

The Effect of the Giving Question Getting Answers Model through Experimental Methods on Physics Motivation and Learning Outcomes

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Abstract

The aim of this research is to know the impact of the applying Giving Question Getting Answers model with experimental methods toward the learning motivation and result of physics learning. The type of research used was quasi-experimental with posttest only control group design. The population was all student of grade XI in senior high school 1 of Labuapi. The sampling technique used saturation sampling, while the sample are class XI MIA 1 as the experimental 1 class, and the XI MIA 2 as experimental 2 class. Experimental 1 class was treated with giving question getting answers learning model with experimental methods and experimental 2 class was treated with giving question getting answers learning model without experimental methods. The instrument of motivation learning was used motivation questionnaire and instrument the result of physics learning used multiple choice test. The research hypothesis was tested using Manova-test, data analysis shows that Sig. <0,05 which mean that H_0 was rejected and H_a accepted. Thus, it can be concluded that there are effect of Giving Question Getting Answers model with experimental methods on student's motivation and physics learning result.

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INTRODUCTION

Physics is a part of science that studies natural phenomena and their interactions through a series of scientific processes. Learning physics should not only instill knowledge as products but also as processes and attitudes that apply learning material in everyday life because according to Utami (2014) physics learns about natural phenomena at a basic level, the logic is very reasonable because it is in accordance with our daily experience - day. Therefore, in learning physics it is expected that students not only memorize theories but can understand phenomena and solve problems related to daily life. Ideally, learning physics will be more interesting and enjoyable if the teacher is able to present the learning process according to the demands of the education curriculum, namely organizing learning actively, interactively, inspiratively, fun, challenging, and motivating students to be actively involved in the learning process. Hikmawati (2015) states that teachers should help students to be active in finding concepts, principles and facts for themselves, not just giving lectures and controlling the class (teacher centered). Thus, students will be able to build their own knowledge. This can be achieved if the teacher can apply appropriate learning models and methods because monotonous learning will make students less motivated to learn.

The condition of physics learning in the class that has happened lately places more students as objects that can receive and hear only. Teachers play more role as informants for students, the material that is considered important is recorded by the teacher on the

board while students tend to be passive, the physics learning process still relies on the teacher and textbooks so that learning that should be based on student centered according to 2013 curriculum demands is not done. This is in accordance with what was revealed by Lilawati (2011) that physics learning is still dominated by teacher-oriented learning and students are less given the opportunity to develop thinking skills so that learning activities still do not facilitate students to be actively involved in the learning process. It is suspected that this causes physics learning to be less attractive, monotonous, boring and is considered a difficult subject so that students' motivation and physics learning outcomes are low. The same phenomenon was also stated by Pelawi and Karya (2016) based on the results of observations made at Sinar Husni Private High School, it was found that physics learning was still oriented towards teachers. Students tend to accept whatever is explained by the teacher without having to know the meaning of the lesson, students tend to memorize the understanding and formulas, this is causes students to be passive, less motivated in learning, and consider physics difficult and boring so students have difficulty learning and causes physics learning outcomes to be low.

This problem needs to be pursued, one of the ways is by using a more interactive and interesting learning model. One alternative learning model that can be used is the Giving Questions Getting Answers (GQGA) model. This, according to the research conducted by Chasanah et al. (2012) which states that the application of the GQGA learning model has a positive influence on learning outcomes because this learning model encourages students to be more active, more daring to submit questions and opinions and help students better understand the material taught, based on the results of the study found that students' understanding those who take GQGA learning are better than students who take conventional learning. Yunus and Kurniati (2013) stated that GQGA provides an opportunity for students to express their own ideas to their friends and discuss concepts that have not been understood in the lesson. Thus this learning model will enliven the classroom with a pleasant learning atmosphere and increase students' learning participation.

Suprijono (2012) revealed that the GQGA learning model was also developed to train students to have the ability and skills to ask and answer questions. This is very supportive of the learning process because the activity of asking and answering is very essential in the pattern of interaction between teachers and students who are able to foster new knowledge and increase students' understanding in learning physics. The advantage of the GQGA learning model is that students have the opportunity both individually and in groups to ask questions that are not yet understood, the teacher can also know the students' mastery of the material presented, encourage the courage of students to submit their opinions and can foster mutual respect between students (Yunus & Kurniati, 2013).

Considering physics as science is seen as a process, product, and scientific attitude, learning physics can be more interesting if in practice the teacher applies a method that makes students actively involved. One example is to apply the experimental method (Ardhuha et al., 2013). The experimental method is a way of presenting subjects where students actively experience and prove themselves what they are learning. Through this method students are totally involved in doing themselves, proving and drawing their own conclusions about a particular object, situation or process (Djamarah & Zain, 2010). Through the experimental method students can learn directly from interactions with objects used in these activities (Widiyanto, 2011). Science learning by direct observation of symptoms or scientific processes can train scientific thinking skills, can instill and develop scientific attitudes, can find and solve new problems through scientific methods and so on (Astuti et al., 2012). The function of the experiment itself is as a support for learning to improve students' understanding of the material that has been learned (Salam et al., 2010). The advantages of the experimental method according to Mayangsari et al.,

(2014) are arousing curiosity, arousing scientific attitudes, making learning actual, fostering study habits of groups and individuals. Therefore, the application of the GQGA model through the experimental method will make the learning process take place more optimally so that it can improve learning motivation and student learning outcomes.

METHOD

This type of research is a quasi-experiment. In quasi-experiments, researchers are not always able to make random selection of subjects but researchers are forced to accept subjects that have been grouped in a class determined based on school policy (Setyosari, 2016). The research design used was a posttest only control group. The design of this study used two groups, namely experimental class 1 and experimental class 2. No pretest was given to the two groups (Setyosari, 2016). The design of this study can be seen in Table 1.

Table 1. *Posttest Only Control Group Design*

Group	treatment	Post-test
Experiment 1	X ₁	O ₁
Experiment 2	X ₂	O ₂

(Setyosari, 2016)

The population in this study were all students of class XI MIA in the academic year 2019/2020 as many as 44 students divided into two classes. The sampling technique uses saturated sampling because the entire population is used as a sample so that selected class XI MIA 1 as an experimental class 1 and class XI MIA 2 as an experimental class 2. Student learning motivation is measured using a non-test instrument in the form of a learning motivation questionnaire while 25 results learners physics learning is measured by a test instrument in the form of multiple choice questions totaling 25 questions.

The questionnaire instrument was tested for expert validity while the test instrument was tested with item validity test, reliability test, test the level of difficulty of the questions, different power test problems and the spread of answer choices. The prerequisite of data analysis consists of 2 tests, namely the normality test using the Chi Square test and the hypothesis test using the F test. Sugiyono (2017) test to formulate the Chi Square test as follows.

$$\chi^2 = \frac{(f_o - f_h)^2}{f_h}$$

Irianto (2014) formulates the F-test as follows.

$$F(\max) = \frac{\text{greatest variance}}{\text{smallest variance}}$$

After the pre-test is done, then the hypothesis test analysis is done using the Manova test. Hypothesis testing is carried out to determine differences in learning motivation and physics learning outcomes of students in both classes after being treated.

RESULTS AND DISCUSSION

The purpose of this study was to determine the effect of the GQGA learning model through the experimental method on the motivation and physics learning outcomes of students. Research data in the form of motivation data and learning outcomes data obtained from the posttest value.

Table 2. The value of student learning motivation

Class	Lowest val.	Highest val.	Average val.
Experiment 1	63	85	74
Experiment 2	57	82	67

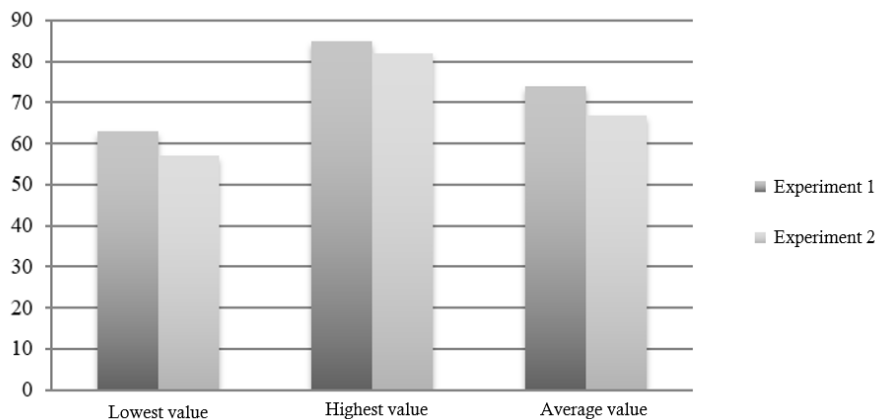


Figure 1. The value of student learning motivation of each experimental class

Data on learning motivation of students shows that there are differences in values between the two classes. The experimental class 1 that applied the GQGA learning model through the experimental method got higher scores than the value of the students in the experimental class 2 who applied the GQGA model without the experimental method. This is because the experimental method makes students able to learn more actively and eager to learn because students are facilitated to carry out experimental activities to prove directly the theory that has been learned. This is in line with the statement (Chebii et al, 2012) which reveals that students can learn science well when teaching methods enable them to be actively involved in class activities by conducting experiments, conducting demonstrations, class discussions and other relevant learning experiences.

The existence of experimental activities that are collaborated with this GQGA model trains cooperation between students in interacting and discussing with friends in their groups so that students are actively involved in asking questions and answering in the learning process. This is in line with the statement of Suprijono (2015) that the GQGA learning model can train students' ability to ask and answer questions. In the experimental class 1 which is combined with the experimental method makes students more interested and feel challenged to take part in learning activities, so that they are not only actively asking and answering questions, they are also enthusiastic and enthusiastic in carrying out scientific procedures, taking data and filling out the distributed worksheets. The results of the study Widodo et al., (2013) states that students who get lessons with the help of experiments have high motivation to learn so that the impact on learning outcomes is increasing.

The implementation of the GQGA learning model through this experimental method makes each group competing to explore the results of their thoughts and findings about the concepts learned then prepare questions related to what is not yet understood. The existence of experimental activities makes students more active, not only when conducting experiments but seen when class discussion activities use question cards and answer cards in progress, where students are enthusiastic to ask and answer questions.

This is consistent with the statement of Susanti, et al (2017) that through the application of the GQGA model students get information in the form of questions or answers from classmates so that they are motivated to support and show interest in the material being studied. Wenna (2008) also states that many ideas and ideas emerge through the application of the GQGA model. This is what makes the experimental class 1 students get a higher motivation value than the experimental class 2 students. The learning motivation value of the students in the experimental class 1 is also higher than the experimental class 2 in each learning motivation indicator used. The data can be seen in Table 3 and Figure 2 below.

Table 3. The value of learning motivation each learning motivation indicator

Nu	Indicator	Value of exp. class 1	Value of exp. class 1
1	Willingness	72	65
2	There is a drive-needs for learning	72	65
3	There are hopes and dreams for the future	78	74
4	There is an appreciation for learning	71	61
5	There are interesting activities in learning	81	70
6	The existence of a conducive learning environment	70	62

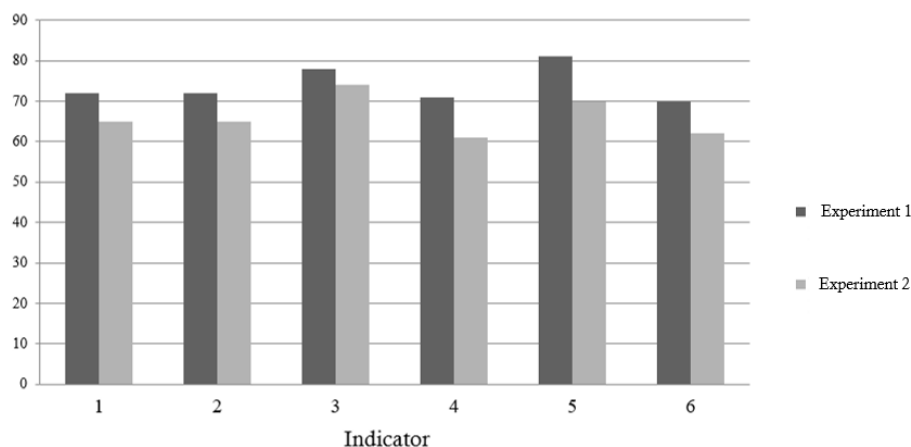


Figure 2. Student learning motivation value of each indicator

The data shows that the highest value is on the fifth indicator which reads that there are interesting activities in learning. The highest value on the indicator indicates that the GQGA learning model through the experimental method using question cards and answer cards as learning media then combined with experimental activities is an activity that attracts students' interest in learning. If examined further, it can be seen that the greatest value difference between the experimental class 1 and experimental class 2 is also found in the fifth indicator, this further strengthens the evidence that integrating the experimental method with the GQGA model is an interesting activity and is able to meet the needs of students in learning so able to be a motivator and enhancer of students' interest and motivation in participating in learning physics, this is in accordance with the results of the study (Pasa, 2016) which states that the experimental method influences students' learning motivation.

Even though the students' learning motivation value of the experimental class 1 is higher than the experimental class 2, but when viewed from the average value that is not

much different then the two classes are in the same category, which has a high motivation because according to Arikunto (2012) the range of values learning motivation from 65-79 is included in the high category. That is because the learning model applied to both classes is the same, the GQGA learning model. This learning model uses question cards and answer cards as learning media that can trigger the activeness of students in the question and answer process so that it affects the enthusiasm and motivation of learners as the results of research conducted by Wardani & Supahar (2017) which states that active learning GQGA able to increase student motivation.

Student learning outcomes data in the experimental class 1 and experimental class 2 are presented in Table 4 and Figure 3 below.

Table 4. Value of student learning outcomes

Class	Lowest val.	Highest val.	Average val.
Experiment 1	60	96	82
Experiment 2	48	88	73

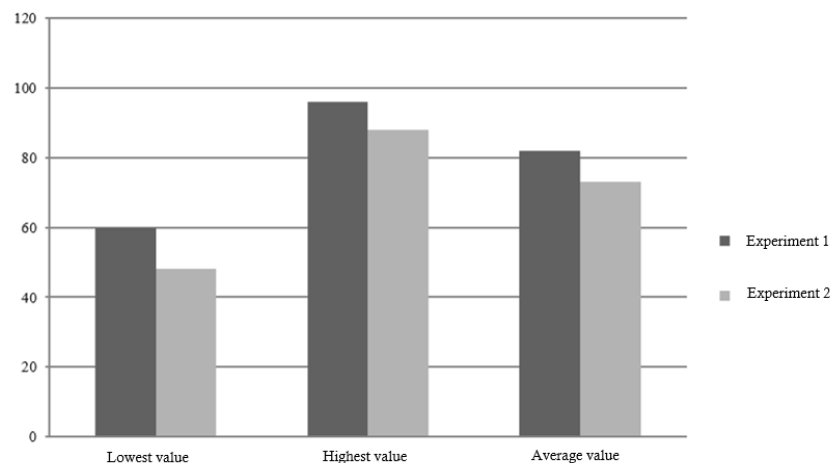


Figure 3. Value of student learning outcomes

The value of students' learning motivation in the experimental class which is higher than that of students in the control class also has an impact on student learning outcomes. This is in line with the results of Mappase's research (2009) which states that students' learning motivation has a positive effect on learning outcomes. Sardiman (2007) also revealed that the right motivation will optimize learning outcomes. From the results of the study it appears that the two classes have a high enough value because it has reached or exceeded the Minimum Completion Criteria (KKM) of 73, meaning that the learning model applied does not only affect learning motivation but also affect learning outcomes, this is in accordance with Erdina research (2017), Chasanah et al., (2012), and Yunus & Kurniati (2013) which states that by implementing active learning GQGA can improve student learning outcomes.

The existence of experimental activities, makes it easier for teachers to deliver subject matter because students can see examples directly from the explanations presented so that students more easily understand the impact on learning outcomes obtained. This is also in line with the results of Hamdu & Agustina's study which states that learning motivation has a great influence on learning achievement. In contrast to the learning process in experimental class 1 which facilitates students to find out and prove directly the theory learned through experiments/practicum, in experimental class 2 students only gain an understanding of the teacher's exposure and discussion activities. The absence of

experimental activities in the learning process affects the understanding of students, seen learning outcomes obtained are lower than the experimental class 1.

The stages in the learning process using the GQGA learning model through the experimental method encourage curiosity of students and then provide opportunities to actively participate in learning activities with the aim of increasing student motivation and learning outcomes. According to Handika (2010) the experimental method can make students more active in learning and can prove the truth of a theory themselves. In the learning process by applying these models and methods, students actively participate in learning activities even when class discussion is opened, each group competes to be an active group by being involved in the question and answer process held by the teacher. This proves that the GQGA learning model through the experimental method affects the learning outcomes of students, not only in the cognitive realm which is seen from the high posstest scores but also seen from the affective and psychomotor learning outcomes of students such as the ability to assemble practical tools and materials, ways expressing opinions, activeness during discussions, courage to ask questions, and also affect the confidence to answer questions. Yatim (2009) revealed that the GQGA learning model can increase the courage of students in expressing their opinions and practice mutual respect between students because it provides an opportunity for students to ask questions about things that are not understood and provide opportunities for students to explain things that are understood to another friend. The implementation of the GQGA learning model through the experimental method is very positive because it can improve students' physics learning outcomes. In other words, the GQGA learning model is very suitable to be combined with the experimental method.

CONCLUSION

The results showed that there was an influence of the GQGA learning model through the experimental method on learning motivation and physics learning outcomes of SMAN 1 Labuapi students, where the level of motivation and physics learning outcomes of students in experimental class 1 (learning using the GQGA model through the experimental method) was higher than experimental class 2 (learning using the GQGA model).

RECOMENDATION

When learning implements the GQGA model, teachers should pay attention to the time allocation because the discussion session using the question card and answer card in the GQGA learning model will take quite a long time. If you want to use the experimental method, it is adjusted to the characteristics of the material to be taught.

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