Art and Technology in Elementary School
Diterbitkan oleh: Program Studi Pendidikan Guru Sekolah Dasar (PGSD) Universitas Muria Kudus
p-ISSN : xxxx-xxxx
e-ISSN : xxxx-xxxx

Influence of Group Investigation Model Assisted by Media Puzzle to Increase Understanding of Science Concepts of Class V Students

Agustin Khoirun Nisa'[1] ✉, Jimin Budiyono[2]
[1] PGSD Universitas Muria Kudus, Indonesia, [2] Sanggar Lukis Boodee
✉agustinkhoirun123@gmail.com

Submitted: 2022-12-02. Revised: 2022-12-19. Accepted: 2023-01-04

Abstract

One of the essential things in achieving educational goals is the ability to understand students' concepts. Understanding the concept of students is the ability of students to understand the knowledge they have learned. In improving students' understanding of concepts, there is a need for teaching innovations in the form of learning models and media. In learning science in elementary schools, it is necessary to apply the understanding of concepts appropriately as basic science at the next level. So, a suitable model and media must be needed to understand student science. The learning model can be a group investigation model that can activate students during learning activities. In addition, there is a need for puzzle media that can facilitate students' understanding of the material studied. So, this study aims to determine an increase after applying the butterfly puzzle media-assisted group investigation model to the experience of science conditions of grade V students. The study lasted for three meetings. The independent variables in this study were the group investigation model and butterfly puzzle media. At the same time, the dependent variable is the understanding of the student's concept. The data analysis techniques used in this study were the normality and n-gain tests. By understanding the concept, students increased between pretest and post-test scores, with an average normality gain of 0.5843 in the medium category. Based on the research that has been done, it can be concluded that the use of the group investigation model with butterfly puzzle media can improve the understanding of science concepts of grade V students of SDN 2 Wonosemi.

Keywords: Improvement, Group Investigation Model, Media Puzzle, Concept Understanding, Science

INTRODUCTION

Learning activities must run effectively, efficiently, and enjoyably to realize educational goals. According to Wulan et al. (2019), education is a conscious activity that is planned and aims to create learning activities so that students can develop their potential actively in increasing their potential. The learning process is good if students can learn through direct experience (Nur Khofiyah et al., 2019). Students take an active role during learning activities to get direct experience; one of the impacts is achieving satisfactory learning outcomes (Kanza et al., 2020). The ability of student understanding of learning material supports the achievement of good learning outcomes by students.

Sri Anith (2019) argues that learning strategies are the chosen way to deliver material that can create student learning experiences. When students are given more opportunities to participate in learning activities actively, it can make them understand the material more optimally. This is by the group investigation learning model, where this model is a cooperative learning model that involves students actively. The group investigation model is a learning model that adheres to constructivism and cooperative understanding (Hendracita, 2021). Learning occurs in how students discover their own knowledge by identifying sub-subtopics acquired during group work. So this model allows students to actively participate from the beginning to the end of the learning evaluation. There is also an intermediary or learning media that can improve students' understanding of concepts.

Media is a tool used during the learning process so that the message can be conveyed clearly and that educational goals are achieved effectively and efficiently (Nurrita, 2018). In applying IT-based media, some obstacles become obstacles for teachers (Zulfa et al., 2020). So it is necessary to use a media that is suitable for students and later can help students understand concepts during learning.

Current learning activities are still characterized by the dominant role of teachers and the number of students who only memorize material and do not understand learning concepts (Hidayattulloh, 2020). Success in achieving educational goals has not been achieved optimally, as well as learning on theme 5 of the Ecosystem. Based on observations made to teachers and grade V students of SDN 2 Wonosemi, researchers found that some students had difficulty understanding the concept of animal life cycle process material.

During the lesson, the teacher applied the learning model but was unsuccessful. The use of learning media in the learning process is also still minimal. Therefore, the learning outcomes of science content have not fully met the KKM. This can be seen from the results of students' daily tests; 4 out of 12 students achieve KKM scores. When presented, students who get scores above KKM are only 33%. In addition, teachers sometimes find it challenging to divide groups and achieve predetermined material delivery targets. During discussion activities, only one to two students are usually active during learning activities, while others are only busy playing. Learning activities also tend to be textual, making books the primary source during learning.

It is necessary to apply the group investigation model assisted by butterfly puzzle learning media to test whether it can improve the understanding of the concept of the material of the perfect metamorphosis process of grade V students of SDN 2 Wonosemi. Group investigation learning assisted by butterfly puzzle learning media can be used as a solution to existing problems. This learning can encourage students' ability to think, analyze, and involve students actively during learning from the beginning to the end of education.

The indicators used to measure students' understanding of concepts, according to Dewi & Ibrahim (2019), consist of seven indicators: interpreting, exemplifying, classifying, summarizing, inferring, comparing, and explaining. This research is supported by previous research conducted by Putri et al. (2019) that applying the Group Investigation model significantly affects understanding science concepts and critical thinking skills.

Research conducted by Husna et al. (2017) explained that the use of puzzle media is feasible to use for learning media. So that it makes it easier for students to remember the concepts of the learning material they have learned. In addition, students can use a medium during learning activities to concretely relate existing learning material to life

(Nurwulan et al., 2023).

Based on the background of this problem, researchers, and grade V teachers of SDN 2 Wonosemi tried to use a group investigation learning model assisted by butterfly puzzle learning media to improve understanding of the concept of metamorphosis material. This effort was realized with a Quantitative Research Experiment entitled "The Effect of Group Investigation Model Assisted by Media Puzzle on Increasing Understanding of Science Concepts of Class V Students." The research aims to find the effect of applying the group investigation model assisted by puzzle media on increasing the understanding of science concepts of grade V students.

METHOD

This experimental quantitative research uses the One Group Pretest-Posttest Design research design. This design will compare the pretest results before treatment with the post-test results after treatment so that the results are more accurate (Wulansari, 2021).

In this study, only an experimental class was treated using the Group Investigation model assisted by butterfly puzzle media. The independent variable in this study is the Group Investigation model assisted by butterfly puzzle learning media. At the same time, the dependent variable is the understanding of the concept of the material process of perfect metamorphosis of students. Here is an overview of the One Group Pretest-Posttest Design (Sugiyono, 2013).

$$O_1 \times O_2$$

Information:

×: Treatment given

O_1: Pretest scores (before treatment)

O_2: Post-test scores (after treatment)

The population used in this assessment is grade V students for the 2023/2024 academic year. The sample selection technique in this study is random sampling because the respondents who were sampled in this study were all grade V students of SDN 2 Wonosemi. Briefly, the stages in the study are divided into three phases. The first is the pre-experiment stage, where researchers give pretest questions before students are given treatment. The second is an experiment where researchers provide treatment in experimental classes by applying group investigation models assisted by butterfly puzzle learning media to understand the concept of perfect metamorphosis process material. And the last is the post-experiment stage, where researchers provide a post-test or final test to determine how much influence the treatment has on the experiment.

Student concept understanding data is obtained through a test instrument consisting of 20 multiple-choice questions containing seven indicators of concept understanding. Then the data obtained were statistically analyzed with an n-gain test to determine the increased students' knowledge of science concepts. The gain normality test was conducted to determine how much understanding the student's idea had before and after the treatment. The calculation of n-gain can be obtained through data on the assessment results of pretest and post-test questions. To facilitate the analysis of the n-gain test, researchers use the help of the computer program SPSS 26 for Windows. The high and low value of n-gain is determined through the following criteria (Guntara, 2021).

Table 1. N-gain score criteria

N-Gain	Category
$g \geq 0,7$	Highest
$0,3 \leq g \leq 0,7$	Keep
$g < 0,3$	Lowest

RESULT AND DISCUSSION

The research conducted on grade V students of SDN 2 Wonosemi was in the form of student concept understanding scores. The results of students' understanding of concepts are known through pretest and post-test results. The results of the recapitulation of students'

concept understanding are shown in the following table.

Table 2. Science concept comprehension score

Component	Concept Comprehension Score	
	Pretest	Post-test
Average	59,17	82,92
Highest	85	25
Lowest	100	75

Based on Table 2, there is a significant effect on increasing students' understanding of concepts. With an average post-test score of 82.92 while the average pretest score is 59.17. The results of the calculation of increasing students' understanding of concepts using the n-gain test can be seen as follows.

Table 3. N-Gain test results pretest value and post-test value

N	Minimum	Maximum	N-Gain
12	.40	1.00	0,5843

Table 3 shows that it is known that the difference in average pretest and post-test scores has increased. Changes in these two values can be calculated using the N-Gain test showing an increase of 0.5843 with a medium predicate category. While the analysis of the calculation of the N-Gain test understanding of students' concepts will be explained in detail in the following table.

Table 4. Analysis of increased understanding of student concepts

N-Gain	Category	Multiple Student
$g \geq 0,7$	Highest	2
$0,3 \leq g \leq 0,7$	Keep	10
$g < 0,3$	Lowest	0

Table 4 shows that increasing students' understanding of concepts through group investigation models assisted by kupu-kupu puzzle media are categorized as medium and high. Based on the results of the N-Gain test proves that there is an increase in understanding of the concept of grade V students at SDN 2 Wonosemi. Through the results of the N-Gain test, students' concept understanding showed an increase of 0.5843 in the medium category. So that there was an increase after treatment using the group investigation learning model and butterfly puzzle media. The score of giving pretest questions has an average score of 59.17, then increases after treatment, as evidenced by the results of the post-test score with an average value of 82.92.

Increased understanding of students' concepts results from the influence of group investigation models with butterfly puzzle media. The effect of using these learning models and media is a new method that has not been used by grade V teachers of SDN 2 Wonosemi. The research by Hanifah et al. (2020) showed that the group investigation model assisted by puzzle media is effectively used in improving science learning outcomes. Students showed positive responses when conducting research using a group investigation model with butterfly puzzle media. The positive reaction is demonstrated by the enthusiastic attitude of students when grouping, discussing, and doing the questions given. Students are rarely formed in a group during the learning process, so when asked to group, they are enthusiastic and show a happy attitude.

Group Investigation helps students understand learning topics by actively increasing students' motivation to learn as well as gaining knowledge from the investigations they have conducted. Chair (2018) supports this the group investigation model can develop student understanding through various sources and learning. In addition, Haffidianti (2016) also mentioned that students become more active and have learning motivation by applying the group investigation model.

This study not only uses a group investigation model but also features the use of appropriate media, namely butterfly puzzles. Butterfly puzzle media is a disassembly game containing pictures of butterflies' life cycle process. This

butterfly puzzle focuses on educating children in learning materials for the perfect metamorphosis of science content in grade V Elementary School. Butterfly puzzles are very effective and can train students' concentration and accuracy. Maviro's opinion (2017) that the advantages of puzzle media include training concentration, precision, patience, and strengthening students' memory.

The dependent variable in this study is the student's understanding of the concept. The determinants of students having an understanding of the concept are by using indicators of student concept understanding, including 1) interpreting, which is changing from one form to another; 2) exemplifying, that is identifying specific examples of a concept; 3) classifying that is finding something that is in a category, 4) summarizing that is putting forward sentences that represent the information that has been obtained, 5) inference is finding patterns from events that are not from learning, 6) comparing, i.e., identifying similarities and differences of an object, 7) explaining, i.e., building a model of a system (Dewi & Ibrahim, 2019).

In conclusion, group investigation model research assisted by butterfly puzzle learning media can improve students' understanding of concepts with an N-Gain value of 0.5843 with a medium category. This is in line with the research of Astuti et al. (2020) obtained an increase in understanding of the concept after using a group investigation model with an N-Gain value of 0.37 in the medium category.

CONCLUSIONS

It can be concluded that the results of significant differences show an increase between pretest and post-test scores from 59.17 to 82.92. The rise in value has an average normality gain of 0.5843 in the medium category.

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