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IMPROVING COGNITIVE LEARNING OUTCOMES OF SCIENCE LESSONS THROUGH PROBLEM BASED LEARNING MODELS ASSISTED BY PUZZLES

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ABSTRACT

This study aims to determine the increase in cognitive learning outcomes of fifth grade students at SDN Sumobito 01 in science learning after learning classroom action. The research method used is descriptive quantitative method. The instruments used in this study were observation sheets and interview sheets as well as pretest and posttest question sheets. The assessment indicator set in this study is that student learning outcomes will be completed if they reach the target of 70%. So this research will be successful if the learning outcomes of students reach 70%. The results obtained are the learning outcomes of fifth grade students have increased by 11.6% from the first cycle. Where the learning mastery results in the first cycle are 65.3% and then increased in the second cycle with 76.9% mastery results. With an increase in mastery from cycle I to cycle II, it can be found that the use of Problem Based Learning (PBL) learning models using puzzle-based media in science subjects learning materials in humans can improve learning outcomes for fifth grade students at SDN Sumobito 01.

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A. Introduction

Education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have religious spiritual strength, self-control, personality, intelligence, noble character, and skills needed for themselves, society, and the nation (Mardiyana & Setyowati, 2017). The use of learning models is one of the teacher's efforts to create appropriate learning for students and the material being taught. The learning model used is expected to convey the material well to students. In the implementation of learning the teacher must know the various learning models and their application to students, thus the teacher will easily adapt the learning model to the characteristics of students in the classroom and the availability of facilities and infrastructure in schools.

The problem of the learning process that is currently often experienced is that teachers are unable to adapt the learning model used to the characteristics of the students being taught and the material being taught. The learning model used is less varied so that students are less interested in the learning that will be carried out. Especially in learning science in elementary schools. Science learning or Natural Sciences is a science that studies natural phenomena (Gunawan et al., 2017). In learning science, teachers are expected to use a learning model that emphasizes students on concrete problems so that students can connect the material with their daily lives. In addition, group learning is very necessary in the science learning process, this is done so that every student has the same understanding of the material.

Problem Based Learning is learning that uses real (authentic) problems and is open as a context for students to develop problem solving skills and build new knowledge (Ratnawati et al., 2020). PBL (Problem Based Learning) learning will be more effective if it is assisted by the use of learning media that aims to make it easier for students to understand the material. Learning media is a learning component that can facilitate the clarity of information conveyed by the teacher during learning so that the planned learning objectives can be achieved. The media used to make it easier for students to understand the material is puzzle. Puzzle media is a learning media in the form of a game of assembling pieces of pictures so that they become a complete picture (Nurrita, 2018).

Media puzzle is a game that is able to sharpen students' brains and requires accuracy in using them (Futihat et al., n.d.). Media puzzles allow them to think

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critically and work together in groups. Puzzle media also allows students to feel or do something directly (Utami et al., 2021). By working with other students they put together puzzle pieces that were originally random into whole again (Jannah & Albar, 2018).

Based on the results of interviews that the researcher conducted with the fifth grade teacher at SDN Sumobito 1, information was obtained that the science learning process carried out in grade V used the direct learning model, where the direct learning model itself is a learning model in which the material is delivered using the lecture or demonstration method. Thus it will allow the learning process carried out less attractive to students. The fifth grade teacher said that in the implementation of learning carried out sometimes using video media or the environment which was carried out individually. The fifth grade teacher also said that during the learning process, from 26 students in fifth grade there were some students who could understand the material well and some students did not understand the material well, so that the learning outcomes obtained by the students in the class could not be evenly distributed. Based on these problems the author will conduct research on improving learning outcomes through a problem based learning model with the help of class V puzzle media at SDN Sumobito 1.

B. Method

The research conducted is included in classroom action research or what is usually called CAR (Classroom Action Research). Class action research itself according to (Farhana et al., 2019) is a research activity with a classroom context that is carried out to solve learning problems faced by teachers, improve the quality and learning outcomes and try out new things in learning in order to improve the quality and learning outcomes. The research design model used is the research model design from Kemmis and Mc Taggart because this design is a design whose stages are considered easy. The instruments used in this research are interviews, observation, and documentation (Prihantoro & Hidayat, 2019). Improved learning outcomes using pretest and posttest which were conducted to determine the initial condition of the subject before and after being given treatment (Sugiyono, 2019). Learning in cycle I and cycle II is continuous and continuous, if in the previous cycle you get unsatisfactory results, it can be continued in the next cycle ((Indahyati, 2019).

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C. Result and Discussion

The use of media puzzles on the material "Human Pollution" in grade 5 students of SDN Sumobito 1 by using the Problem Based Learning learning model on 26 students with 12 female students and 14 male students obtained the results which will be discussed below.

1. Pre-Cycle

Before the researcher took the action, the researcher gave the students a pretest question on the "Human Digestion" material to determine the initial abilities of all fifth grade students at SDN Sumobito 01. Test is a technique or method used in carrying out activities measurement in which there are questions that must be done by students (Arifin, 2013). From the results of students working on the pretest, the following results were obtained:

Table 1. Pretest Results of Initial Ability

No.	Name	Roll Number	Pretest	Percentage of Achievement of Learning Outcomes	Completeness
1.	Anggun	01	60	60%	Not Complete
2.	Anugrah Dwi Agatha	02	60	60%	Not Complete
3.	Bayu Bagaskara Putra Pamungkas	03	90	90%	Complete
4.	Chika Marela Gita Anugrah	04	60	60%	Not Complete
5.	Farah Aufa Barsam	05	60	60%	Not Complete
6.	Fathkul Abdul Wachid	06	30	30%	Not Complete
7.	Ficko Ditian Dwi Purna	07	30	30%	Not Complete
8.	Fina Anggraini	08	40	40%	Not Complete
9.	Gonzales Afazila	09	50	50%	Not Complete
10.	Keisya Aprillia Putri Wintanuraini	10	60	60%	Not Complete
11.	Melinda Fitria	11	70	70%	Complete
12.	Syauqi	12	50	50%	Not Complete
13.	M. Jauhar Nehru	13	90	90%	Complete
14.	Muhammad Kiano Arsya Stevian	14	60	60%	Not Complete
15.	Vito	15	10	10%	Not Complete
16.	Najwa Aulia Rahmadani	16	30	30%	Not Complete
17.	Rahagi Al Adhan S.	17	30	30%	Not Complete
18.	Raizel Kafa Prosdinata	18	90	90%	Complete
19.	Rizky Syaifullah	19	30	30%	Not Complete
20.	Selvia Maharani	20	60	60%	Not Complete
21.	Indra	21	70	70%	Complete

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22	Zahira Nailatul Izza	22	70	70%	Complete
23.	Valerina Septianindyta	23	70	70%	Complete
24.	N. Safania F.	24	60	60%	Not Complete
25.	Yuanita Putri Timur	25	60	60%	Not Complete
26.	M. Athar R. N.	26	40	40%	Not Complete

Based on the results of working on the pretest questions, it was found that only 7 students had completed or met the school's KKM standards, meaning that the other 19 students were still incomplete. So it can be said that only 26.9% of students have completed and 73.1% of other students have not yet completed. The lowest score obtained is 10 and the highest score is 90. The average score obtained by students is 55.

2. Cycle I

Based on the results of class observations at the pre-cycle stage, it can be seen the initial abilities of students, therefore the researchers took action. The action in the first cycle of the researcher carried out learning in accordance with the syntax of the Problem Based Learning (PBL) learning model.

The results obtained after the researchers applied the learning model were outlined in the form of posttest questions in the first cycle, with the following results:

Tabel 2. Cycle I Posttest Results

No.	Name	Roll Number	Pretest	Percentage of Achievement of Learning Outcomes	Completeness
1.	Anggun	01	50	50%	Not Complete
2.	Anugrah Dwi Agatha	02	60	60%	Not Complete
3.	Bayu Bagaskara Putra Pamungkas	03	80	80%	Tuntas
4.	Chika Marela Gita Anugrah	04	60	60%	Not Complete
5.	Farah Aufa Barsam	05	80	80%	Complete
6.	Fathkul Abdul Wachid	06	80	80%	Complete
7.	Ficko Ditian Dwi Purna	07	70	70%	Complete
8.	Fina Anggraini	08	90	90%	Complete
9.	Gonzales Afazila	09	60	60%	Not Complete
10.	Keisya Aprillia Putri Wintanuraini	10	50	50%	Not Complete
11.	Melinda Fitria	11	60	60%	Not Complete
12.	Syauqi	12	40	40%	Not Complete
13.	M. Jauhar Nehru	13	80	80%	Complete
14.	Muhammad Kiano Arsya Stevian	14	60	60%	Not Complete
15.	Vito	15	60	60%	Not Complete
16.	Najwa Aulia Rahmadani	16	60	60%	Not Complete

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17.	Rahagi Al Adhan S.	17	30	30%	Not Complete
18.	Raizel Kafa Prosdinata	18	80	80%	Not Complete
19.	Rizky Syaifullah	19	30	30%	Not Complete
20.	Selvia Maharani	20	60	60%	Not Complete
21.	Indra	21	70	70%	Complete
22	Zahira Nailatul Izza	22	80	80%	Complete
23.	Valerina Septianindyta	23	40	40%	Not Complete
24.	N. Safania F.	24	70	70%	Complete
25.	Yuanita Putri Timur	25	60	60%	Not Complete
26.	M. Athar R. N.	26	40	40%	Not Complete

After doing the first cycle, the results showed that 9 students were declared complete and 17 students were declared incomplete with an average score of 69 students. The lowest score obtained was 30 and the highest score was 90. The percentage of completeness from cycle 1 was 65.3%. Based on observations made by colleagues, it was obtained several suggestions that needed to be improved, the first is that researchers need to use media that is more interesting and in accordance with the characteristics of students, so that students can better understand the material being taught. The next suggestion is that researchers should be more communicative in the learning process so that students will be more active in answering questions or asking model teachers. Through some suggestions from the observers, the researcher finally corrected this in cycle II.

3. Cycle II

To correct the deficiencies that occurred in the first cycle, then proceed to the second cycle stage. Research improvements in cycle II were carried out on changing the learning media used. In the first cycle, students were only presented with pictures to be observed, but the use of picture media according to the observer did not match the characteristics of the students in the class. Thus in the second cycle the researchers improved the learning media.

The existence of media is intended to make it easier to convey teaching materials from teachers to students (Marlina et al., 2021) The media that researchers use is in the form of a human digestive puzzle. According to (Syafitri et al., 2019), puzzle media has the advantage that it is able to stimulate students to be more active in participating in learning, has varied colors and pieces of images and will make it easier for teachers to convey material. Where in its use students are divided into 2 groups, students are directed to work together to adjust the function of the digestive organs and the images that have been given.

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At this stage the teacher continues to guide students in groups according to the syntax of the Problem Based Learning (PBL) learning model. According to (Astuti, 2019) mentoring individually or in groups, in pairs or in smaller groups is the essence of problem-based learning. The results of the group work were read out by one of the group representatives in front of the class, and it was proven that the results of the work of the 2 groups were all correct. In addition to improving the media used, the researchers also improved the way of teaching more communicatively. Researchers emphasize communication with students in learning. In the implementation of the second cycle, the following results were obtained:

Table 3 Posttest Results Cycle II

No.	Name	Roll Number	Pretest	Percentage of Achievement of Learning Outcomes	Completeness
1.	Anggun	01	100	100%	Complete
2.	Anugrah Dwi Agatha	02	80	80%	Complete
3.	Bayu Bagaskara Putra Pamungkas	03	100	100%	Complete
4.	Chika Marela Gita Anugrah	04	90	90%	Complete
5.	Farah Aufa Barsam	05	90	90%	Complete
6.	Fathkul Abdul Wachid	06	80	80%	Complete
7.	Ficko Ditian Dwi Purna	07	70	70%	Complete
8.	Fina Anggraini	08	80	80%	Complete
9.	Gonzales Afazila	09	70	70%	Complete
10.	Keisya Aprillia Putri Wintanuraini	10	70	70%	Complete
11.	Melinda Fitria	11	60	60%	Not Complete
12.	Syauqi	12	100	100%	Complete
13.	M. Jauhar Nehru	13	100	100%	Complete
14.	Muhammad Kiano Arsya Stevian	14	100	100%	Complete
15.	Vito	15	60	60%	Not Complete
16.	Najwa Aulia Rahmadani	16	60	60%	Not Complete
17.	Rahagi Al Adhan S.	17	40	40%	Not Complete
18.	Raizel Kafa Prosdinata	18	100	100%	Complete
19.	Rizky Syaifullah	19	40	40%	Not Complete
20.	Selvia Maharani	20	60	60%	Not Complete
21.	Indra	21	100	100%	Complete
22	Zahira Nailatul Izza	22	80	80%	Complete

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23.	Valerina Septianindyta	23	80	80%	Complete
24.	N. Safania F.	24	80	80%	Complete
25.	Yuanita Putri Timur	25	80	80%	Complete
26.	M. Athar R. N.	26	90	90%	Complete

Based on the results obtained in the second cycle, it can be seen that 20 students were declared complete and 6 others had not. The lowest score obtained is 40 and the highest score is 100. The average score obtained by students is 79.2. Furthermore, the percentage of completeness from cycle II is 76.9%

From these results, it can be said that the implementation of the actions in cycle II has been successful with the acquisition of results that have reached the targets set as indicators of research success, therefore the research was carried out only until cycle II.

An important benchmark in the learning process is to improve the learning outcomes of fifth grade students at SDN Sumobito 01. Through the Problem Based Learning (PBL) learning model with game-based puzzle media, learning objectives and learning outcomes can increase, besides that learning becomes more progressive. active. Based on the data analysis in this study, the increase in student learning outcomes can be seen in the following table:

Table 4. Percentage of Student Learning Outcomes Cycle I and Cycle II

No.	Cycle	Average	Completeness	
			Complete	Not Complete
1.	I	69%	65,3%	34,7%
2.	II	79,2%	76,9%	23,1%
Increasing		3,9%	11,6%	

The results in the table above show that student learning outcomes from cycle I to cycle II have increased. The average learning outcomes in the first cycle of 69 rose to 79.2 in the second cycle or an increase of 3.9%. Then the mastery of learning outcomes from 65.3% in the first cycle increased to 76.9% in the second cycle or an increase of 11.6%. Based on the results achieved by these students, it can be said that student learning outcomes in science learning material digestion in humans can be improved through the Problem Based Learning (PBL) learning model using puzzle media.

D. Conclusion

Based on the results of the study, it can be concluded that the learning outcomes of fifth grade students at SDN Sumobito 01 in learning the science of digestion in humans through the Problem Based Learning (PBL) learning model

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using puzzle-based learning media have increased. The learning outcomes of class V students increased by 11.6% from the first cycle. Where the results of learning mastery in the first cycle were 65.3% and then increased in the second cycle with 76.9% mastery results. With the increase in mastery from cycle I to cycle II, it can be concluded that the use of Problem Based Learning (PBL) learning models using puzzle-based media in science subjects with digestive materials in humans can improve learning outcomes for fifth grade students at SDN Sumobito 01.

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