

Improving understanding the concept two dimensional figure using brunner learning stages class III elementary schools

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1. Abstract

Research on Efforts to Increase Understanding of the Concept of Flat Shape Characteristics through the Application of the Bruner Learning Stages Model to Grade III Students of elementary schools of the 2023/2024 academic year on mathematics material using the Bruner learning stage method regarding a basic understanding of the characteristics of two dimensional figure against the background of the low percentage of success students and the lack of student activity in following the learning process on the material. For this reason, researchers aim to improve learning outcomes and student activity in improving learning that will be carried out. This research was carried out in 2 cycles of 4 practice times starting from May 22 to May 29 2023, with research subjects of class III elementary school students in 2023/2024 academic year, Depok District, Sleman Regency, totaling 27 students. Data collected through observation methods and documentation methods. From the research conducted in 4 meetings, learning outcomes always increase. In cycle I it increased by 47.4% and in cycle II it increased rapidly by 73.7% compared to the pre-cycle implementation where only 15.8% of students completed. In cycle II the success of student learning has exceeded the target indicator of achievement desired by the researcher, namely 85% of students succeed, but in fact in cycle III it is 89.5% and in cycle IV 97% of students have successfully completed learning flat wake characteristics with using Bruner's learning stages method of understanding the basic two dimensional figure. From the results of the study, the researchers concluded that by using Bruner's learning stages method about understanding the concept of two dimensional figure, it could increase the activity and learning outcomes of third grade elementary school students.

Keyword: understanding, dimensional figure, brunner learning

2. Introduction

Learning is the actualization of a curriculum that demands teacher activity, creativity and wisdom in creating and cultivating student activities in accordance with plans that have been programmed in an effective and enjoyable way. J. Bruner's well-known view is that any subject can be taught effectively in an intellectually honest form to all children at all levels of development. This basis is largely based on Jean Piaget's research on children's intellectual development. In this case, among others:

A. Children's intellectual development

According to J. Piaget's research, children's intellectual development can be divided into three levels.

- 1) The pre-operational stage until the age of 5-6 years is the preschool stage so it is not related to the child's school. At this point, he was unable to clearly distinguish between his personal feelings and motives and the realities of the outside world. Because of this, he was unable to understand the basic foundations of mathematics and physics, namely numbers that don't change if their shape changes. At this stage, the ability to communicate some concepts to children is very limited.
- 2) The concrete operations stage, at level 2, is manipulation which is "internalized", that is, when faced with a problem, there is no need to solve it with real tests and actions; he may have done it in his head. However, at this particular level of activity, he can only deal with the real problems that he faces head-on. He cannot solve a problem that he has never encountered in a practical or concrete way or that he has never encountered before.
- 3) The formal operational stage, at this stage the child can function on the basis of presumptive abilities and is no longer limited by what

has happened before. From the description of the background above, the problem can be formulated as follows: "How is the understanding of students regarding the flat wake characteristics of grade 3 elementary school students?"

In accordance with the problems that have been described, the research has the following objectives:

- a) Developing learning media in accordance with Bruner's theory of learning stages for Mathematics subject matter on two dimensional figure in elementary school
- b) Knowing the feasibility of developing interactive learning media in accordance with Bruner's theory of learning stages for the Mathematics subject of flat shape material in Grade 3 Elementary School based on student responses.

The benefits that can be drawn from the research conducted are:

- 1) Benefits for Researchers
 - a) As a means of applying knowledge that has been obtained in college and providing innovation in the field of learning media
 - b) It can be used as a learning medium if one day becomes a teaching staff.

- 2) Benefits for Students

This interactive learning media becomes a reference in the learning process in class and independent learning at home so that it can increase students' interest in learning.

3. Method

A. Research Subjects and Focus

- 1) Description of Learning Media

Learning media is a set of auxiliary or complementary tools used by teachers or educators in order to communicate with students or students. Zainal Arifin and Adhi Setiyawan (2012: 126) argue that learning media is a tool that helps students in the learning process.

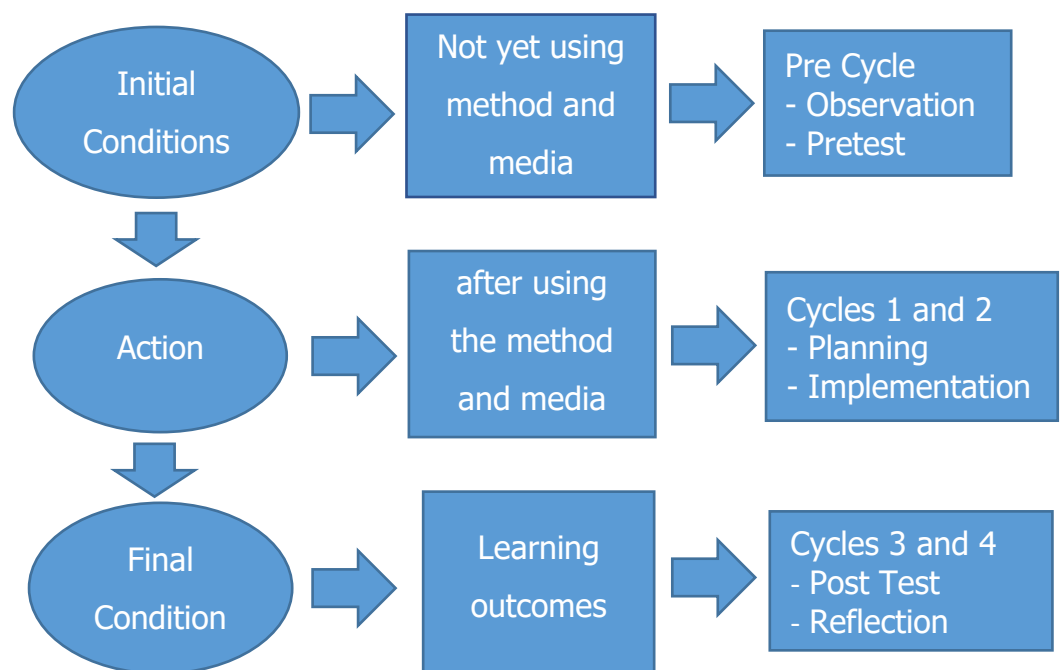
2) Skill Upgrade

The existence of learning media can increase student enthusiasm in participating in online learning, so students will understand more and be able to take part in learning more easily than just using the lecture method.

3) Interactive learning media

Interactive learning media can be used by students individually, not only in school settings, but also at home.

B. Framework of thinking



C. Hipotesis

Based on the literature review and framework on the research focus, the following conclusions can be drawn:

The development of learning media in accordance with Bruner's theory of learning stages for Mathematics subject matter of two dimensional figure in class III elementary schools can facilitate learning activities and increase student enthusiasm in learning.

3.1. Research Instruments

This research was carried out by designing classroom action research consisting of Pre-Cycle, Cycle I, Cycle II, where each cycle was contained:

1) Planning

At this planning stage the researcher prepares:

- a) Syllabus
- b) The action plan is in the form of a learning implementation plan
- c) Evaluation design that includes tests and non-tests

2) Implementation

In the pre-cycle the action will be carried out in accordance with the plan, namely the teacher conveys learning material with the following steps :

- a) Students listen to basic competencies and indicators or subject matter.
- b) Students listen to learning objectives.
- c) Students pay attention to the material provided.

- d) Observing student activity.
- e) Evaluate student learning outcomes.

The first cycle plans actions to be carried out in accordance with the plan, namely with the following steps:

- a) The teacher divides students into several groups (consisting of 3-4 people).
- b) The teacher sends learning videos that have been downloaded to students via the whatsapp group.
- c) Furthermore, the teacher explains the understanding the concept of two dimensional figureon skills material through the learning videos that are made, namely by recording the teacher when explaining again the material from the learning videos that have been downloaded to students and sent via the class III WhatsApp group.
- d) Each group was asked to take a height measurement and then the measurement results were reported by the group representative to the WhatsApp group.
- e) After the measurements were reported, all students copied the data they had obtained into their respective books.
- f) Observing student activity.
- g) Evaluate student learning outcomes.

In the next cycle, namely cycle II, the teacher will form groups (with 3-4 members) so that students are more active in

participating in online teaching and learning activities. The steps are as follows:

- a) The teacher divides students into several groups (consisting of 3-4 people).
 - b) The teacher sends learning videos that have been downloaded to students via the whatsapp group.
 - c) Then, the teacher explains the understanding the concept of two dimensional figureon skills material through the learning videos that are made, namely by recording the teacher when explaining again the material from the learning videos that have been downloaded to students and sent via the class III whatsapp group.
 - d) Each group was asked to measure their weight and then the results of the measurements were reported by the group representative to the whatsapp group.
 - e) After the measurement is reported, all students copy the data that has been obtained into their respective books.
 - f) Make observations on student activity.
 - g) Evaluate student learning outcomes.
- 3) Observation aims to be able to directly observe all student behavior, both positive and negative during the teaching and learning process.
- a) In observation, the observed aspects are as follows :
 - Students' attitudes towards learning techniques carried out by researchers (student activity),

- The attitude of students when receiving subject matter (student attention),
 - Assignments.
- b) Interviews were conducted after the action process took place. The interview aims to find out students' interests and impressions of the techniques or methods used by researchers in the learning process even though they are online.
- 4) Data collection technique
- Data collection techniques were carried out using tests and non-tests. Collecting data with tests is used to reveal students' skills in solving problems related to understanding the concept of two dimensional figureon. Data about teaching and learning situations were taken using observation, and data for reflection were obtained from interviews.
- 5) Instrument's Shape
- a) Test instrument
- The test used to measure mastery skills in understanding the concept of two dimensional figure is a written test in the form of 5 questions describing the concept of two dimensional figure of data. Assessment is carried out with a value range of 0-100 from all of these questions.
- b) Non-test instrument
1. Observation
- Observations were made during the teaching and learning process in progress to obtain data. The observed aspects include:

- The activeness of students in receiving learning materials for presenting skills data using learning video media.
- Students' attention to the teacher's explanation regarding the presentation of data.

2. Assignment

Table 2. Observation Sheet

No	Observed Things	Skor			
		1	2	3	4
1	Student activity: a. Students actively ask b. students actively submit ideas				
2	Attention Students: a. Focused on material b. Enthusiastic	Information; 4 : Very good 3 : Good 2 : Not good 1 : Very Not Good			
3	Assignment : a. Do all tasks b. Accuracy in submitting assignments on time c. Work according to orders				

6) Reflection

Reflection is carried out after carrying out learning cycles I and cycle II, to understand and give meaning to the processes and learning outcomes that occur, which are carried out in the following way :

- a) Evaluating the results of observations

- b) Analyze learning outcomes
- c) Preparation of the next action plan

The results of the analysis of the actions in this cycle are used as a reference to determine the level of achievement of the goals carried out by the teacher in increasing the mastery of understanding the concept of two dimensional figure skills by students.

3.2. Data Collection and Analysis

The type of data used is the type of quantitative data and qualitative data. Quantitative data is obtained by calculating the overall student scores and recapitulating test scores, then calculating the average value obtained and calculating the percentage of students who have completed the lesson.

The following is the percentage value formula:

$$VP = \frac{R}{TS} \times 100\%$$

Information :

VP = value in percent

R = score achieved by students

TS = total number of students

100= fixed number

Qualitative data obtained from describing and classifying data obtained from observations and interviews. Description to reveal all changes in action and improvement in student behavior during the cycle. The data between the pre-cycle, cycle I, and cycle II are

compared to find out the increase in achievement and changes in students' attitudes in participating in learning skills understanding the concept of two dimensional figureon.

3.3. Research Limitations

Based on the research that has been carried out, there are several deficiencies in carrying out action research in class 3 elementary schools, namely as follows:

- 1) Lack of teacher ability in managing the class because there are some students who are very active so that it disrupts learning and requires special attention.
- 2) Grade 3 students have not been able to memorize the characteristics of a flat shape correctly due to a lack of reading skills and must be asked to write slowly to provide an understanding of the concept.
- 3) The limited size of the school yard for environmental exploration of material outside the classroom.

3.4. Success Indicator

Research performance indicators are indicators that are used as guidelines by researchers to determine the achievement or success of actions in research. This research is said to be successful if 85% of students have completed this lesson with Standard of minimum completeness of mastery learning for elementary school 70.

NO	Percentage	Category
1	85%-100%	Very good
2	75%-85%	Good

3	60%-75%	Enough
4	40%-59%	Not enough
5	0%-39%	Less Once

3.5. Reflection

Reflection is carried out after carrying out learning cycles I and cycle II, to understand and give meaning to the processes and learning outcomes that occur, which are carried out in the following way:

- a. Evaluate the results of observations
- b. Analyze learning outcomes
- c. Preparation of the next action plan

The results of the analysis of the actions in this cycle are used as a reference to determine the level of achievement of the goals carried out by the teacher in increasing the mastery of understanding the concept of two dimensional figure skills by students.

4. Results and Discussion

4.1. Description of Learning Improvement Research Results

1) Pre Cycle Description.

Before conducting the research, the researcher conducted a value analysis. This initial value analysis aims to determine the initial conditions of mastery of the concept of understanding the concept of two dimensional figure in skills in third grade elementary school students. It is also used to look for problems that exist in these students. The initial conditions also become a reference for determining further actions. Based on the results of the researcher's analysis of third grade elementary school students for the 2023/2024 academic year, a problem was identified that arose, namely their low understanding of the concept of two dimensional figure. In addition, the learning process for increasing understanding of the concept of flat wake characteristics is less innovative and too monotonous, namely only the teacher is active so that children are bored and do not understand the concept of presenting the skill data. Mastery of the concept of presenting skill data in the initial conditions (pre-cycle) can be seen from student learning outcomes in the form of scores before the application of interactive learning media with two dimensional figure. In the pre-cycle action (Friday, 19 May 2023) an evaluation task was carried out to ensure students mastery of the concept of understanding two dimensional figure. The understanding of the concept of a flat shape is not satisfactory, there are only 4 students or 14% of students who have completed the Standard of minimum completeness of mastery learning for elementary school, while there are 23 students who have not completed it or 86% of the 27 students in class III elementary schools. For more details, we can

see the learning outcomes of third grade elementary school students
before using interactive learning media as followst :

Table 3. Pre Cycle Action Values

No	Student's name	Value	Value description
1	ARP	80	Complete
2	AR	60	Not Completed
3	AK	70	complete
4	DA	65	Not Completed
5	DS	65	Not Completed
6	EPL	55	Not Completed
7	ES	55	Not Completed
8	IM	60	Not Completed
9	JRP	60	Not Completed
10	KO	70	Complete
11	NL	60	Not Completed
12	RS	60	Not Completed
13	SS	60	Not Completed
14	SK	60	Not Completed
15	TA	60	Complete
16	TSP	60	Not Completed
17	WS	60	Not Completed
18	YNS	55	Not Completed
19	ZA	55	Not Completed

Information :

Not Completed yet 86%

Completed for 14%

Figure 1. Graph of Pre-Cycle Action Values

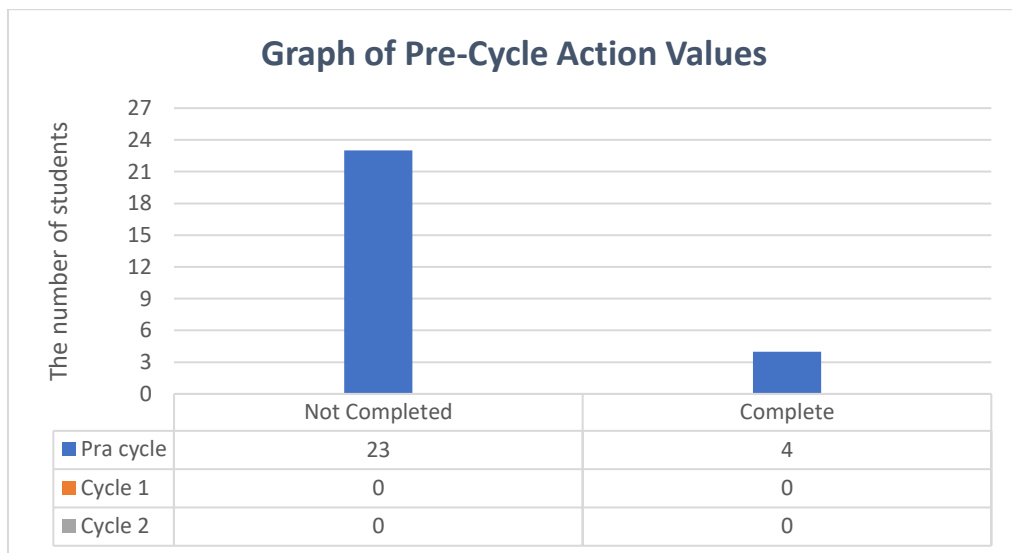
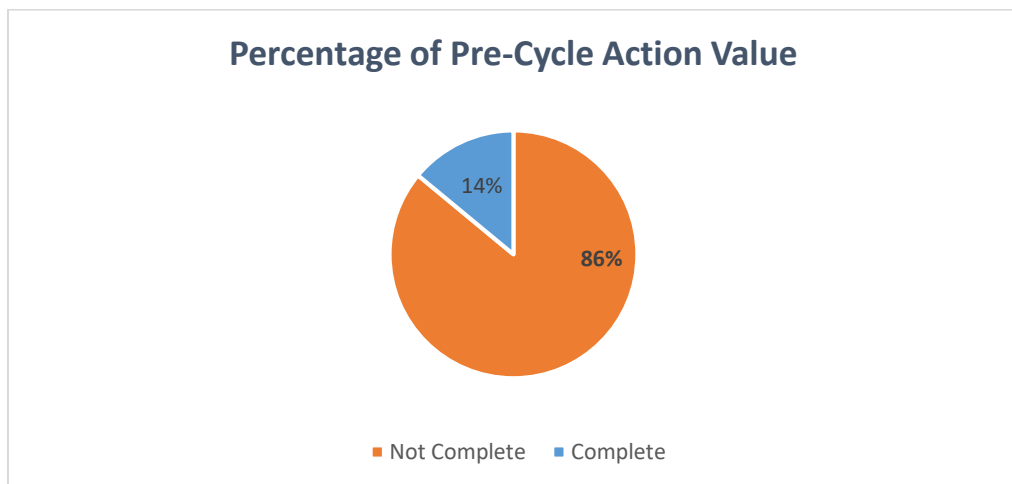


Figure 2. Percentage of Pre-Cycle Action Values



Information:

- Number of students who completed : 4
- Number of students who did not complete : 23
- Percentage of students who complete : 14%
- Percentage of students who did not complete : 86%

Based on the data in the graph above, it can be concluded that 84% or 23 students mastery of the concept of understanding the concept of two dimensional figure skills of class III students who have not completed it and 16% or 4 students who have completed it. Based on these results the researcher wants to improve the understanding of the concept in class III students through interactive learning media.

2) Description of Cycle 1

The first cycle of action was carried out on May 20, 2023. after the pre-cycle implementation. Researchers and class teachers collaborated to discuss learning designs by creating interactive learning media for class 3 two dimensional figure. The sequence of actions planned and to be implemented in cycle I is as follows:

- a) Researchers and colleagues studied the material for understanding the concept of two dimensional figure on basic skills and competencies (KD) that would be achieved by class III students in the implementation of cycle I.
- b) Researchers and colleagues collaborated in compiling RPP cycle I and developing indicators for achieving goals. The indicators achieved were that students were able to explain the meaning of data and solve problems related to understanding the concept of two dimensional figure on skills.
- c) Researchers and colleagues download video skills learning media and arrange measurement experimental steps to obtain data that is used to increase understanding of the concept of flat wake characteristics.

Understanding the concept of two dimensional figure in cycle 1 there was an increase after being given an understanding of the concept of two dimensional figure using the Bruner learning stages, namely there were 12 students or 44% of students who had completed Standard of minimum completeness of mastery learning for elementary school, while there were 15 students who had not completed or 56% of the 27 class III students.

Table 4. Cycle 1 Action Value

No	Student's name	Value	Value description
1	ARP	80	Complete
2	AR	60	Not Completed
3	AK	90	Complete
4	DA	65	Not Completed
5	DS	85	Complete
6	EPL	85	Complete
7	ES	85	Complete
8	IM	90	Complete
9	JRP	60	Not Completed
10	KO	80	complete
11	NL	80	Complete
12	RS	90	Complete
13	SS	60	Not Completed
14	SK	60	Not Completed
15	TA	60	Not Completed
16	TSP	60	Not Completed
17	WS	80	Complete
18	YNS	85	Complete
19	ZA	55	Not Completed

20	SS	60	Not Completed
21	SK	60	Not Completed
22	TA	60	Not Completed
23	TSP	60	Not Completed
24	WS	80	Completed
25	YNS	60	Not Completed
26	ZA	60	Not Completed
27	ZF	60	Not Completed

Information :

Not Completed yet 44%

Completed for 56%

Figure 3. Graph of Cycle 1 Action Values

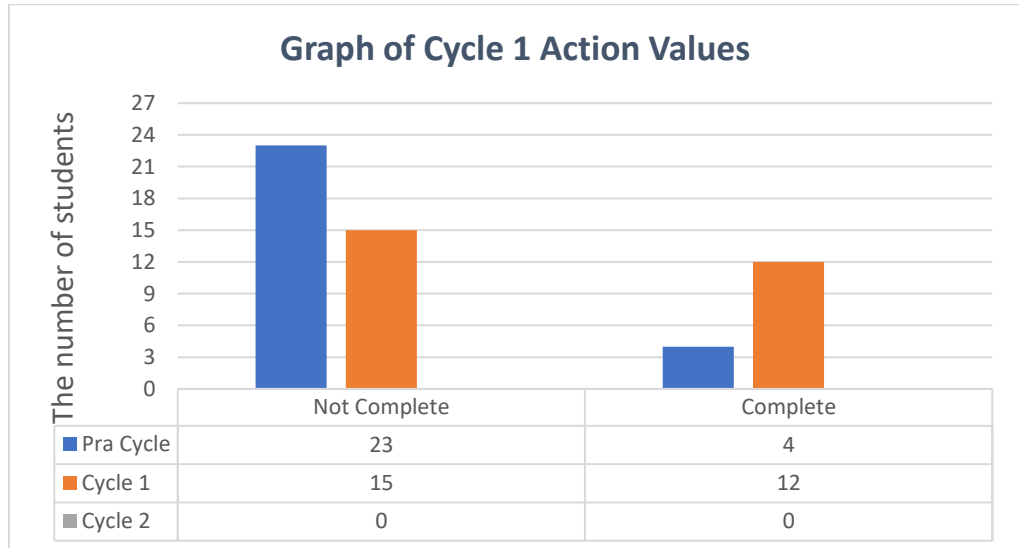
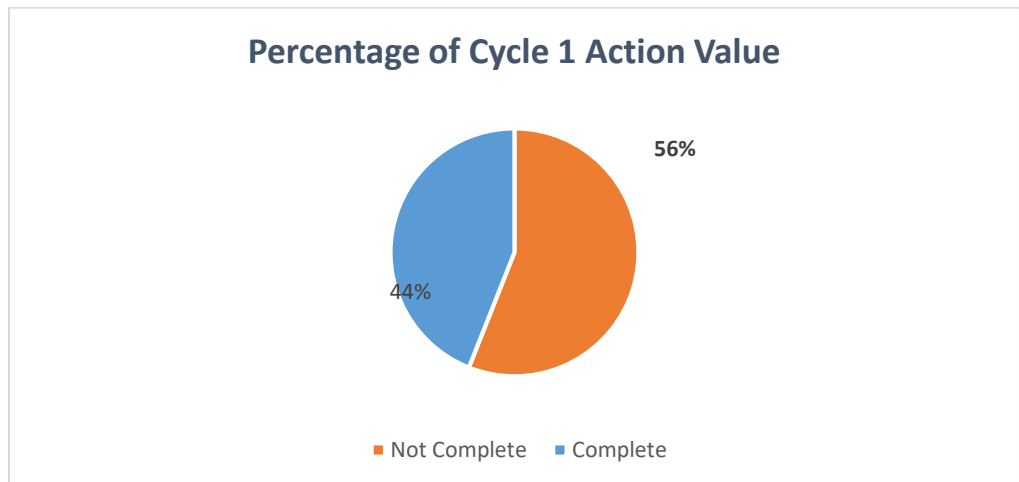


Figure 4. Percentage of Cycle 1 Action Values



Information :

- Number of students who completed : 12
- Number of students who did not complete : 15
- Percentage of students who complete : 44%
- Percentage of students who did not complete : 56%

3) Description of Cycle 2

The action plan for cycle II is based on the implementation in cycle I. In cycle I there are still deficiencies or weaknesses, therefore in cycle II an improvement plan is made, which is as follows :

- a) Researchers make the learning atmosphere even better by encouraging students and inviting students to make observations in the school environment by observing directly
- b) Researchers form smaller groups consisting of 3 or 4 students.
- c) Researchers prepare teaching materials that are more emphasized in the observation process presented in student worksheet.

Understanding the concept of two dimensional figure in cycle 1 there was an increase after being given an understanding of the concept of flat wake characteristics using the Bruner learning stages, namely there were 25 students or 92% of students who had completed Standard of minimum completeness of mastery learning for elementary school, while there were 2 students who had not completed it or 8% of the 27 class III students.

Table 5. Cycle 2 Action Value

No	Student's name	Value	Value description
1	ARP	80	Complete
2	AR	80	Complete
3	AK	90	Complete
4	DA	80	Complete
5	DS	85	Complete
6	EPL	80	Complete
7	ES	80	Complete
8	IM	90	Complete

9	JRP	60	Not Complete
10	KO	80	Complete
11	NL	80	Complete
12	RA	90	Complete
13	RAP	80	Complete
14	RR	85	Complete
15	RSF	90	Complete
16	RP	80	Complete
17	SAP	80	Complete
18	SA	90	Complete
19	SCY	80	Complete
20	SS	80	Complete
21	SK	85	Complete
22	TA	90	Complete
23	TSP	60	Not Complete
24	WS	80	Complete
25	YNS	80	Complete
26	ZA	80	Complete
27	ZF	85	Complete

Information :

Not Completed yet 8%

Completed for 92%

Figure 5. Graph of Cycle 2 Action Values

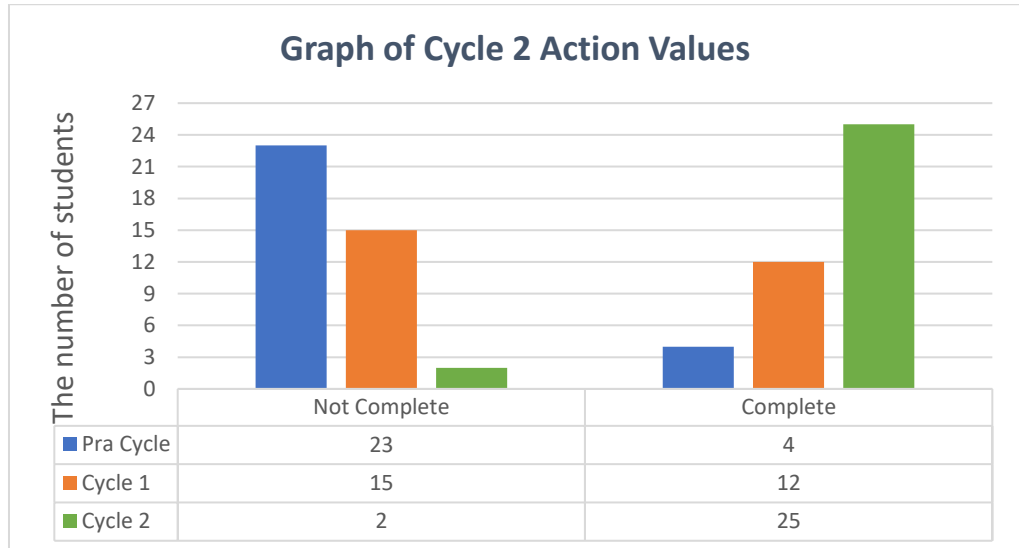
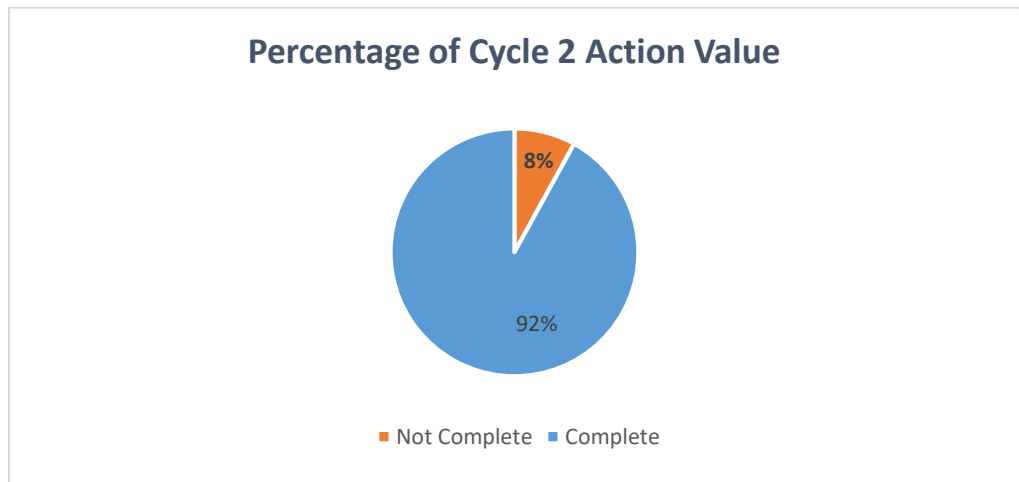


Figure 6. Percentage of Cycle 2 Action Values



Information:

Number of students who completed : 25
 Number of students who did not complete : 2
 Percentage of students who complete : 92%
 Percentage of students who did not complete : 8%

4.2. Discussion

Based on research in cycle II, mastery of understanding the concept of two dimensional figure skills of third grade elementary school students has achieved success indicators beyond what researchers expected, which was originally only planned with a success percentage of 85%, but in cycle II, student success reached 92%. In addition, there is also an increase in attitude assessment during the cycle II process. The assessment of his attitude is as followst :

Table 6. Student Attitudes During Cycle II

No	Student's name	Score		
		liveliness	Attention Students	Assignment
1	ARP	4	4	4
2	AR	3	3	3
3	AK	4	4	4
4	DA	4	4	3
5	DS	3	4	3
6	EPL	4	3	3
7	ES	3	3	2
8	IM	3	2	2
9	JRP	3	3	3
10	KO	4	4	4
11	NL	3	3	3
12	RS	3	3	3
13	SS	4	4	4
14	SK	3	4	3
15	TA	4	4	3
16	TSP	4	3	3
17	WS	4	3	3
18	YNS	3	3	2

19	ZA	3	2	2
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Information :

4 : Very good

3 : Good

2 : Not good

1 : Very Not Good

From the data above, students' attitudes have shown 100% activeness, as many as 95% of students have paid attention to learning enthusiastically, and as many as 89.5% have been good at doing their assignments by being able to submit assignments on time.

1) Pre Cycle Discussion

At this stage, it can be said that the implementation of learning actions is not in accordance with the meaning of learning conveyed by Bruner, namely that the learning process occurs over three episodes, namely the information stage, the transformation stage, and the evaluation stage. Here the information to be conveyed (transformed) to students has not occurred optimally. Obtained data about the actions used in the learning process of mastery of the understanding the concept of two dimensional figure skills in class III elementary school students still using conventional methods so that learning feels monotonous and boring. Many students did not pay attention when the researcher was explaining in front of the class so that many students did not master the concept of presenting skill data. In this pre-cycle, mastery of the concept of understanding the concept of two dimensional figure skills of third grade elementary school students who had not completed was 86% or 23 students and those who had completed were 14% or 4 students.

2) Cycle I Discussion

From the pre-cycle conditions where the transformation of learning information on mastery of the concept of presenting skills data has not run optimally, so researchers try to use experimental methods and learning media in the form of learning videos about skills which are expected to make students active in learning. In accordance with the opinion of Syaiful Bahri Djamarah (1995) the experimental method is a way of presenting lessons in which students conduct experiments by experiencing and proving something learned themselves and the opinion of Briggs (1977) who says that learning media is a physical means of conveying content or learning material.

From learning using experimental methods and learning media in the form of videos about skills, the results obtained were in the form of increasing mastery of understanding the concept of two dimensional figureon skills in class III elementary schools students before the action was carried out and after the cycle I actions were carried out. The percentage increase in results that matched or exceeded the Standard of minimum completeness of mastery learning for elementary school was 44% or 12 students, while those who were still below the Standard of minimum completeness of mastery learning for elementary school were 56% or 15 students. At the first cycle meeting, mastery of the concept of presenting skills data increased compared to the pre-cycle meeting.

Based on the results of observations and discussions between researchers and colleagues, the obstacles in cycle I were obtained, namely:

- a) There were some students who were not active in group discussions, both in determining questions and first answering questions.
- b) There are still children who do not focus on learning activities.
- c) Many students still do not master the difference between angles and vertices.
- d) For this reason, it is necessary to improve the cycle II action which is expected to bring changes to the understanding of the concept of flat wake characteristics

3) Discussion of Cycle II

Based on the results in cycle I, the researcher changed the study groups which used to be groups of three to four people into discussion groups of two to three people in learning so that students gained mastery of understanding the concept of two dimensional figure. Student skills have increased, with the number of students completing 92% or 25 students and leaving only 8% or 2 students not completing Standard of minimum completeness of mastery learning for elementary school.

Efforts to improve mastery of understanding the concept of two dimensional figure on skills by using interactive learning media about two dimensional figure according to Jerome Bruner identified three stages of cognitive representation regarding the learning stage, Enactive, which is the representation of knowledge through actions. Iconic, which is the visual summarization of images. Symbolic representation, which is the use of words and other symbols to describe experiences, and even bring psychological influences to students. Based on observations during the learning process taking place at cycle II meetings, students' mastery of understanding the

concept of flat wake characteristics has increased, namely the number of students who have completed as much as 92% or as many as 25 students and as much as 8% have not completed or a number of 2 students have not completed Standard of minimum completeness of mastery learning for elementary school.

Table 7. Comparison of Pre-Cycle, Cycle I, and Cycle II Results

No	Research time	Complete Student ($70 \leq$)	Incomplete Students ($70 \geq$)	Percentage According to Indicator	The percentage does not meet the indicator
1	Pre Cycle	4	23	14%	86%
2	Cycle I	12	15	44%	56%
3	Cycle II	25	2	92%	8%

5. Conclusion

Based on the results of the classroom action research that has been carried out, it can be concluded that with efforts to improve the mastery of understanding the concept of two dimensional figure skills in class III students through the Bruner learning stage method, the basic understanding of two dimensional figure in class III elementary school has increased. This is evidenced by the increasing value of mastery of the concept of presenting skills data from the initial conditions or pre-cycle to cycle II. Efforts to improve mastery of the concept of presenting skills data in class III in 2023/2024 academic year are carried out using interactive learning media about the characteristics of two dimensional figure.

6. Acknowledgement

Based on the conclusions of the research results, as well as in order to improve the quality of students by holding efforts to increase mastery understanding the concept of two dimensional figure skills in class III students through the Bruner learning stage method regarding the basic understanding of flat wake characteristics in class III elementary schools academic year 2023/2024, then the following suggestions can be submitted :

1. For student

Aso that this research becomes additional insight for students to be more active in learning so that they can have broader insights, especially in terms of innovative ways of learning so that learning is more fun for the students themselves.

2. For Teachers

It is hoped that the results of this study can provide additional insight to teachers to be able to be creative and innovate in various models, methods and learning media used to support the success of a lesson itself.

3. For Schools

It is hoped that schools can provide learning media that are relevant and accessible to students at home so they can continue to take part in online learning such as the Google site and so on.

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