%)	Criteria
I am interested in participating in the learning process of nervous system material biology using the Group Investigation and Team Quiz models	90	Very happy
I understand the nervous system material using Group Investigation and Team Quiz	90	Very happy
The use of the Group Investigation and Team Quiz models motivated me to take part in learning the nervous system.	90,71	Very happy
I like the learning atmosphere when using the Group Investigation and Team Quiz models	93,33	Very happy
The use of the Group Investigation and Team Quiz models made it easier for me to find concepts independently	92,61	Very happy

The use of the Group Investigation and Team Quiz models made it easier for me to understand the nervous system objects that were originally abstracted to be more real	91,42	Very happy
The use of the Group Investigation and Team Quiz models made it easy for me to link structure, function, and abnormalities in the nervous system	91,42	Very happy
The use of the Group Investigation and Team Quiz models made it easier for me to understand the nervous system's mechanisms of attack.	93,33	Very happy
Using the Group Investigation and Team Quiz models increased my learning activities	95,95	Very happy
The use of the Group Investigation and Team Quiz models needs to be used in the material of the nervous system.	95,95	Very happy

Table 7 shows that although the ten statements of students have different percentages, they are still on the same criteria, namely students are very happy and interested in the application of the Group Investigation and Team Quiz Learning Models during learning

Teacher Responses

The teacher's response to the application of the Group Investigation and Team Quiz Learning Model during the learning of the learning outcomes and the character of the students' cooperation in the nervous system material was obtained from a questionnaire filled in by Biology teacher Grade of XI IPA 1, XI IPA 2, and XI IPA 3.

Table 8. The results of teachers' responses to learning using the Model Group Investigation and Team Quiz at SMA N 16 Semarang

No.	Main Questions	Teachers Responses
1.	Impression of learning	The learning atmosphere is fun, students look more active
2.	Student activities	The application of the group investigation model with the key to determination can more easily increase student learning activities motivating students
3.	Difficulties	Control student activities so that learning runs according to the specified time allocation
4.	Interest in learning	Interested, because it is easier to teach animalia material because students directly observe the object being studied, students are more active, and learning is not boring.
5.	Criticism and suggestions for learning	Students must always be controlled so that learning continues to run effectively according to the specified time allocation

In general, the teacher gives a good response to learning. This can be known from the very good impression and the teacher's interest in learning using contextual LDS so that it can help students in understanding the principles and mechanisms of everyday life in developing the concept of nervous system material which is still too abstract.

Based on teacher responses, the application of the group investigation learning model and Team Quizelain can motivate students to increase student learning activities (Table 8). Students are involved in every learning process such as discussion so that it triggers students to be active. Student activity can be increased because of student-centered learning (Mustofa et al., 2018). This model places students working in heterogeneous groups. Students exchange ideas to solve problems faced by the group. The group activities in this study ran smoothly because they were always accompanied by the teacher. Through group activities,

students can have good skills in communicating and collaborating so that they can grow their thinking and socializing skills (Kadavakollu, 2013; Lestari, 2018).

CONCLUSION

Based on the results of the data analysis and discussion of the results of the study, it was concluded that the application of the Group Investigation (GI) Learning Model and Team Quiz was effective in learning outcomes and the character of student cooperation on the nervous system material in SMA N 16 Semarang. This is indicated by classical completeness of students reaches 86.66%, N-gain test results of 100% of students are in the criteria of being medium and high and 86.2% of students have good and very good cooperative character criteria

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