



The Effectiveness of PAKAPIN to Improve Science Learning Outcomes in Fourth-Grade Elementary School

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ABSTRACT

Students' understanding of flower structure in science lessons is still low because the learning media used are not innovative and concrete enough. This affects the learning outcomes of fourth-grade students at MI Darul Muttaqin Gresik. This study was conducted to improve students' conceptual understanding and learning outcomes regarding flower structure by using Smart Bag Boards (PAKAPIN) as a learning medium. This study used a Classroom Action Research (CAR) approach with the Kemmis and McTaggart model, which was carried out in two cycles. Each cycle consisted of four stages, namely planning, implementation of actions, observation, and reflection. The research subjects were 12 fourth-grade students at MI Darul Muttaqin, Gresik. Data collection methods included observations of teacher and student activities, pre-test and post-test, student response questionnaires, and documentation. The collected data were analyzed qualitatively and quantitatively. The results showed that student learning outcomes improved after using PAKAPIN media. In the first cycle, there were 8 students who achieved learning completeness with a percentage of 66.60%. In the second cycle, the number of students who achieved completeness increased to 10 with a percentage of 83%. In addition, student activities and responses to learning were in the very good category, indicating that students were actively involved during the learning process. Based on the results obtained, it can be concluded that the use of the PAKAPIN media successfully improved students' understanding of the concepts and learning outcomes of the IPAS subject on flower structure in fourth-grade students at MI Darul Muttaqin Gresik.

INTRODUCTION

Studying Sciences in grade IV of Islamic Elementary School Darul Muttaqin Gresik has an important role to help students understand the various events that occur in the natural and social environment around them. Through science learning, students are expected to be able to master knowledge in real life and be able to develop scientific thinking skills and science process skills. However, the results of observations in the classroom show that the implementation of social studies learning still faces several obstacles, especially in the material of flower structure. The majority of students are not able to know the parts and functions of the flower parts correctly and scientifically.

The learning activities that have been implemented so far still tend to be *teacher-oriented (teacher-centered learning)*. Teachers do not optimize the use of learning media to deliver material. Even though books are available to make it easier to deliver material, some students still look less active and tend to be less enthusiastic in participating in learning. Students play more of a role as a listener without active involvement in finding concepts independently. This condition indicates that the learning strategy that has been used has not fully fostered students' conceptual understanding of the material to be delivered.

This low level of learning completeness is caused by students' limitations in explaining the parts of the flower and the difficulty in remembering their functions correctly. Students often memorize terms without understanding their meaning scientifically. In addition, students' motivation to learn social studies is also relatively low. Students show relatively low interest in the material presented because learning is more one-way and leaves less room for exploratory activities. In fact, the characteristics of elementary school-age children are at the stage of concrete operational thinking according to theory Piaget. This means that it is easier for students to understand concepts when using appropriate learning media (Sasmita et al., 2022).

Science learning in elementary needs to focus on the formation of scientific attitudes and the development of students' science process skills (Wahyuni & Hambali, 2024). The scientific approach in teaching social studies plays an important role in fostering students' scientific attitudes and thinking skills. At this level, science is the basis for students to cultivate curiosity and the ability to think critically about various problems (Purnawati & Yakin, 2025). Optimal social studies learning will equip students with relevant skills to face future challenges. These skills are not only useful in the field of science, but can be implemented in real life. Therefore, teachers need the use of learning media that gives students hands-on experience so that they can discover for themselves the parts of the flower and its functions that are





learned.

One of the solutions that teachers can use to solve these problems is to use Smart Pocket Board (PAKAPIN) media in learning science, especially in flower structure materials. Several previous studies have proven that using PAKAPIN media has good implications in the learning process. According to Makkasau, using PAKAPIN media in science learning, significantly improves student learning outcomes (Makkasau et al., 2022). It is also supported in Puspita & Iswana, his research which said that PAKAPIN media has an influence in improving student learning completeness (Puspita & Iswana, 2025). Other research conducted Arita (2024) it shows that this media also attracts students' attention and enthusiasm to study science in elementary school (Arita et al., 2024). In addition, Me et al., (2024) also mentioned that PAKAPIN media helps teachers and students in the learning process. Overall, these various studies confirm that the use of PAKAPIN media is not only able to develop students' understanding and learning outcomes, but also encourages their active participation in the learning process, especially in flower structure materials in elementary schools.

Based on initial observations made by researchers at MI Darul Muttaqin, Ngepung, Kedamean, it was found that the understanding of grade IV students of the material of plant parts, especially flower structures, is still lacking. Many students have difficulty in recognizing and explaining parts of flowers such as flower stalks, petals, flower crowns, stamens, and pistils. This shows that students need learning media that can help them understand concepts more clearly and in a structured way.

Based on the problems that arise, the researcher feels the need to innovate in the teaching and learning process by using media that is in accordance with the nature of the subject matter and the needs of students. Therefore, this research is focused on the use of PAKAPIN media as a way to improve the understanding of fourth grade students of MI Darul Muttaqin about the structure of flowers. The title of this study is "The Use of Smart Pocket Board Media to Improve Understanding of the Concept of Flower Structure in Class IV MI Darul Muttaqin."

LITERATURE REVIEW

A system is a combination of various ideas that aim to achieve a goal in a structured way (Qomarudin, 2021). Learning is an activity carried out by teachers systematically and instructionally with the aim of making students learn actively.(Dimiyati & Mudjiono, 2009). The learning system is a combination of various components of activities carried out by teachers that aim to achieve learning goals in a structured manner. The learning system has components that influence each other to achieve learning goals, such as objectives, materials, methods, media, and evaluation. Kustandi and Sutjipto's opinion in Muryaningsih & Utami's position in the learning system is as an aid, a tool for conveying messages, a tool for strengthening the material, as well as representing the teacher in delivering the material in a more thorough, clear and interesting manner. With learning media, the distribution of messages will be clearer and make it easier for students in the teaching and learning process.(Muryaningsih & Utami, 2021). The position of learning media has an important role because it presents information in more detail, clarity and attractiveness. The use of learning media is one of the efforts of the learning process that ultimately improves student learning outcomes.(Kaniawati et al., 2023). The following is a picture of the position of the media in the learning system:



Figure 1. Position of the Media in the Learning System

The media has many benefits for the teaching and learning process between teachers and students in the process of knowledge transfer in order to achieve learning goals. Not only important, learning media is really very important to help make it easier for teachers to explain and students to understand learning materials. In this era, there are a lot of media that can be used as tools in the learning process, whether in the form of audio, visual or audio-visual. Teachers only need to have the ability to master and choose which media is suitable to use (Fadilah et al., 2023).

Basic education is a very important level of education to grow students' basic knowledge, skills, and character. At this stage, the basis of students' understanding of the natural and social environment begins to be built, which will be used as a provision for the next stage of education. Quality education does not only focus on mastery of the material; It also focuses on building students' overall attitudes, thinking, and skills. Therefore, the learning process in elementary school must be well designed to achieve educational goals.

One of the important lessons in shaping students' understanding is Natural and Social Sciences. Science combines learning about natural phenomena and the social environment that exist around students (Paris & Sisi, 2025). The purpose of this lesson is to understand various natural and social events, as well as to train critical and analytical thinking skills in solving everyday problems. In addition, Science also helps students to be more able to adapt to the surrounding environment and improve their ability to feel and understand phenomena that occur around them (Az-zahra et al., 2025).

However, the implementation of social studies learning in elementary schools has not gone well as expected. There are still many problems that occur in the teaching and learning process, both due to the lack of facilities and





infrastructure and because of the methods used by teachers. Many elementary schools do not have laboratories, learning aids, or sufficient and interactive learning media. This is further exacerbated by the traditional learning method, so that learning is more directed at the teacher and does not actively involve students. As a result, students have difficulty understanding abstract science concepts, especially in materials that require visual imagery and direct observation.

The availability of the right learning facilities and media greatly affects student learning outcomes. Adequate learning facilities can help students understand concepts more clearly and meaningfully, thereby increasing their motivation and learning achievement Ruliandari et al., (2025). On the other hand, the inadequacy of learning media can cause students to be less involved in the learning process, which negatively impacts students' ability to think, feel, and act.

One way that teachers can do to overcome this problem is to use learning media that is in accordance with the characteristics and needs of students. Learning media is a tool used to convey information from learning sources to students. By using learning media, teachers not only find it easier to explain the material, but can also increase students' enthusiasm and desire to learn because the learning process becomes more interesting and interactive. Therefore, the selection of learning media must be adjusted to the nature of the material and the level of development of students so that learning goals can be achieved properly.

One of the learning methods that can be used in science studies is to use the Smart Pocket Board media or abbreviated as PAKAPIN. This media is in the form of a board with small pockets designed to make it easier for students to understand the material through an active and interactive way of learning, as explained by Anggraini (2020). PAKAPIN media is easy to make because the ingredients are simple and can be obtained easily. Although various studies show that PAKAPIN media is effective, its application in studying the structure of flowers in the science subject of class IV in elementary school has not been discussed in particular. In fact, the material on flower structure is included in the science topic which is somewhat abstract and requires a good understanding of concepts and visual media help so that students can understand the parts of the flower in order and precisely.

METHOD

This study uses the Classroom Action Research (CAR) method with the Kemmis and McTaggart models. This model is an extension of Kurt Lewin's model that combines the stages of action and observation simultaneously. This classroom action research aims to improve students' understanding of the concepts taught through the application of learning media PAKAPIN in learning science subjects.

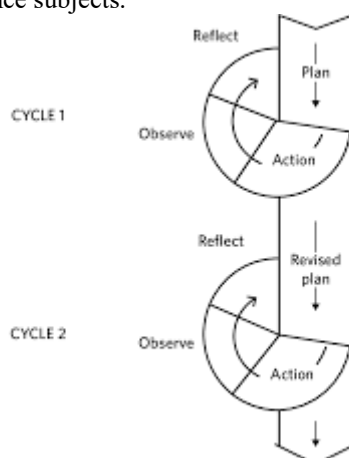


Figure 2. Kemmis and McTaggart model CAR flow

The research was carried out in two cycles, each cycle consisted of four stages, namely planning, action, observation, and reflection. The research was stopped in the second cycle because the success indicators had been achieved. Success indicators are determined if at least 80% of students get scores above the Minimum Completeness Criteria (KKM) and the activities of teachers and students are in the good or very good category.

This research was conducted at MI Darul Muttaqin Gresik with a focus on 12 grade IV students, consisting of 4 male students and 8 female students. The researcher himself is in charge of carrying out actions, while the classroom teacher acts as a colleague in the process of observation and reflection.

The data collection techniques in this study include observation, tests, questionnaires, and documentation. The observation used is systematic observation, which is observation made using observation tools that have been prepared in advance so that the things observed become more directed (Ramdhan, 2021). The observation tool is in the form of sheets to observe teacher activities and student activities during the teaching and learning process.

The test is used to find out the extent to which students understand the material about the structure of flowers. This test consists of two parts, namely pretest and posttest. The pretest is given before the teaching and learning process begins, in order to find out the student's initial ability. Meanwhile, the posttest is given after the learning is over, in order to find out how well the students' understanding of concepts improves after using PAKAPIN media (Yusnarti &





Suryaningsih, 2021). In addition, there is a student response questionnaire in the form of questions with a choice of answers, so students only need to choose the appropriate answer (Cardona, 2020). Documentation is also used to strengthen research data, such as photos of learning activities and other supporting files.

The collected data was then analyzed using two methods, namely descriptive qualitative analysis and descriptive quantitative analysis. Descriptive qualitative analysis is used to describe the learning process, teacher and student activities, and reflection results in each learning cycle. Meanwhile, descriptive quantitative analysis was used to examine data in the form of pretest and posttest scores, average grade scores, percentage of student learning completeness, and student answer results from the response questionnaire.

The following formula is used to get scores from teacher and student activities:

$$NP = \frac{R}{MS} \times 100$$

NP = Percentage value searched
R = Score obtained
MS = Maximum score

The formula to find out the level of completeness of student learning outcomes is as follows:

$$NA = \frac{A}{B} \times 100$$

NA = Classical learning outcomes
A = Total score obtained
B = Maximum score

The formula used to determine the learning outcomes of each end-of-cycle test with the calculation of the average score refers to the KKM of 75 as follows:

$$M = \frac{\sum x}{\sum n}$$

M = Average value
 $\sum x$ = The number of grades students earn
 $\sum n$ = Number of students

To find out the results of the student response questionnaire to PAKAPIN media are as follows:

$$Rpd_n = \frac{R}{MS} \times 100$$

To find out the final results of the response questionnaire from all students, it is calculated using the average formula:

$$Rpd = \frac{Rpd_1 + Rpd_2 + Rpd_3 + \dots + Rpd_n}{n}$$

Rpdn = Student response with n = 1, 2, 3, ... etc.
Rpd = Average combined responses of all students
R = Score obtained
M.S. = Maximum score
n = Number of students

RESULT

Teacher activities have a very important role in determining the success of the learning process. Teachers who are able to design and implement learning in a directed manner, create meaningful learning experiences, and make optimal use of learning media will have a positive impact on improving student activities and learning outcomes. Therefore, the quality of teacher activities is one of the main indicators in achieving learning goals.

In this study, the learning of IPAS material on Flower Structure was carried out by utilizing PAKAPIN media as a means to facilitate students' understanding of concepts. The assessment of teachers' activities was carried out through observation using a likert scale of 1-4, with criteria of 1 (less), 2 (adequate), 3 (good), 4 (very good). The success indicator is determined if the results have reached a minimum percentage of 80% with the very good category. The results of the observation of teacher activities in the first cycle and the second cycle are presented in the following table:

Table 1. Teacher Activities of Cycle I and Cycle II

		Score	
No	Indicator	Cycle I	Cycle II
Introductory Activities			
1	The teacher opened the learning with greetings and friendly greetings	4	4
2	The teacher ensures the readiness of students before starting the lesson	4	4
3	Teachers connect new material with student experiences	3	4
4	Teacher motivates about the importance of studying the material	4	4
5	The teacher conveys the learning objectives clearly	4	4
PAKAPIN Media Core Activities			
6	Teachers prepare and display PAKAPIN media well	3	3
7	The teacher explained how to use PAKAPIN media	4	4
8	The teacher instructs the activity using simple and clear language	3	3
9	Teacher guides students to observe PAKAPIN media step by step	3	4
10	The teacher gave an example of how to identify information from PAKAPIN media	4	4
11	Teachers ask questions to provoke students' understanding	4	4
12	The teacher gives students the opportunity to ask questions and respond well	3	4
13	Teachers manage the classroom in an orderly manner during the use of media	4	4
14	Teachers provide feedback when students use PAKAPIN media	3	3
15	The teacher facilitates the discussion and guides the students to express their opinions	3	4
Discussion and Reasoning			
16	The teacher helps students draw conclusions from the results of PAKAPIN media observations	3	3
17	The teacher provides follow-up questions to encourage students to reason	4	4
18	Teachers respect every opinion of students while discriminating	4	4
Conclusion and Reflection			
19	The teacher guides students to draw conclusions at the end of the learning	3	4
20	Teacher closes the learning with greetings and positive reinforcement	4	4
Quantity		71	76
Prosentase		88,75%	95%

Based on the table of research results, teacher activities in cycle I obtained a percentage of 88.75% with the category of very good and have achieved the set success indicators. This shows that the use of PAKAPIN media in the 4th grade science learning of MI Darul Muttaqin Gresik has been carried out very well, but the implementation still needs to be perfected so that the media can be used more optimally in supporting the learning process.

In cycle II, teacher activities increased with a percentage of 95% and were included in the very good category. These results show that the use of PAKAPIN media is able to increase teachers' activities in learning science, so that the indicators of research success in 4th grade students of MI Darul Muttaqin Gresik have been achieved.

The results of student activities on mathematics learning through PAKAPIN media were observed and assessed using structured observation sheets. The results of student activities in cycles I and II can be presented in the following table:

Table 2. Activities of students in cycle I and cycle II

		Score	
No	Indicator	Cycle I	Cycle II
<i>Introductory Activities</i>			
1	Responding to opening: Students respond to the teacher's greetings and instructions	4	4
2	Learning readiness: Students are ready to take part in learning (stationery & sitting position)	4	4
3	Following perception: Students answer a lighter question about flowers	3	4
4	Listening to motivation: Students pay attention to the teacher's motivation about the importance of learning the function of flowers	4	4
5	Understanding the purpose: Students listen to the learning objectives about the function of flowers	4	4
<i>PAKAPIN Media Core Activities</i>			
6	Observing PAKAPIN media: Students pay attention to smart office boards containing flower parts	3	3
7	Following observation directions: Students observe each part of the flower as per the teacher's instructions	4	4
8	Record information: Students record the names and functions of the flower parts	3	3

9	Identifying sections: Students point to and name the flower section on PAKAPIN media	3	4
10	Explain the function: Students describe the function of each part (crown, pistil, stamen, petals, stalk)	3	4
11	Drafting the function cards: Students correctly pair the flower function cards on the PAKAPI board	4	4
12	Answering questions: Students answer the teacher's questions about the function of flowers	3	4
13	Ask: Students ask questions related to media or materials	4	4
14	Show curiosity: Students show enthusiasm when observing the function of the flower section	3	3
15	Active participation: Students actively use PAKAPIN media during learning	3	4
Discussion and Reasoning			
16	Voice opinions: Students express their opinions independently about the function of the flower section	3	3
17	Reasoning: Students can explain the consequences if one of the parts of the flower does not work	4	4
18	Students respect other individuals' differences of opinion during class question and answer sessions	4	4
Conclusion and Reflection			
19	Conclusion: Students participated in drawing conclusions about the function of flowers	3	4
20	Positive response: Students show a positive attitude at the end of learning	4	4
Quantity		70	76
Prosentase		87,5%	95%

Based on the table of research results, student activity in cycle I showed a percentage of 87.5% with the category of excellent and had reached the set success indicators. This shows that the use of PAKAPIN media in the 4th grade science learning of MI Darul Muttaqin Gresik has been carried out very well, but its implementation still needs to be perfected so that the media can be used more optimally in supporting the learning process.

In cycle II, student activities experienced a satisfactory increase with a percentage of 95% and were included in the very good category. This increase shows that the use of PAKAPIN media is able to improve the quality of mathematics learning more effectively and in a targeted manner, so that student activities are in accordance with the indicators of research success and actions are stopped in cycle II.

The use of PAKAPIN media in learning IPAS on flower structure material has an impact on improving student learning outcomes. The increase can be seen through the results of the evaluation test in the form of multiple-choice questions and descriptions given by the teacher. The results of students' mathematics learning in fractional materials can be seen in cycle 1 and cycle 2 presented in the following table:

Table 3. Student Learning Outcomes in Cycle I and Cycle II

No	Student's Name	Score	
		Cycle I	Cycle II
1	An	45	65
2	Ay	85	90
3	Rah	50	75
4	On	75	80
5	Diz	80	95
6	Ca	75	75
7	Ra	75	80
8	Oc	95	100
9	Fre	75	80
10	Kev	75	80
11	Gio	55	75
12	Fer	50	65
Quantity		835	960
Average		69,58	80
Prosentase		66,60%	83%

Based on the results of the table, in cycle 1, student learning outcomes showed that learning completeness was still low with a processpercentage of 66.60%. Of all students, only 8 students have achieved learning completeness, while 4 students have not met the minimum completeness criteria. The average class score in this cycle was 69.58





which was included in the medium category, so the learning outcomes in the first cycle have not reached the success indicators and still need improvement in the next cycle.

In the second cycle, student learning outcomes experienced a very significant increase, with a percentage of 83%. A total of 10 students after achieving learning success and only 2 students have not completed. The average grade of the class increased to 80 with the category of excellent. With this achievement, the learning outcomes in cycle II have met the set success indicators, so that learning actions are stopped in this cycle.

The results of students' responses to IPAS learning through PAKAPIN media were observed and assessed using questionnaires that had been prepared in a directed manner. The results of student responses in cycles I and II can be presented in the following table:

Table 4. Students Response to the PAKAPIN in Cycle I and Cycle II

No	Student's Name	Score	
		Cycle I	Cycle II
1	An	81,6%	86,6%
2	Ay	85%	88,3%
3	Rah	91,6%	93,3%
4	On	86,6%	93,3%
5	Diz	93,3%	96,6%
6	Ca	88,3%	91,6%
7	Ra	50%	86,6%
8	Oc	86,6%	93,3%
9	Fre	88,3%	95%
10	Kev	88,3%	95%
11	Gio	61,6%	85%
12	Fer	75%	88,3%
	<i>Quantity</i>	835	976,2%
	<i>Average</i>	69,58	81,35%

Based on the table of research results, students' responses to learning IPAS flower structure materials using PAKAPIN media in the first cycle showed an average percentage of 81.35% and were in the very good category. These results indicate that students have responded very well to learning.

In cycle II, student responses experienced a very satisfactory increase with an average percentage of 91.07% and included in the very good category, this increase shows that the application of PAKAPIN media is able to increase student responses to the maximum, so that indicators of research success can be achieved.

DISCUSSION

The implementation of science learning using PAKAPIN showed an increase in teacher and student activities. The teacher plays the role of a facilitator who directs the course of learning, explains the purpose and steps of using media, and guides students in understanding the concept of fractions gradually. Teachers are also able to manage the classroom well so that learning takes place in a structured and conducive manner.

Student activities during learning are also very good. Students are actively involved in learning activities both individually and in groups, such as trying media, discussing, and answering questions from teachers. This active involvement creates an interactive and fun learning atmosphere, so that students are more excited to participate in learning. The increase in activities is in line with the results of the research Kusnindar, n.d. which explained that learning that is interactive and directly involves students can increase student participation and enthusiasm for learning during the learning process.

The use of fractional rotary wheel media has a positive impact on the learning outcomes of 4th grade students of MI Darul Muttaqin Gresik. This media helps students visualize abstract flower structure concepts into more concrete so that they are easy to understand. The results of the study showed an increase in student learning outcomes in each cycle. After learning improvements in cycle II, most students have reached the minimum completeness criteria (KKM). This is in line with research Solichah et al., (2023) It shows that concrete media helps students understand abstract fractional concepts more easily, thus having a positive impact on the achievement of their learning outcomes.

In addition to improving activities and learning outcomes, the use of PAKAPIN media also received positive responses from students. Students feel happy, interested, and more motivated in participating in social studies learning because the media used is interesting and easy to understand. This positive response has an impact on increasing students' interest and motivation to learn during the learning process. These findings are in line with research Raudah et al., (2024) which shows that the use of interactive media in learning can provide a positive response from students and increase interest and motivation to learn, because the media used is able to create an interesting and fun learning atmosphere for students.



CONCLUSION

The learning of science subjects about flower structure using the Smart Pocket Board (PAKAPIN) media has succeeded in improving the learning outcomes of fourth grade students of MI Darul Muttaqin Gresik. This increase can be seen from the active involvement of teachers and students as well as the improvement of student learning outcomes in each learning cycle. This evidence was obtained from the results of observations in cycle II, where teacher activity reached 95% and student activity also reached 95%, both values are included in the very good category. In addition, the student learning outcomes in cycle II showed a level of completeness of 83%, so that it met the indicators of research success. Thus, using PAKAPIN media not only helps to increase students' understanding of the concept of flower structures, but is also able to arouse the spirit of learning and increase student involvement in learning science. PAKAPIN media can be a creative alternative choice as a learning tool for other science and other subjects at the elementary level.

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