The effect of guided inquiry learning models using the help of student activity sheet on the knowledge competency of students in class xi of SMAN 1 Sungayang

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Abstract: This research is motivated by a learning process that is still teacher-centered. Students are still waiting for instructions from the teacher and are less active in implementing the learning process. The lack of teaching materials used by teachers and learning models that do not vary become one of the causes of low student learning outcomes. To overcome this problem, teachers are required to be able to use diverse learning models to improve students' knowledge competencies. One learning model that can enable students is the guided inquiry learning model supported by student worksheet. This study aims to determine the interaction of student worksheet-assisted inquiry models with students' knowledge competence at SMAN 1 Sungayang. This research is an experimental study with a Randomized Control Posted Only Design. The population in this study were students of class XI IPA SMAN 1 Sungayang. Data analysis techniques to test hypotheses using independent sample T-test. Hypothesis test results showed a significant effect on student learning outcomes by obtaining a small significance value of 0.05 which is 0.008 with an average value in the experimental class 84.40 while the control class 77.74.

1. Introduction

Learning is a process of interaction between students, students and educators and learning resources in a learning environment[1]. The learning process requires students to become qualified human beings who are able to compete and be proactive in responding to the challenges of the times. The learning process that can be done by people who have faith and devotion to God Almighty, noble, knowledgeable, capable, creative, independent and responsible[2]. Natural Sciences specifically Biology is one of the subjects that gives students access to hone their ability to be proactive in taking the development and progress of the times.

Biology is a lesson that systematically finds out about nature, so Biology does not only master the collection of knowledge in the form of facts, concepts or principles, but also is a way of working, ways of thinking and ways to solve problems. Based on observations made by researchers at SMAN 1 Sungayang, information was obtained that the learning process was still running in one direction (the teacher’s center), the teacher was still using the lecture method and giving assignments in the learning process, student activity at school. the learning process is still low and the teaching materials used by teachers in learning are still limited.
One learning model that can improve students' thought processes so that they can learn actively is guided inquiry. The guided inquiry learning model is a teaching model that emphasizes the process of concept discovery and the relationship between concepts in which students design their own experimental procedures so that students' roles are more dominant, while the teacher guides students in the right direction. The guided inquiry model can increase student motivation because students discover their own learning concepts through direct experience. Students are formed in several groups and faced with a problem, from the problem there are students who are looking for answers to these problems. To prove the answer to a problem, students conduct experiments and analyze the data obtained so that they can find the cause of a symptom logically and can be linked to the facts that occur at this time so as to develop an attitude of honesty, discipline, responsibility, tolerance, courtesy and trust self on students [3,4,5,6,7].

The guided inquiry learning model consists of six stages (phases): (a) planning; (b) information; (c) processing information; (d) making information; (e) communicating information; and (f) evaluating [8]. Guided inquiry learning enables students to build knowledge independently and helps them develop an understanding of the concepts of representation and their scientific literacy practices [7,9,10,11,12,13]. The benefits of inquiry learning models are: (a) Can develop process skills; (b) increase student creativity; (c) Generate high learning enthusiasm for students (d) provide independence to students; (e) sharing two-way cooperation (teacher-student and student) [14].

Some of the advantages of teaching using the guided inquiry method proposed by Bruner include: (a) students know basic concepts and ideas better, (b) help in remembering new learning processes; (c) motivate students to think and work on their own initiative, (d) encourage students to think intuitively and formulate their own hypotheses, (e) provide intrinsic decisions, (f) more interesting learning processes [6].

The learning process can take place well if the learning model used is also equipped with appropriate teaching materials. Here the researcher completes the guided inquiry learning model with LKPD. Student Activity Sheet is one of the facilities to help and facilitate teaching and learning activities so that effective interactions will be formed between students and educators and also enhance student activities in improving learning achievement. Student activity sheet is also a sheet containing assignments that must be done by students, activity sheets are usually in the form of instructions, steps for completing assignments [15].

Based on the explanation above, the researcher wants to see whether the guided inquiry learning model assisted by Student Activity Sheet is better than the learning competency of the knowledge domain of students who follow conventional learning.

2. Methodology
This research was conducted in class XI IPA 1 Sungayang High School in the second semester of the 2018/2019 academic year. This study was a quasi-experimental study with a Randomized Control Group Design Only. The experimental class was treated by applying the Guided Inquiry learning model assisted by Student Activity Sheet, while the control class used a conventional learning model.

The population in this study were Sungayang XI XI grade 1 students consisting of 3 classes namely XI IPA 1, XI IPA 2 and XI IPA 3 with a sampling technique that is posopositive sampling, where the sample was deliberately chosen based on certain characters needed. The sample in this study was class XI IPA 3 which amounted to 27 students as a control class and class XI IPA 1 which amounted to 30 students as the experimental class.

The independent variable in this study is the inquiry model with the help of student worksheet while the dependent variable is the learning outcome from the realm of student knowledge. The research instrument used was a written test in the form of multiple choice. Data analysis techniques were performed using a T-test. Prerequisite tests before conducting a T-test test data must be normally distributed and homogeneous. Data processing using SPSS software. T-test criterion is H; accepted if the value of sig. <0.05.
3. Results and Discussion

3.1. Data Description

Knowledge domain competency data obtained through the final test in the form of a written test in the form of objective questions. Questions are given to students at the end of the meeting for each Basic Competency. Data on research on student knowledge competencies is presented in Table 1.

Table 1. Average Values, Maximum Values, Minimum Values of the Experimental Class and the Knowledge Field Competency Control Class

| School       | Class    | Number of Students | Average | Max Value | Min Value |
|--------------|----------|--------------------|---------|-----------|-----------|
| SMAN 1 Sungayang | Experiment | 30                | 84.40   | 97        | 67        |
|              | Control  | 27                | 77.74   | 93        | 60        |

Based on Table 1 it can be seen that the average knowledge competency of the experimental class is higher than the average of the control class. The average value of the experimental class at SMAN 1 Sungayang was 84.40 while the control class was 77.74. The highest value for the experimental class is 97 while the highest value of the control class is 93. The lowest value for the experimental class is 67 while the lowest value of the control class is 60.

3.2. Testing Requirements Analysis

The analysis prerequisite test was carried out to test the normality and homogeneity of the data. Normality test and homogeneity test are prerequisite tests before conducting the t-test (parametric test). If the data is normally distributed and homogeneous, then the hypothesis test is a t-test (parametric test), but if the data is not normal or not homogeneous, then the hypothesis test used is the Mann-Whitney U test.

3.2.1. Normality Test. Normality test is conducted on the value of the knowledge competency of the control class and the experimental class. Data is said to be normal if the value of sig. > 0.05. The following normality test results are presented in Table 2.

Table 2. Results of Competency Normality Test for Students' Knowledge Domain

| School       | Class    | Student Competency in Knowledge |
|--------------|----------|---------------------------------|
|              |          | Significance | Conclusion |
| SMAN 1 Sungayang | Experiment | 0.200       | Normal     |
|              | Control  | 0.069       | Normal     |

Based on Table 2, it is known that the significance value of the normality test for the experimental class and the large control class 0.05 indicates that the data are normally distributed.

3.2.2. Homogeneity Test. Homogeneity tests on the knowledge competence of the control class and the experimental class were tested for overall homogeneity. The data is said to be homogeneous if the significance value> level (α = 0.05). The following homogeneity test results are presented in Table 3.

Table 3. Competency Homogeneity Test Results for Student Knowledge Domain

| School       | Class    | Student Competency in Knowledge |
|--------------|----------|---------------------------------|
|              |          | Significance | Conclusion |
| SMAN 1 Sungayang | Experiment | 0.979       | Homogeneity |

Based on Table 5 it is known that the significance value of the homogeneity test for the experimental class and the large control class 0.05 indicates that the variant is homogeneously distributed.
3.2.3. **Hypothesis Test.** Based on prerequisite tests conducted previously, it is known that the competency value of the knowledge domain is normally distributed and homogeneous, so to test the competency hypothesis, the knowledge domain uses the t-test. presented in Table 4.

| School            | Class       | Average | Significance | Conclusion          |
|-------------------|-------------|---------|--------------|---------------------|
| SMA 1 Sungayang   | Experiment  | 84.40   | 0.008        | H0 is rejected      |
|                   | Control     | 77.74   |              |                     |

Based on Table 4 it is known that the significance value for the knowledge domain is 0.008. This shows that the value of sig. <0.05, which means H0 is rejected. Thus it is known that the guided inquiry learning model that is assisted by student activity sheet affects the biological competence in the realm of student knowledge in class XI of SMA Negeri 1 Sungayang.

Based on data learning outcomes that have been processed using the t test seen a small significance value of 0.05. These results suggest that there is a significant influence between the use of guided inquiry learning models on learning outcomes from the student's knowledge domain. Student learning outcomes using the guided inquiry model assisted by student activity sheet 84.40 are greater than the average value in the control class of 77.74.

The difference in average learning outcomes between the experimental class and the control class cannot be separated from the role of the guided inquiry learning model guided by student activity sheet. The guided inquiry learning model that is assisted by student activity sheet in the experimental class is very helpful in improving student learning outcomes. The use of guided inquiry models with the help of student activity sheet makes students actively involved in learning, such as: formulating problems, formulating hypotheses, designing experiments, conducting experiments, collecting and analyzing data, then drawing conclusions. Guided inquiry also makes students concentrate in carrying out all learning processes \[16\]. All the steps in the guided inquiry model are very instrumental in improving student learning outcomes.

In the learning process in the experimental class, learning begins by giving problems that are relevant to real life in accordance with the excretory system material, then students formulate their own problems and also look for temporary answers (formulate hypotheses). The search for answers to existing problems is carried out through a process of inquiry that begins with designing an experiment. When students design experiments, they will express ideas so that their cognitive abilities can be well trained. Next, students conduct experiments to collect data to be analyzed and conclusions obtained. The learning process is able to invite students to be actively involved both physically and mentally in the learning process. Students can optimize their ability to find concepts from the material being taught.

Of the six steps in guided inquiry, the stage of observation and data collection and the process of analyzing data from the results of practicum conducted by students is very supportive in understanding student concepts. By making and conducting experiments and observing directly make students better understand learning material and can increase the value of student learning outcomes.

During the process of applying learning using the guided inquiry model assisted by student activity sheet in the experimental class, students are trained to learn independently to solve problems in learning. The group discussion methods provided support student activities in finding their own answers to problems. student activity sheet assistance provided can make students better understand
concepts and steps in implementing learning. Student activity sheet is used to train students to work independently according to the steps in the guided inquiry model. Students are expected to develop their own knowledge through independent work.

In line with the opinion of Abelta et al. [19] increasing student competency because student activity sheet guided inquiry makes students more independent and easier to relate the phenomena of daily life to the concepts learned. The active involvement of students in learning makes the learning process more meaningful. Trianto [20] states, that learning will be more meaningful if the child experiences what he is learning, not knowing it. Students not only learn by memorization but students build and understand their own concepts.

The guided inquiry learning model is one of the learning models that provides opportunities for students to be able to learn actively and independently. This model provides direct learning experience, involves activities, and invites students to carry out experimental activities in the form of discoveries that can help students understand the concept of the material provided by the teacher [21]. Asmawati [22] states that guided inquiry learning is expected to overcome student learning difficulties. The main purpose of this model is to develop intellectual skills, think critically, and be able to solve problems scientifically.

The guided inquiry learning model will make students the center of learning, so as to increase the competence of students' knowledge, attitudes, and skills. This is consistent with what Lee et al. [10] state that the guided inquiry model independently builds student knowledge and can enhance students' knowledge, skills, and understanding of concepts. Correspondingly, Simatupang [23] state that the use of guided inquiry models can improve student learning outcomes and activities and influence learning outcomes of student attitudes and skills.

Asmawati [22] states that the guided inquiry model assisted by LKS / LKPD can improve critical thinking skills and mastery of students' concepts. Similar to Abelta, et al., (2017) states that the use of guided inquiry-based worksheets can facilitate students in understanding the material taught by teachers and can improve student learning outcomes. According to Hapsari et al. [8] guided inquiry learning models with syntax which include: formulating problems, formulating hypotheses, designing experiments, conducting experiments, collecting and analyzing data, and making conclusions that pay great attention to students' active activities. Physically and mentally in the learning process.

The application of guided inquiry learning models in Biology learning combined with student activity sheet is very effective for building student knowledge through discovery activities. Kuhlthau et al. [24] stated that, "Investigation is a learning approach where students seek and use various sources of information and ideas to increase their understanding of a problem, topic, or problem.

From this explanation, it can be seen the advantages of guided inquiry models, namely: (1) increasing student motivation; (2) provide opportunities for students to think more about existing ideas, problems, and questions; (3) Provide opportunities for students to fully participate in things that will increase their curiosity, both inside and outside the classroom; (4) encourage students to have the spirit of initiative, patience, cooperation, unity and decision making between students viewed from practicum activities undertaken [25].

The weakness of the guided inquiry learning model that researchers find during the learning process is that it makes students frustrated if they do not find ideas of existing problems. In the practicum process, students will feel less satisfied if the desired data is not answered optimally. So, from the results of the knowledge domain research analysis it can be concluded that the learning domain competency of students who take the student activity sheet guided inquiry learning model has a positive effect on the learning domain competence of students who use conventional learning.

4. Conclusion

From the research that has been done, it can be concluded that the learning domain competency of students who follow the guided inquiry learning model assisted by student activity sheet is better than the learning domain competency of students who use conventional learning.
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