

THE IMPLEMENTATION OF A GUIDED INQUIRY MODEL ASSISTED BY VISUAL MEDIA TO IMPROVE STUDENT'S LEARNING OUTCOMES ON DIGESTIVE SYSTEM LEARNING MATERIALS

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Abstract: This research aimed to determine the influence and the effectiveness of the guided inquiry model assisted by visual media to improve students' learning outcomes. This research used a one-group pretest-posttest design. The research subject is 12 class VIII students in one public Junior High School in Sidoarjo. The instrument and data collection techniques are pretest-posttest. The data analysis techniques were learning implementation analysis and learning outcomes analysis using the Wilcoxon test and normalized gain score. The results showed that the percentage of the learning implementation for the first and second meetings was very good. The average N-Gain score was 0,60, which was in the medium category. Based on this result, it can be concluded that the guided inquiry model assisted by visual media can improve students' learning outcomes.

Keywords: *Guided Inquiry, Visual Media, Learning Outcomes.*

INTRODUCTION

The government made a recent policy in education that temporarily stops the face-to-face teaching and learning process, which substitutes with an online learning system. On March 30, 2021, the Joint Decree stipulates that learning may be conducted face-to-face but is still limited to strict health protocols. Online learning, carried out via the internet and using a cellphone or computer, tend to pay more attention to students' level of understanding and foresight in processing and receiving the information presented. So that teachers delivering material with an online learning system must be precise and memorable. Therefore the students get good online learning [1].

One of the issues faced in learning is the inadequacy of the educational process, which tends to focus on memorizing without requiring students to master the knowledge they remember [2]. The current teaching and learning process relies heavily on the teacher, resulting in students' lack of independent learning attitudes [3]. The lecture must overcome the flaws in teaching and learning techniques in schools, and a creative teaching process is required to overcome students' variances. A teacher must be at the forefront of learning implementation in Indonesia [4].

Using the guided inquiry approach creates effectiveness and efficiency since the teacher is a facilitator who directs students, and learning is student-centered [5]. Using the guided inquiry approach will pique students' interest in analyzing and solving each problem for themselves, assisting kids in understanding the subject in the epidemic era, which limits learning as it is today. The guided inquiry learning methodology impacts the mastery of science focuses [6].

Applying the guided inquiry learning model received a high gain score [7]. The inquiry learning paradigm can assist students in improving

understanding by actively and independently searching through their learning stages. The inquiry model learning stage comprises orientation, problem formulation, hypotheses formulation, data collection, hypothesis testing, and conclusion [8].

Interactive learning media will attract students' interest in learning science. Visual media is a tool a teacher or teacher uses during teaching and learning, where students can enjoy it through the five senses [9]. Thanks to visual media usage, teachers can quickly tell what it means or will be addressed to students. Students not only imagine a phenomenon in the learning process but can also be seen directly in videos, texts, animations, or images that stimulate students to pay attention [10].

Learning outcomes result from an interaction between teaching and learning. From the teacher's perspective, the act of teaching concludes with an assessment of the learning outcomes; from the students' perspective, the learning outcomes mark the completion of the teaching activities of a learning process [11]. Learning outcomes are the object of assessment in the classroom, where the teaching and learning process takes place in the form of new abilities earned by students [12].

Based on the challenges in the field discovered in the current Covid-19 outbreak era, new learning is required to improve student understanding, which will affect student learning results. An adequate and meaningful learning technique is necessary because science learning cannot be conveyed solely through the lecture approach. Digestive system material is closely related to daily life. Students need to have a good mastery of concepts in understanding the digestive system material, not just memorizing it. The existence of learning with a guided inquiry model with the help of visual media amid limited face-to-face learning is likely to help students understand the phenomena that occur. Based on the background

described previously, a guided inquiry model with the help of visual media on the digestive system material applies to this research, which aims to improve student learning outcomes.

RESEARCH METHODS

Because the research took place in a single group without a comparison class, the research design used was one group pretest-posttest. In the first step, pretest questions establish their initial abilities before engaging in guided inquiry learning with visual media. Students were treated in the second stage using guided inquiry learning models aided by visual media. After completing guided inquiry learning models aided by visual media in restricted face-to-face learning, posttest questions were given to students to measure student learning outcomes.

The research subject is class VIII, consisting of 12 students, five females and seven males, from one of Sidoarjo's junior high schools. Because the school is still implementing limited face-to-face learning, students who attend face-to-face represent around 1/4 of the total number of students in every class, with the remainder learning online. The study rolled during the odd semester of the 2021/2022 academic year.

The research instrument used was a written test with 12 multiple choice questions in the pretest and posttest, delivered through a Google Form and a learning implementation sheet that two observers observed during the learning process. The learning tools are applied inquiry model lesson plans, visual media (animated videos and power points), and Student Worksheets.

The data collection technique was in the form of a written test method, namely, pretest and posttest, to assess the improvement of student learning outcomes in the knowledge aspect and learning implementation methods to assess whether the implementation of the learning carried out was going well. The data analysis technique in observing the implementation of learning during two meetings is two observers and the results of the pretest and posttest. The questions are made the same and given twice for the pretest and posttest, with the explanation presented in Table 1.

A validity test is carried out to determine how effectively the questions are applied to measure whether they are valid. In the SPSS program, the Pearson Product Moment Correlation approach was used to test the validity of each item by comparing the scores of each questionnaire item to the total score. The instrument is said to be valid if it has a value of $r_{count} > r_{table}$ and a correlation probability value [sig. (2-tailed)] < significant level (α) 0, 05 [13]. After the calculation, the r_{table} reference point is 0.576, so if the validity value obtained is > 0.576, the instrument is said to be valid. The reliability test is the data or findings' degree of consistency and stability. The basis for taking the Cronbach Alpha

reliability test is said to be reliable if the value obtained (α) > 0,60 [14].

Table 1. Indicators of Competency Achievement

Indicator	Item
Analyze digestive disorders	7
Connecting the interrelationships of organs and functions of the main digestive organs	1
Correcting the true and false statements of the main digestive organs	3
Connecting the interrelationships of organs and functions of additional digestive organs	5
Comparing the table of statements regarding enzymes	9
Analyzing the suitability of enzymes and their production sites	10
Analyzing the suitability of enzymes and their roles	11
Choose the correct statement regarding mechanical and chemical digestion	12
Define digestive organs	4
Analyzing the digestive organs through which food enters the human body	2
Analyze the relationship between organs and their functions appropriately	6
Analyzing the symptoms of digestive disorders experienced	8

Table 2. Indicators of Learning Implementation

No	Indicator	Observed criteria
1	Introduction	Conditioning the Class and Apperception
2	Core activities	a. Orienting Students To Problems b. Organizing Students to Formulate Problems c. Encouraging Students to Submit Temporary Hypotheses d. Guiding Group Investigations to Collect Data e. Guiding Students to Test Hypotheses f. Evaluating and Formulating Conclusions
3	Closing	a. Finishing with Common Prayers and Greetings

The instrument's validity for student learning outcomes for all items obtained $r_{count} > 0.576$. It is said that the instrument on each item is valid. Then the reliability of the learning outcomes instrument is

0.904 because the reliability value obtained is > 0.60, so it is said to be reliable.

The learning implementation sheet that has been applied has passed the validity test stage by a science lecturer at the State University of Surabaya until it is said to be feasible to use. The implementation of learning consists of a score range of 1 to 4, where the more significant the score obtained, the better the score brought and contains 20 statements filled out by two observers. The indicators assessed on the implementation sheet are presented in Table 2.

The percentage results of learning implementation are computed and displayed in Table 3.

Table 3. Criteria for Percentage of Learning Implementation

Percentage	Evaluation
81 % - 100 %	Excellent
61 % - 80 %	Excellent
41 % - 60 %	Good
21 % - 40 %	Satisfactory
0 % - 20 %	Less Satisfactory

The data from the pretest-posttest results were analyzed using the N-gain score to determine the results of improving student learning after carrying out the learning process using the guided inquiry model. Interpretation criteria for acquiring the N-Gain score are presented in Table 4.

Table 4. N-gain Score Criteria

Score (g)	Classification
$g > 0.7$	High
$0.3 \leq g \leq 0.7$	Moderate
$g < 0.30$	Low

The Wilcoxon test is a non-parametric test used to assess whether the mean of two paired samples differs. When the research data is not regularly formed, the Wilcoxon test is an alternative to the paired sample t-test. The basis for decision-making in the Wilcoxon signed test is when the probability value is Asymp. Sig. (2-tailed) < 0.05, then there is a difference in the mean and when the probability value is Asymp. Sig. (2-tailed) > 0.05, then there is no difference in mean. Wilcoxon test analysis using SPSS version 22.0 program and obtained the probability value of Asymp. Sig. (2-tailed) of 0.02, the significant difference between the pretest and posttest learning outcomes concluded that the hypothesis is accepted.

RESULTS AND DISCUSSION

The use of guided inquiry learning facilitated by visual media in one of Sidoarjo's public junior high schools provided data on learning implementation and student learning outcomes as

measured by the N-Gain and Wilcoxon tests. As a result, there will be a considerable improvement in learning outcomes between the pretest and posttest outcomes.

Analysis of the implementation of learning

According to the syntax of the Guided Inquiry learning model, The learning implementation sheet organizes and used for two face-to-face sessions with class VIII C, a group of 12 students. The teacher encourages students to learn about the digestive system and the required pretest in the orientation phase. The teacher shows an animated video and a PowerPoint presentation during the problem formulation phase. Then the teacher asks students to share their thoughts on the problem formation based on the video they have watched. During the hypothesis-proposal phase, the teacher invites students to suggest temporary solutions to the problems. The teacher asks pupils to complete the Student Worksheet throughout the data-gathering stage. The teacher encourages students to report the outcomes of group discussions to prove the tentative hypothesis during the hypothesis testing phase. The teacher fosters members of each group to conclude the lessons provided during the conclusion phase.

Figure 1 depicts the application of learning at each meeting.

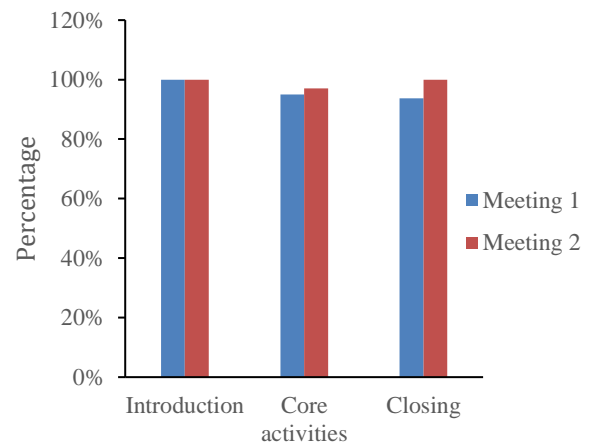


Figure 1. Implementation of Learning Every Meeting

According to the graph in Figure 1, the guided inquiry model learning on the digestive system in each phase at both meetings was rated as very excellent. There was an increase in core and closing activities at meeting two due to the students being more engaging and interactive in replying and contributing their ideas. This data proves that guided inquiry learning with the help of visual media applied to classroom learning is going very well. Today's education must include facilities that support learning, professional teaching personnel, and new and creative teaching methods [15].

Learning Outcomes

The N-Gain score may calculate the increase in student learning outcomes. It intends to assess the

efficacy of the guided inquiry learning approach by examining the gain scores on the pretest and posttest outcomes. Figure 2 depicts the resulting N-gain score.

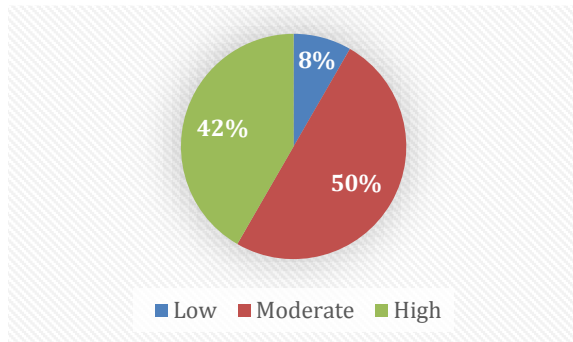


Figure 2. N-Gain score Result Chart

The N-Gain score of class VIII-C students acquired a value of 0.6 after being computed, indicating that it is moderate. A total of 42% of students (5 students) belonged to the high category (N-gain 0.7), and as many as 50% of students (6 students) belonged to the medium category (0.7 > N-gain 0.3). 8% of students (1 student) belong to the low category (N-gain < 0.3). Applying the guided inquiry model in this study can effectively use the material in the digestive system. A guided inquiry learning paradigm may assist students in becoming more engaged persons who can receive direct experience through investigative activities [16].

The achievement of student learning outcomes is also determined based on the Competency Achievement Indicators (GPA) success. GPA is a benchmark for achieving a Basic Competence, and the Basic Competencies stand achieved if all the Basic Competence indicators remain fulfilled [17]. GPA results are obtained based on the posttest scores that students have done. The total number of questions on the posttest is 12. If the student answers correctly on numbers 1 to 8, the score is 8, and on numbers 9 to 12, the score is 9, and if the student answers incorrectly, at that point, a score of 0 is then calculated using the average. The GPA remains when the item questions with a score of 8 receive an average score > 6. Equally, the GPA was also considered achieved for item questions with a score of 9 and an average score of > 6.75. Because each indicator's computation results were above the average, it fulfilled all indicators.

Wilcoxon test analysis using SPSS program and obtained the probability value of Asymp. Sig. (2-tailed) of 0.02. When the probability value is sig. (2-tailed) > 0.05, then there is no difference in mean. The significant difference between the pretest and posttest learning outcomes concluded that the hypothesis is accepted.

The students' N-Gain learning outcomes are categorized as moderate, and the Wilcoxon test stated that the hypothesis was accepted by applying the guided inquiry learning model. The guided

inquiry learning model can help students to step by step get used to them to think scientifically and improve students' ability to understand information [18].

Table 5. Wilcoxon Test Result

Test Statistics	
	posttest - pretest
Z	-3.063 ^b
Asymp. Sig. (2-tailed)	.002
a. Wilcoxon Signed Ranks Test	
b. Based on negative ranks.	

The main emphasis in the guided inquiry-based process lies in the ability of students to understand phenomena [19]. Students find and end by solving problems shows that guided inquiry learning with the help of visual media can help students understand the material presented. Visual media in learning increases students' attention to teacher explanations. It motivates to think and actively ask questions and increases student interest in learning to create a more efficient learning process [20].

CONCLUSION

Based on the results of the data analysis, it is possible to conclude that the guided inquiry learning approach, assisted by visual media, can increase student learning outcomes in terms of the gain score of 0.6, which is included in the moderate category. The average pretest and posttest results of 56.50 and 82.83 learning implementation were categorized as outstanding. Researchers realize that in a study, there will be obstacles. One of the obstacles in this research is the limited facilities in the learning activities, and not all classes have adequate facilities. For example, using LCD errors and speakers that do not function properly. Certainly, these obstacles affect at the time of the research process. However, the researcher tried her best to take advantage of the existing facilities during the research process.

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