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The Effect of Cooperative Learning Model Type Group Investigation (GI) Assisted Macromedia Flash, Adversity Quotient (AQ) on Students' Conceptual Knowledge

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Abstract
This research aimed to analyze whether the conceptual knowledge of students using cooperative learning model of group investigation type assisted macromedia flash better than the conceptual knowledge of students by using conventional learning; to analyze whether the conceptual knowledge of students between students who have adversity quotient above average and students who have adversity quotient below the average; to analyze whether there is an interaction between cooperative type of group investigation-assisted macromedia flash and adversity quotient in improving student conceptual knowledge outcomes. The design of this research was quasi experiment with the design of two groups of pretest and posttest. Data were collected by using conceptual knowledge test and adversity quotient questionnaire. The population were all students' of class XI IPA SMA Negeri 5 Langsa Academic Year 2016/2017 and the sample was class XI IPA 1 as experimental class and XI IPA 2 as control class chosen by random class. Data were analyzed by two-way ANOVA. The results showed that the students' conceptual knowledge using cooperative model of group investigation type assisted macromedia flash better than conventional learning. The results showed that the conceptual knowledge of students using cooperative model type of group investigation-assisted macromedia flash better than conventional learning. The students' conceptual knowledge with adversity quotient above average showed better results than students' with adversity quotient below average. This interaction showed the dominant conceptual knowledge of the cooperative type model of group investigation assisted of macromedia flash in the group having an above average adversity quotient.
Keywords: Cooperative Learning Model Type Group Investigation, assisted macromedia flash, conventional learning, AQ, conceptual knowledge

1. Introduction

Good education is expected by the public requires professional teachers in managing the learning process in order to achieve the learning objectives. In learning, physics is developed through the ability of analytical, inductive and deductive thinking in solving problems related to the use of knowledge, skills development (Sumaji, 1998).

Assessment of learning outcomes undertaken by teachers so far only use the assessment of cognitive learning outcomes in general and still use Bloom's cognitive theory. The 2013 curriculum specifically divides assessment of learning outcomes into factual, conceptual, procedural and metacognitive knowledge with indicators of each knowledge based on the revisions of Anderson and Krathwohl. Objective assessment of learning outcomes by teachers on the competence level of knowledge includes the ability to know, understand, apply, analyze, and evaluate the factual knowledge, conceptual knowledge, procedural knowledge, and metacognitive knowledge (Maliqah et all, 2015).

Based on the results of interviews and observations found problems that are related to the process of learning in the classroom is rarely use a variety of learning models with the reason of lack of knowledge about learning models. Exercises and assignments that cause students to be bored and not interested in learning physics, causing low student learning outcomes, especially conceptual knowledge.

NCTM conceptual knowledge (2000) is one part in building impressive mathematical knowledge. Conceptual knowledge has three dimensions: classification and category dimension, principle dimension and generalization, and principle of model, theory and structure (Arends, 2008)..

Another problem is the rarity of teachers to do a simple lab or laboratory to strengthen students' knowledge on the material that is abstract due to inadequate laboratory equipment. The last problem is the adversity quotient of students in obtaining knowledge is very less. Students only expect the science provided by the teacher without intending to seek other reference sources in addition to science.

Leman (2007) defines adversity quotient succinctly i.e., as a person's ability to deal with problems. Some of the above definitions are quite diverse, there is a focus or point of tap, namely the ability of a person, whether physical or psychic in the face of problems or problems that are being experienced. Stoltz (2000) adversity quotient (AQ) as the intelligence of a person in the face of obstacles or difficulties regularly. Adversity Quotient help individuals strengthen the ability and perseverance in facing the challenges of everyday life while still sticking to the principles and dreams regardless of what was going on. Stoltz also offers four basic

dimensions that will result in high adversity quotient capabilities, i.e., control, endurance, reach, origin and ownership.

In response to the above problems, it is necessary to have a learning model that oriented learning on practicum activities and discussions that can create student involvement in the learning process to foster students' conceptual interest and knowledge of physics (Aksoy, 2013). Students who learn by active learning methods, not only learn better, but also take more pleasure in learning experiences (Bello, 2011). One of the learning models to enable students through group learning in the classroom and conduct discussions, exchange opinions and ask questions is a cooperative learning model type Group Investigation (GI) (Akçay, 2012).

The cooperative model type GI has a constructivist theory base proposed by piaget and vygotsky. The cooperative model type GI has a syntax of choosing topics, planning of learning, implementation, analysis and synthesis, presentation of results and evaluations by teachers and students (Arends, 2008). The social system of the cooperative model type GI is the formation of groups with heterogeneous and democratic student conditions. Students are given the freedom to express their opinions in open discussions. In addition students are also taught to dare to express his opinion in public (Joyce, 2009). The instructional impact of this model are constructionist view of knowledge, disciplined inquiry, effective group processes and governance. As for the impact of nurturant are interpersonal warmth and affiliation, commitment to social inquiry, independence as a learner, and respect for dignity of all and commitment to pluralism. More Joyce explain reaction principle of cooperative model type GI is teacher act as facilitators directed to the group (helping learners to formulate a plan, action, organizing groups) and needs investigation (awareness methods). Teacher serves as an academic counselor.

"Cooperative learning model of group investigation type is a learning model that involves students since planning, both in determining the topic and investigative procedures used" (Maliqah et al, 2015). The cognitive goal of cooperative model of group investigation type is that students have academic conceptual knowledge, and investigating skills. Based on the objective of cooperative model type of group investigation above, in this study selected cooperative group investigation model because it is considered students can improve the ability of cooperation and learning outcomes. "Cooperative group investigation type models continue to offer students the opportunity to have their own learning and demonstrate their knowledge and understanding" (Mitchell, 2008).

2. Method

This study is quasi experiment that aims to see the effect of the GI model on conceptual knowledge that distinguishes the average AQ above and below the AQ average. The population in this study is SMA Negeri 5 class XI in Langsa, Aceh which consists of four classes. The sample in this research is two classes using random class, the first class as the control class which is taught by conventional teaching and second class as the experimental class which is taught by GI model macromedia flash assisted. Both sample classes consist of 30 students taught with physics lessons.

The design of this study was the design of two pretest-posttest groups. Design research with 2x2 factorial design for technical analysis of two way variance (ANOVA). Data collection techniques in this study will be obtained through a conceptual knowledge test and AQ questionnaire. The data collection will be conducted in two stages, collecting data on student AQ and collecting data on students' conceptual physics knowledge.

The test for using conceptual knowledge is a multiple choice by using indicators based on Anderson and krathwohls' research results. The conceptual knowledge by Anderson and krathwohl: remembering, understanding, applying, analyzing, evaluating and creating.

Meanwhile, AQ Adversity Response Profile (ARP) questionnaire form was used to classify students in two categories: low (score 0-149), and high (score 150-200). The ARP questionnaire contains 20 events based on modifications from Stolz (2000) with five possible answers for each question. The scale used is the likert scale. The answer of each instrument item ranges from very positive to very negative. For five possible answers use letters by replacing 1 to 1, a scale of 2 to b, and so on, with a total score of 200.

3. Results

Student's conceptual knowledge on conventional class and flash assisted GI class is shown in Table 1 below.

Table 1. Pretest and Posttest Results Conceptual Knowledge of Students'

	Conceptual Knowledge	
	Control Class	Experiment Class
Pretest	33.33	30.33
Posttest	55.50	65.00

Based on Table 1, the description of the average pretest and posttest conceptual knowledge on the GI model macromedia flash assisted and conventional class is as follows: For each class of conventional pretest and GI assisted macromedia flash is 33,33 and 30,33. For each conventional post-test class and GI model macromedia flash assisted support is 55.50 and 65.00. The result of conceptual knowledge of posttest physics

students in conventional class and GI assisted macromedia flash using AQ below average and above average is shown in Table 2 below.

After the posttest test is done, then analyze the items about the conceptual dimension of knowledge which results are presented in Figure 1.

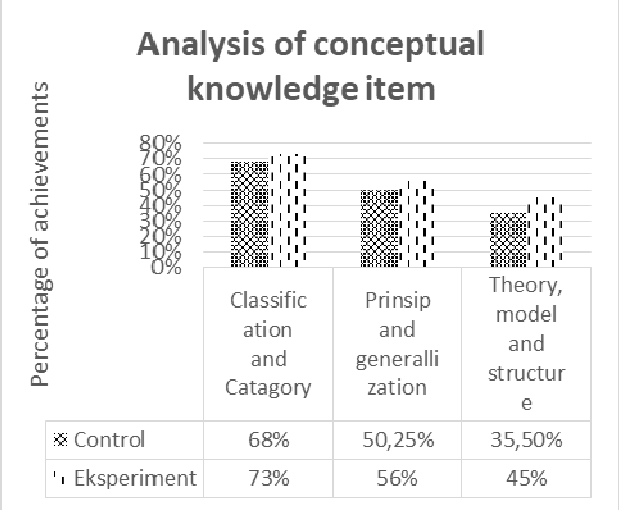

Figure 1. Analysis of conceptual knowledge items on control and experiment class

Based on Figure 1, the conclusions of this analysis are percentage of students achieving the average score that correctly answers the conceptual knowledge of students in the experimental class higher than the control class. The highest percentage of achievement for each indicator lies on first indicator, that is classification and category, where the percentage of achievement in the experimental class is 73 % and control class 68 %. Posttest percentage of conceptual dimension of conceptual knowledge of theory, model and structure is lower than other dimensions of knowledge. This is because the dimensions of theory, model and structure are the most difficult dimensions compared to the other two dimensions.

The dimensions of theory, model and structure include knowledge of paradigms, epistimology, theories, models used in the disciplines to describe, understand, explain, and predict phenomena so that these dimensions become more complex than the other two dimensions. The classification dimension and the category are the highest because it is the easiest dimension because the knowledge of classification and category includes classes, categories, divisions and specific arrangements in the disciplines. The dimension of classification and category is the basis for principles and generalizations. Principles and generalizations form the basis for theory, model and structure.

The results of conceptual physics knowledge on student posttest in conventional class and Group Investigation assisted flash media using AQ above average and below average shown in Table 2 below.

Based on Table 2 it can be seen that the students' physics conceptual knowledge with AQ above average is better in class using cooperative type learning model of GI assisted macromedia flash.

Table 2. Two-way ANOVA

Class / AQ	Control (A_1)	Experiment (A_2)	Average
Below Average (B_1)	60	64.28	62.88
Above Average (B_2)	53.5	68.28	58.38
Average	55.50	65.00	

Based on Table 2 can be seen that the students' physics conceptual knowledge with AQ above average better in class using cooperative type learning model GI assisted macromedia flash.

Table 3. Data on Calculation Result of Two Way ANOVA

Number of variation	DF	The mean squared	F	Sig.
Learning model type GI	1	1643.447	42.211	.000
Adversity Quotient	1	4088.787	105.017	.000
Learning model type GI* *Adversity Quotient*	1	166.780	4.284	.043
Total	60			

Based on Table 3, the results of data analysis are as follows: (1) The conceptual knowledge of students learning to use cooperative-type GI-assisted macromedia flash is better than conventional learning (sig 0,000

<0.05), (2)The conceptual knowledge of students learning to use cooperative-type GI-assisted macromedia flash is better than conventional learning (sig 0,000 <0.05), and (3) There is an interaction between cooperative type of GI-assisted macromedia flash model and conventional learning by using AQ in influencing student conceptual knowledge Sig 0,043.

To be more clearly seen as a positive influence in improving the conceptual knowledge of students' interaction will be shown in Figure 2.

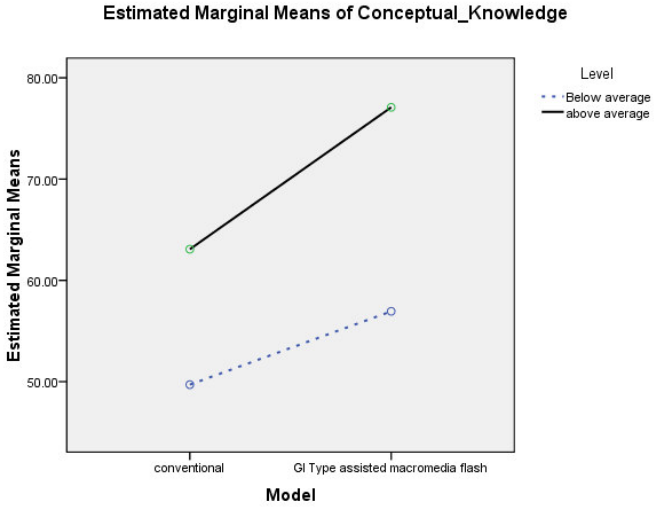

Figure 1. Learning Interaction Model and Adversity Quotient to Conceptual Knowledge

The graph shows that Macromedia Flash-assisted GI classes with conceptual knowledge of students who score above average are better than the conceptual knowledge of students who have AQ below average.

4. Discussion

4.1 Student's Conceptual Knowledge by Using Cooperative Learning Model Type Group Investigation Helps Flash Media Better than Conventional Learning

Cooperative learning model of GI type assisted macromedia flash and conventional learning basically provides an opportunity for students to obtain optimal learning outcomes. The results obtained in this study indicate that there is a difference of knowledge in the experimental class using cooperative learning model of group investigation type assisted macromedia flash and control class by using conventional learning. The average conceptual physics knowledge of the experimental class before treatment is given is 33,33 while the control class is 30,33.

After being given different treatment in both classes obtained the average value of conceptual knowledge of the experimental class is 65.00 while the control class is 55.50. GI type cooperative learning model can improve student learning outcomes. This is in line with the results of the study Prihatiningrum et al (2014), which suggests that cooperative type of GI type learning is better at improving learning outcomes. This is due to the cooperative learning model of GI type of students finding their own constructed physics knowledge. While GI research on knowledge is also done by Siregar and Harahap (2016) and concludes that that with learning GI-assisted macromedia flash.

Self-discovery is not easily forgotten because the process of student discovery is involved and experienced directly in finding the knowledge, so that student learning outcomes through the application of cooperative learning model type GI has increased significantly compared with conventional learning.

In line with the opinion Siregar and Bukit (2014) which mentions GI type cooperative learning model rooted in constructivism, which the students obtain information by constructing their own information obtained, thus affecting student learning outcomes. The cooperative learning model of group investigation continues to offer students the opportunity to have their own learning and demonstrate their knowledge and understanding " (Mitchell, 2008).

4.2 Conceptual Knowledge of Student Physics Having Adversity Quotient above Average is better than Students with Adversity Quotient below Average

Conceptual knowledge with adversity quotient above average in experiment class is 67,5 and control class is 54,33. Conceptual knowledge with adversity quotient below average in experimental class is 68.28 and control

class is 57. Adversity quotient learning outcomes above average have an average of 71.25 while learning outcomes with adversity quotient are below average, The average is 62.5. From these data it can be seen that the conceptual knowledge of students with adversity quotient above average is better than the students' conceptual knowledge with adversity quotient below average. The results of this study suggest that students who have adversity quotient below average will produce low conceptual knowledge while students who have adversity quotient above average will produce high conceptual knowledge. The condition is seen in classroom investigation using macromedia flash where the learning model is appropriately applied to students who have adversity quotient above average.

This is in line with the results of Carol Dweck's research in Stolz (2000) which proves that children with a pessimistic response to adversity will not learn and perform when compared to children who have more optimistic patterns. It was later added by Mitchell (2008), regarding the relationship between adversity quotient and learning achievement. The results show that there is a positive relationship between adversity quotient and learning achievement. This is indicated by the score of students with high adversity quotient better in the achievement of student learning compared to students with low adversity.

Increased conceptual knowledge of student physics is also caused because adversity quotient is seen as intelligence / ability to fight in the face of difficulty or problem to gain knowledge. The level of adversity quotient affects students' learning abilities. Sahyar and Fitri (2016) stated "The students 'physics problem solving skills in the above-average adversity quotient group is better than the students' physics problem solving abilities in the below-average adversity quotient group. It can be shown from the research data that the problem solving ability on adversity quotient is above average of 82.24 and in the adversity quotient group below the average of 79.41. There is an adversity quotient effect on student problem solving abilities.

4.3 Interaction between Cooperative Learning Model Group Investigation Types Helps Flash Media and Adversity Quotient in Influencing Conceptual Knowledge.

Based on Table 3 the results of the interaction test in general (learning model * adversity quotient) shows the interaction between the learning model used with the adversity quotient variable on student learning outcomes (obtained significance of 0.043 <= 0.05). This explains that the model of group investigation study using macromedia flash and adversity quotient greatly influence the conceptual knowledge of physics students because the learning can motivate the students to learn with the curiosity to the subject matter so that the students better understand the concepts of physics so that the desired results will be achieved by Teachers and students. The results of Saka's study (2011) suggest learning methods with effective computer help in improving student success, positive interests and attitudes; Saniman states that there is an interaction between the learning model and conceptual understanding of student learning outcomes.

5. Conclusion

Conceptual knowledge of physics students on GI type assisted macromedia flash class better than using conventional learning. These results indicate that there is influence of GI type assisted of macromedia flash and conventional model to conceptual physics knowledge Students. The conceptual knowledge of students in the group of students who have an average AQ score is better than the group of students who have an average AQ below the average. These results indicate that there is an AQ influence on students' conceptual physics knowledge. There is an interaction between the assisted GI model of macromedia flash and conventional learning using AQ in improving students' conceptual physics knowledge. In this research that in class of assisted GI macromedia flash, AQ give effect to conceptual knowledge of student physics.

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