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The Influence of Guided Inquiry Learning Model using Thinking Empowering by Questioning Model on Learning Outcomes Cognitiv Students

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A B S T R A C T

This study aims to determine the effect of the Guided Inquiry (GI) learning model with Thingking Empowering By Questioning (TEQ) on student cognitive learning outcomes. This study was a quasi-experimental study with a pretest posttest control group design. The population of this research was the students of class XI MIPA SMAN 3 Dumai in the academic year 2018/2019. Sampling method was done using random sampling techniques to get experiment and control class. The parameters measured were cognitive learning outcomes and the instrument used was an objective test. The data analysis technique for testing hypotheses was independent t-test. Data analysis showed sig < 0.05 then H_0 was rejected, this shows that student learning outcomes with the Guided Inqury model with Thingking Empowering By Questioning were significantly different from student learning outcomes with conventional models. Student learning outcomes using the Guided Inqury learning model with Thingking Empowering By Questioning are better than student learning outcomes using conventional learning. The average value of student learning outcomes in the experimental class was 81.82 while the control class was 61.29. The average N-gain of the experimental group was 0.70 with a high category and the control group was 0.38 with a moderate category.

1. Introduction

The learning process in schools is influenced by learning components such as teachers, students, learning objectives, learning materials, learning methods and

learning evaluation. The learning components are aimed at achieving good learning. In the teaching and learning process, teachers and students have the same expectation that students can understand the learning material so that it can improve learning outcomes especially in biology subjects.

Biology subjects in high school aim that students have the following abilities: (1) Form a positive attitude towards Biology by realizing the regularity and beauty of nature and glorifying the greatness of God Almighty, (2) Cultivating scientific attitudes that are honest, objective, open, resilient, critical and can work together with others, (3) Develop analytical, inductive, and deductive thinking skills using biological concepts and principles, (4) Apply biological concepts and principles to produce simple technological works related to human needs (MONE, 2006) .

Realizing the enormous role of biology lessons, students are expected to master the sciences within Biology itself. This should be reflected in the results of daily tests of students who have reached the Minimum completeness Criteria (KKM) set in schools. But the reality is in class XI MIPA SMA N 3 TP. 2017/2018 daily test scores are still below the Minimum Completion Criteria (KKM) which is set at 64. The low percentage of daily tests of students on the Circulation System material for the academic year 2017/2018 shows that there are 54% of students who have not yet completed the biology learning process.

Nationally, assessment of student learning outcomes is carried out one of them with the National Examination. From the BSNP Puspendik National Exam Results Report, it is known that the learning outcomes of the students of SMAN 3 Dumai in Biology, have decreased in the last 3 years, for the 2015/2016 academic year, the average value of biology (50.00), year 2016/2017 school with a biology average score (44.03) and 2017/2018 school year with a biology average score (49.67).

One learning model that can contribute to learning outcomes and help students understand difficult concepts, as well as improve student memory on material that has been obtained is a Guided Inquiry learning model. The Guided Inquiry learning model is a series of activities that involve maximum learning activities of all students' ability to solve problems systematically, critically, logically and analytically so that students become skilled in obtaining and analyzing information.

The learning process involves students actively seeking information, building knowledge, and writing down what is thought and responses that arise during completing assignments or a problem with the TEQ pattern. Thinking Empowering By Questioning is a learning pattern that seeks to empower thinking skills through questions. According to Jamaluddin (2009) there is an important relationship between asking and thinking in implementing learning. Teachers who ask questions in the right way will stimulate students' thinking processes.

Based on the study of the two lessons, the learning process needs to be further developed by combining the positive aspects of both learning to get better results.

The Guided Inquiry learning model benefits students in understanding basic concepts, expressing better ideas and developing critical thinking skills. The Advantages of Thinking Empowering By Questioning students are able to remember material and are able to answer through media, technology, and learning to think about their real lives, so that students' thoughts and questions will arise.

Guided inquiry learning is learning that involves students in formulating procedures, analyzing and drawing conclusions independently, while in determining the topic, questions and supporting materials the teacher only acts as a facilitator. According to Ibrahim Bilgin (2011) the syntax in the guided inquiry learning model is as follows: (1) Problem orientation, (2) Making hypotheses, (3) Data collection, (4) Analyzing data and (5) Making conclusions.

The Thinking Empowering by Questioning pattern is a pattern of empowering reasoning questions. Programmable reasoning is believed to improve students' critical thinking skills. Questions are very important to use for teachers and students. The teacher uses questions to guide students' thinking processes. The teacher also uses questions in conducting ongoing assessments to find out student understanding. According to Jamaluddin (2009) the syntax in the Thinking Empowering by Questioning pattern is as follows: (1) Provide, (2) Do, (3) Reflect, (4) Think, (5) Evaluate and (6) Directions.

Based on the stages of learning in the Thinking Empowering by Questioning pattern, it can be concluded that the learning process with the Thinking Empowering by Questioning pattern can empower students' thought processes so that Thinking Empowering by Questioning is a learning pattern that is implemented in the absence of the learning process is directly informative, all done through a series or chain of questions that have been designed in writing in the student worksheet. The Integration of GI with TEQ is in the following steps:

Phase 1: Problem Orientation (GI)
Phase 2: Making a Hypothesis through activities Provide and braid Questions on
Do (GI and TEQ)
Phase 3: Gathering Data with Interwoven questions on Meditation and Think (GI
and TEQ)
Phase 4: Analyze data and evaluation (GI and TEQ)
Phase 5: Conclusions and Direction (GI and TEQ)

Learning outcomes are the results of changes in behavior due to the learning process. Learning outcomes are those obtained by students from the experiences or exercises that are followed during learning in the form of cognitive, affective, and psychomotor skills (Dimyati, 2009). Learning outcomes are essentially a change in behavior that occurs in students. The use of Guided Inquiry learning model significantly gives a different effect on student learning outcomes. This fact is reinforced by research conducted by Kurniawati et al., (2016) that the application of Guided Inquiry learning models equipped with worksheets can improve science processes and student achievement. Various studies have shown

that the application of TEQ strategies both alone and integrated with several cooperative strategies influences student learning outcomes. This is in line with the opinion of Nofitasari (2011) that increasing understanding of student concepts is the implication of increasing students' thinking abilities. Not only that, the application of TEQ is also proven to improve student cognitive learning outcomes.

This study aims to determine the effect of the Guided Inquiry learning model with Thingking Empowering By Questioning on the learning outcomes of biology students in grade XI MIPA of SMA Negeri 3 Dumai.

2. Methodology

This research was a quasi experimental research with Pretest Posttest Control Group Design as shown in Table 1 (Sugiyono, 2010).

Table 1. Research Design

Group	Pre- test	Treatment	Post-Test
T	Y_1	X	Y_2
K	Y_1	-	Y_2

In the experimental class the Guided Inquiry learning model with Thingking Empowering By Questioning was given and the control class was given conventional learning. This research was carried out in the 11th grade students of MIPA of SMA Negeri 3 Dumai in the odd semester of the 2018/2019 academic year. The date of research data collection was carried out on 18 October 2018 until 30 May 2019.

The research data collected was the result of students cognitive learning in the learning process, which was carried out by means of tests. In this study the test given was in the form of an objective test. The test was given to the control class and the experimental class in two stages, namely: the initial test (pretest) and the final test (posttest). Data analysis of the results of this study used statistical methods to see the achievement of student learning success. Statistical tests were performed using the Independent Sample T Test to determine the effect of the Guided Inquiry learning model with Thingking Empowering By Questioning on student learning outcomes. Hypothesis testing was done using SPSS software. The test criterion was accepting H_0 if the value of sig. > the real level (α = 0.05) and reject H_0 if vice versa. N-gain test was used to analyze data on student learning outcomes improvement.

3. Results and Discussion

Description of Research Implementation

This research was conducted using the control class and experimental class. Before conducting research prepare learning tools to be used. Learning tools such as the Syllabus, Learning Implementation Plan (RPP) and Student Worksheets (LKS) are validated in advance by supervisors, examiners and subject teachers in schools. In line with the opinion of Yenita et al (2017), Miftahul et al. (2019) that validation was carried out by three validator experts and was revised based on input from the validator. The questions used for the Prettest and Posttest Questions are validated by testing test questions on classes that have studied the Circulation System material.

Figure 1: Photograph of research activities using the GI-TEQ model

The number of students in each class XI MIPA 1 is 33 people and class XI MIPA 2 is 31 students. This research used KD 3.6. Analyzing the relationship between the structure of tissues making up organs in the circulation system in relation to bioprocess and impaired function that can occur in the human circulation system consisting of 6 meetings.

The application of Guided Inquiry learning model with Thinking Empowering By Questioning is guided by LKS which has been prepared in accordance with the model applied. Learning activities in accordance with the syntax of learning models. The preliminary stage the teacher explores the student's initial knowledge by showing pictures. At this stage the teacher directs students to look for information about the material to be learned.

The first stage is the implementation of the Guided Inquiry model with Thinking Empowering By Questioning (TEQ). At this stage the teacher gives a problem by asking students to observe the pictures in the worksheet. Students identify problems and formulate problems with the help of the teacher. At this stage aspects of the ability to think through questions that are solving problems have begun to be trained.

The second stage, formulating a hypothesis. Students formulate relevant hypotheses based on the formulation of the problem that has been made. The

process of formulating hypotheses is carried out in group discussions based on the knowledge they already have. The teacher guides students in determining hypotheses that are relevant to the problem. The stage of formulating a hypothesis can train the ability of thinking empowerment through questions on the aspects of providing and doing.

The third stage is collecting data, the teacher provides the opportunity for students to gather relevant information to prove the hypothesis made. The teacher guides students in group discussions. Group discussion activities will occur interactions between group members such as exchanging opinions, sharing knowledge and expressing ideas to solve problems. At this stage train the aspects of the ability to think empowerment through questions such as pondering and thinking. The fourth stage is testing the hypothesis, the teacher guides students in testing the hypothesis. Students test hypotheses with regard to data and theories with hypotheses that are made accordingly or not. The teacher guides students in making conclusions. At this stage train the aspects of the ability to think empowerment through evaluating questions and concluding evaluation. Students convey the results of the answers with a percentage and convey the conclusions of the discussion with guidance by the teacher. The teacher also guides students to recall data that has been proven true. In line with the opinion of Syafaren et al (2019) that the integration of guided inquiry with NHT affects the skills to think critically on indicators of analyzing, synthesizing, solving problems and concluding.

In the fifth stage, the teacher guides students to summarize the learning outcomes that have been carried out. The teacher gives group assignments (Directions). Closing activity and the end of the learning process material on the Human Circulation System. Students are given a posttest. Posttest is the same as the daily test when the work is done for 90 minutes.

Cognitive Learning Outcomes

The biology learning outcomes data in this study were obtained by giving a written pretest in the form of multiple choice questions given to the experimental class and the control class then the two classes were treated, the experimental class was taught with a Guided Inquiry learning model with Thinking Empowering By Questioning while control class using conventional learning. After the teaching and learning process is carried out then give a final test in the form of a posttest to measure student learning outcomes. N gain is used to find out how high the improvement of students' learning outcomes in the experimental and control classes.

The average pretest score of the experimental class students was 38.55 and the control class was 37.06. After being given treatment, obtained an average posttest score of experimental class students 81.82 while the control class 61.29. The results of data analysis from the experimental class and the control class can be seen in Figure 2.

Based on Figure 2 it can be seen that the results of the pretest analysis of students have the same initial ability in the material circulation system. Posttest analysis results can be seen that there are differences in cognitive learning outcomes between the experimental class and the control class. The average value of students' cognitive learning outcomes in the experimental class was higher than the control class, and there were differences in the N-Gain scores between the two classes.
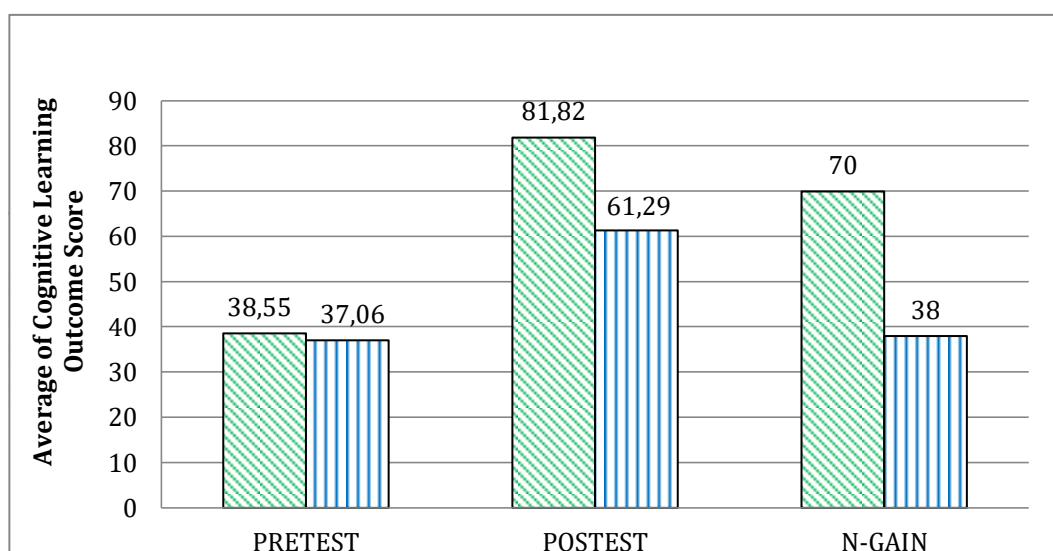

Figure 2. Comparison of the mean pretest and posttest values of the experimental class (green) and the control class (blue)

The learning outcomes of experimental class students using the Guided Inquiry learning model with Thinking Empowering By Questioning are better than the control class students taught by the usual method, this is because the steps or processes given in each learning also different. Cognitive learning outcomes are influenced by the methods used by the teacher (Slameto, 2010). Achievement of student learning outcomes that are taught by the Guided Inquiry learning model with Thinking Empowering By Questioning gives more optimal results compared to students who learn by the usual method. According to Janneta (2005) explained that the inquiry method has five main stages to increase student activity and achievement, namely the question stage (Question), the stage of generating student interest (Student Engangement), the stage of active interaction in groups (Cooperative Interaction), the stage of evaluating student opinion (Performance Evaluation) and the stage of using relevant sources (Variety of resources). Hasruddin (2004) explained that biology science learning using PBMP proved to have the most potential to empower students' reasoning abilities, compared to learning using student questions, learning using question cards prepared by teachers, and conventional learning.

Learning outcomes are inseparable from learning activities because learning activities are a process while learning outcomes are results obtained from the learning process (Dimyati & Mudjiono. 2009). Inquiry learning model is one model that can encourage students to be active in learning. According to

Kunandar (in Aningsih and Irnawati Sapitri, 2018) revealed that inquiry learning models can increase students' curiosity about learning material that they do not yet know, and make students want to find out for themselves so that inquiry learning models can increase student activity and independence of learning which will affect both learning on student learning outcomes.

Measurement of the average difference between the pretest and posttest scores aims to compare how much improvement in student learning outcomes from before treatment to the value after research between the two classes. In line with the opinion of Saputra (2019) that there is an effect of the application of Think Pair Share (TPS) types of cooperative learning and conventional learning on student learning outcomes.

The difference in the improvement of student learning outcomes in the Circulation System material is due to the different learning processes between the experimental class and the control class. The learning process in the experimental class uses the stages of the Guided Inquiry learning model with Thinking Empowering By Questioning while in the control class with ordinary learning. In the Guided Inquiry learning model with Thinking Empowering By Questioning students are more active in the learning process that has been conditioned to be able to empower thinking skills in an effort to explore for themselves all the concepts to take initiative in efforts to solve problems, take decisions and train the ability to think through questions. TEQ is able to improve student reasoning, and has a significant relationship with student learning outcomes (Meha, M, LBG & Corebima, 2005). The Guided Inquiry learning model with Thinking Empowering By Questioning is one way to improve student biology learning outcomes. In this learning the role of the teacher does not look dominant, the teacher acts as the organizer and facilitator. The teacher does not tell the concepts but guides students to find these concepts through learning activities. So the concepts obtained based on the learning activities and experiences will always be remembered by students for a long time. The stages of the Guided Inquiry learning model with Thinking Empowering By Questioning can accommodate activities that lead to improving student biology learning outcomes. The questions are arranged in such a way as to form patterns that sequentially include introduction, provide, do, reflect on and evaluate, then end with direction (Sutomo, 2005).

Hypothesis Testing

Calculation results Table 2 shows that learning outcomes have a sig value. equal to 0,000 with a level of nayata = 0.05. This means the value of 0.000 <0.05 then H0 is rejected. Thus it can be concluded that there is a significant influence on the Guided Inquiry learning model with Thinking Empowering By Questioning on student learning outcomes and student learning outcomes who follow the Guided Inquiry learning model learning model with Thinking Empowering By Questioning is better than the learning outcomes of students who take regular learning.

Table 2. Hypothesis Calculation Results

Class	$\overline{X}$	Sig	A	Conclusion
Experiment	81.82	0.000	0.05	H_0 rejected
Control	61.29			

The results showed that using the Guided Inquiry learning model with Thinking Empowering By Questioning could improve student learning outcomes. The activeness in discussions to solve problems through observation will foster high learning motivation in students and will ultimately affect learning outcomes (Purwanto, 2012).

Inquiry learning can develop scientific thinking that places students as learners in solving problems and obtaining inquiry knowledge so that they can understand scientific concepts (Amilasari & Sutiadi, 2008). Application of Guided Inquiry patterned learning with Thinking Empowering By Questioning refers to constructivist learning, students are expected to be able to build their own concepts in an orderly and structured manner, training them to think coherently, so as to improve learning outcomes.

Chapsah et al (2004) explain that the merging of PBMP and TPS results in better student learning outcomes, students are more enthusiastic in answering questions, actively giving rebuttal and opinions, using continuous and more complete sentences, and dare to express opinions with good sentences even though there are answers which is still wrong. Thus the use of the Guided Inquiry learning model with Thinking Empowering By Questioning can improve student learning outcomes in biology learning in the 11th grade of Mathematics and Natural Sciences in SMA Negeri 3 Dumai.

4. Conclusion

Based on the discussion of the above research results it can be concluded that an increase in student learning outcomes through the application of the Guided Inquiry learning model with Thinking Empowering By Questioning (TEQ). In addition, the biggest increase in students' cognitive learning outcomes occurs in phase 3 of learning activities that is collecting data with a tangle of questions to ponder and think about. With an increase in understanding of student concepts means that the Guided Inquiry learning model with Thinking Empowering By Questioning has a positive and significant effect on improving student learning outcomes.

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