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COLLABORATION AND ACHIEVEMENTS OF STUDENTS MOTIVATION IN PHYSICS LEARNING

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ABSTRACT

Teaching and learning activities that tend to be monotonous and passive result in low student interest in learning and achievement. Therefore, this study aims to determine the collaboration and achievement of student motivation in learning physics. This research is applied with the cooperative learning model Group Investigation (GI) type in six phases that can improve collaboration, motivation and student achievement, namely selecting topics, cooperative planning, implementation, analysis and synthesis, presentation, evaluation. This type of research is a quasi experiment. The instrument used was a test of student learning outcomes in the form of descriptions totaling 10 items and student activity sheets, namely experimental activities. The results showed that the existence of good peer collaboration will affect the achievement of student motivation in learning physics.

Keywords: **collaboration; achievement; motivation**

INTRODUCTION

Physics as an exact science requires critical thinking skills such as identifying, analyzing, concluding and making decisions in mastering concepts through natural phenomena and unique phenomena that are specifically studied (Wuri & Mulyaningsih, 2014). Physics learning cannot be done by studying the product directly, but a learning activity is needed that involves students in a problem-solving or experimental process to produce a product (Erlinda, 2016). The researcher conducted an interview with one of the physics teachers. It was found that physics learning outcomes were still low due to several factors, namely from the teacher, the students, as well as the facilities and infrastructure. Indicators that show that student learning outcomes are low is seen from the average score of students who do not meet the minimum completeness criteria (KKM). There are still quite a lot of students getting an average score in physics subjects under the KKM while the minimum completeness criteria that will be achieved is 70. Based on the observation sheets given by researchers to students, physics is a difficult and boring subject. The low learning outcomes achieved by students are due to the less varied learning models used by teachers (Suryadana, Suprihati, & Astutik, 2012). The learning process applied by the teacher tends to be less meaningful and monotonous because students only listen to the teacher's explanation and are not actively involved in exploring knowledge. Teacher-centered learning makes students tend to be passive, so that teachers have difficulty conditioning learning which requires students to be more active, because students are only able to master the limited material presented by the teacher, discussion activities carried out by

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students during learning have not been fully implemented optimally. Students often lack the ability to visualize and interpret abstract physical concepts in meaningful ways (Balta, 2015). Students need to be involved to be more active during the learning process, so that in overcoming problems, students must be trained to do experiments. The experiment was carried out in addition to aiming to train students in finding and understanding concepts, but also aimed at forming teamwork so as to increase student motivation in carrying out active learning activities.

Team interventions have made use of a number of training methods to target these rules of team performance (ie, preparation, execution, reflection) and team management dimensions of maintenance (ie, interpersonal dynamics). These intervention strategies generally fall into one of four categories. First, the most basic approach to training and teamwork development involves providing didactic education to team members in a classroom type setting, such as giving a lecture on the importance of providing social support in teams or promoting ways to manage interpersonal conflict among teammates. This type of training has been found to be useful for increasing team effectiveness (eg, Group Investigitation-type models) (Cheater, Hearnshaw, Baker & Keane, 2005). The assessment of learning outcomes that have been carried out by teachers has only used general cognitive assessment of learning outcomes and still uses Bloom's cognitive theory. The 2013 curriculum specifically divides the assessment of learning outcomes into factual, conceptual, procedural and metacognitive knowledge with indicators of each knowledge based on Anderson and Krathwohl's revisions. As revealed by Sagala (2013) in his book, "the essence of learning is between relationships and the process to reveal knowledge by teachers and students which results in learning outcomes." So, it is necessary to have a learning model that is oriented towards learning experimental activities and discussions that can create student involvement in the learning process to foster student interest and understanding of physics concepts (Aksoy, 2013). One of the learning models to enable students through group learning in class and conducting discussions, exchanging opinions and interrogations is the Group Investigation type cooperative learning model (Akçay, & Doymuş, 2012). Cooperative learning model type Group Investigation is a learning model where students actively discuss in heterogeneous groups, exchange opinions and carry out activities (Hossain & Tarmizi, 2013). The Cooperative Learning Model Group Investigation type has a constructivist theoretical basis proposed by Piaget and Vygotsky. Constructivist is a teaching and learning perspective in which a learner constructs meaning from experiences and interactions with other people, this is the role of the teacher. There are six steps in this model, namely topic selection, cooperative planning, implementation, analysis and synthesis, presentation of the final product (Arends, 2012). Several studies on cooperative learning model type Group Investigation have been done and it is proven that Group Investigation can help teachers in explaining a material. The results of some of these studies state that the Group Investigation type cooperative model is able to encourage students to hone their learning skills independently (individually or in groups) and can increase the activity of each group effectively so that they can measure learning outcomes in the cognitive, affective, and psychomotor aspects. , which means being able to make students more creative. Student learning outcomes using the Group

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Investigation type cooperative learning model are supported by several previous studies such as that which has been done by Simanjuntak & Simanjuntak (2014), showing that the existence of a computer-assisted Group Investigation type cooperative learning model can improve student learning outcomes and can increase activity. students in teaching and learning activities. In addition, research conducted by Cahyaningrum, Retno & Muhardjito (2016) shows that the application of the Group Investigation type cooperative learning model is able to improve student learning achievement as evidenced by the student's cognitive learning achievement and the percentage of students' physics learning completeness that exceeds the completeness indicator. Effective teaching methods such as discussion and cooperative learning can be alternatives to improve student achievement. Unlike cooperative learning methods, lectures and demonstration techniques do prevent students from collaborating with peers to maximize learning outcomes (Sausa, 2006; Johnson & Johnson 2009). Social competencies such as being respectful, obedient, completing tasks, and being tolerant are better promoted by cooperative learning (Tavakoli, & Soltani, 2014). Cooperative learning is oriented towards improving student academic achievement through the creation of a fun learning environment (Joshi and Bhatnagar, 2015). Group investigation is a cooperative learning model that offers students the opportunity to create their own methods to learn and display their knowledge and understanding (Mitchell, Monthgomery, & Holder, 2008).

METHODS

The research was conducted at SMA Negeri 15 Medan, Jl. Sekolah Pembangunan No. 7-A Medan Sunggal. The research population consisted of all students of class X majoring in Natural Sciences at SMA Negeri 15 Medan in the first semester of 2018/2019, consisting of 6 classes. The research sample was 35 students of class X MIA-5. This type of research is a quasi experiment with a group pretest-posttest design. Pre-test in class before learning begins. The instrument used in this study was a learning outcome test in the form of an essay of 10 items. The pre-test data on student learning outcomes serves to determine students' initial abilities before the Group Investigation type cooperative learning model is carried out which will then be used as a comparison with the student's final score or post test score. Then carry out learning using the Cooperative learning model type Group Investigation. The cooperative learning model of the Group Investigation type has six phases that can improve peer collaboration and student learning motivation, namely selecting topics, cooperative planning, implementation, analysis and synthesis, presentation, evaluation. Furthermore, the researcher gave a post test. Then collaboration among students and student learning motivation is analyzed from the data post test and pre-test students and student activities.

RESULT & DISCUSSION

The value of student activity in the experimental class shows in Figure 1 that the highest percentage of indicators of knowledge is an indicator of principles and generalizations. This is because classified problems and principle indicators and generalizations are easy to solve because principles and generalizations form the basis for theories, models, and structures. Meanwhile, the percentage of achievement

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of each indicator which lies in the theory, model and structure indicators as well as classification and category is the same where the percentage of achievement in the experimental class is 66%. Knowledge of theories, models and structures including knowledge of various paradigms, epistemologies, theories, models used to describe, understand, explain, and predict phenomena. However, the level of mastery of students' conceptual knowledge on the three indicators is the same, which is classified as moderate.

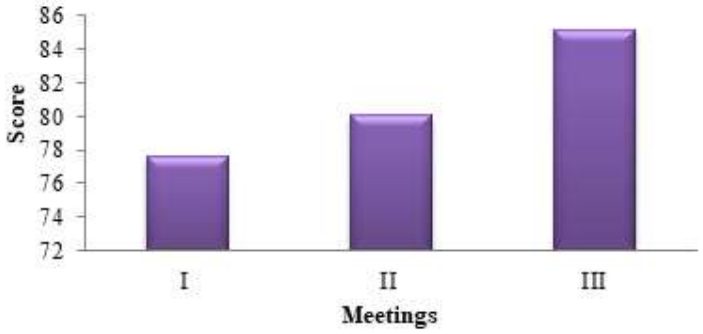

Figure 1. Percentage of Student Activity in Experimental Class

The ability of students to cooperate in conducting experiments can improve student learning outcomes. Doing experiments will really help students in understanding the subject matter so that it will be quickly remembered and also long remembered. This is supported by Harahap and Turnip (2014) in their research which states that through the use of the Group Investigation type cooperative learning model the increase in student learning outcomes is accompanied by high student cooperation abilities in conducting experiments.

The results of this study are also in accordance with previous research by Husna, Alkhafi, & Hotman (2016), in terms of their research entitled "The Effect of Group Investigation Type Cooperative Learning Model on Student Learning Outcomes". This study shows that student learning outcomes due to the effect of the group investigation type cooperative learning model are better than the conceptual knowledge learning outcomes using conventional learning. The cooperative learning model type Group Investigation oriented experimental activities was applied in this study and the researcher found several advantages and disadvantages. The advantages include: causing active students to study in groups by involving their minds in finding and conducting experiments; give enthusiasm for initiative; creative; and active because of a growing sense of inquiry and a desire to succeed; generate self-confidence for students; increase motivation to learn; provide meaningful learning experiences and enhance collaboration between students and teachers. This inner satisfaction encourages wanting to make more discoveries, especially in relation to it in everyday life, so that interest in learning increases. The constraints faced by the researchers were the limitations of practicum equipment that made the group division a little so it was more difficult to control less active students. But overall students are active in the activities carried out. The implementation of cooperative physics learning model type Group Investigation can run well seen from the post-test average score which is better than the pre-test average value. As well as

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the category of the level of mastery of the conceptual knowledge obtained is in the medium category. However, there is still much that needs to be addressed, both in terms of planning, equipment, and in terms of implementation.

CONCLUSION

From this research it can be concluded that Cooperative learning model type Group Investigation can increase collaboration among students in learning physics. Cooperative learning model type Group Investigation can increase student motivation in learning physics. Student learning outcomes in physics learning using the cooperative learning model type Group Investigation gave an average post test score of 79.39 better than the pre-test student average score of 44.93.

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