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Improvement of Science Learning Result on Classification of Living Things through E-LKPD PjBL for Class VII Students

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Abstract

This study aims to test the application of PjBL-based E-LKPD can be an effective strategy in improving students' understanding of the concept of classification of living things and improving student learning result. This research is a classroom action research with a Quantitative approach. This design involves two cycles, each of which consists of four stages, namely planning, action implementation, observation, and reflection. The subjects of this study were students of class VII - G with a total of 30 students. The instruments used in this study were the developed E-LKPD PjBL, student activity observation sheets, and learning result tests. Based on the results of data analysis of student scores in Cycle 1, it was noted that 60% of students were categorized as complete, 40% of students were not complete. Cycle 2 results showed a significant increase in the percentage of student learning completeness, which reached 86.67% and 13.33% of students were not yet complete. Based on this, it can be concluded that E-LKPD PjBL can increase the value of science learning result on the material Classification of Living Things.

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INTRODUCTION

Classification of living things is an important foundation in learning natural science (IPA) (Yanseli et al., 2024). By understanding how living things are grouped based on similarities and differences in their characteristics, students can build a deeper understanding of biodiversity on earth. Classification not only helps students recognize and distinguish between different types of living things, but also allows them to understand kinship relationships between living things (Indriyati, 2019). Through the classification process, students are invited to think critically, analyze data, and develop observation skills that are very useful in studying other sciences (Widiya & Radia, 2023). In addition, the material of classification of living things also has broad implications in everyday life. An understanding of classification can help students in various fields, such as agriculture, medicine, and conservation. Thus, the material of classification of living things is not only important for students' cognitive development, but also has a high relevance in real life..

Low learning results of students on the classification of living things has become a concern in the world of education. Various studies and learning evaluations show that there are a number of challenges faced by students in understanding the basic concepts of classification (Insani, 2016). Empirical data shows that many students have difficulty in distinguishing morphological and anatomical characteristics that are the basis for grouping living things (Sholehah Pangsuma & Hidayat, 2023). In addition, students still often have problems in understanding the taxonomic hierarchy and kinship relationships between living things. This is reflected in the evaluation test results which show that the percentage of students who achieve competence in classification material is still relatively low. Some of the factors that contribute to this low learning result include the fact that classification material involves quite abstract concepts, such as taxonomy and phylogeny, which are difficult for students to visualize. The dominant use of the talking method and the lack of practicum activities make the lesson less interesting and effective (Andeka et al., 2021). All these factors together affect students' understanding of the classification of living things.

Conventional learning methods, which are often dominated by lectures and one-way distribution of information from teachers to students, have several significant shortcomings in the context of learning the classification of living things (Siregar, 2024). One of the main drawbacks is the lack of active student involvement. This method tends to make students passive, only listening and recording information without the opportunity to explore concepts independently (Tubagus et al., 2024). As a result, students' understanding of abstract concepts in classification becomes shallow and easily forgotten. In addition, conventional methods also pay little attention to differences in student learning styles. Not all students can absorb information well through lectures, so their learning potential is not optimal (Azizah & Widyartono, 2024). As a result, students' motivation to learn is low and the material learned is considered irrelevant. In addition, conventional methods also do not emphasize the development of critical thinking and problem-solving skills. In fact, these skills are very important to help students understand complex concepts in the classification of living things. Therefore, there is a need for innovation in learning methods to overcome these shortcomings and improve learning effectiveness.

E-LKPD (Electronic Learner Worksheet) based on Project Based Learning (PjBL) has great potential to overcome the problem of low student scores on the classification of living things. Various earlier research have shown positive results related to the use of PjBL-based E-LKPD in science learning. Several studies reported significant improvements in learning motivation, concept understanding, and critical thinking skills of students after using PjBL E-LKPDs (Nurcahyati et al., 2024). In addition, E-LKPD PjBL also proved effective in improving collaboration between students and problem solving skills (Lestari & Tsani, 2024). Other research results show that E-LKPD PjBL can facilitate more student-centered learning, so that students are more active in building their own knowledge.

Constructivism learning theory is the main foundation in the use of E-LKPD PjBL (Rukmana et al., 2024). This theory emphasizes that knowledge is actively constructed by individuals through experience and interaction with the environment. E-LKPD PjBL, with projects that require students to seek information, analyze data, and make decisions, is very much in line with the principles of constructivism. This study aims to test the implementations of PjBL-based E-LKPD can be an effective strategy in improving students' comprehension of the concept of classification of living things and improving student learning result. This

study will compare the learning result of students taught using E-LKPD PjBL with students taught using conventional methods to find out which method is more effective in improving mastery of the classification of living things. Given the low student learning result in the classification of living things, this study seeks to find alternative solutions through the application of E-LKPD PjBL to improve learning effectiveness.

RESEARCH METHOD

This research is a class action research with a Quantitative approaches. Classroom Action Research (PTK) with two cycles is a cyclic and participatory research approach, where researchers as teachers are directly involved in the process of improving learning in their classrooms (Nurlaela et al., 2023). This design involves two cycles, each of which consists of four stages, which are design, practice of action, observation, and reflection (Wahyuni et al., 2021). The subjects of this study were students of class VII - G with a total of 30 students. The instruments used in this study were the developed E-LKPD PjBL, student activity observation sheets, and learning result tests. The procedure of this study includes the planning stage, namely the development of E-LKPD PjBL and making lesson plans. The second stage is the practice of action stage which consists of implementing learning using E-LKPD PjBL, observation, and tests. The third stage is the observation stage in the form of data analysis of observation and test results. And the last stage is the reflection stage which is an evaluation of the learning that has been done and planning improvements for the next cycle.

Data analysis techniques are carried out by processing data on student learning result obtained from the results of formative tests in the form of multiple choice questions of ten items. Student test results at the end of each cycle are processed by giving a score to each correct item. The test results are expressed in a score range of 0 - 100, the lowest score is 0 and the highest score is 100. After obtaining the score of all students' learning result, then categorized into the completeness of learning result based on the Minimum Completeness Criteria (KKM) in the SMP studied, categorized as having been completed in learning if students score ≥ 73.

Table 1 *Category of Students Score Based On KKM*

Student Score	Category
91 – 100	Completed
81 – 90	Completed
74 – 80	Completed
≤ 73	Uncompleted

Determining student grades with the formula:

$$P = \frac{T}{n} \times 100\%$$

Description:

P = Percentage of Learning Completeness

T = Many Students Complete Learning

n = Number of Students

RESULTS AND DISCUSSION

In classroom action research in the first cycle, it consists of activities to design corrective actions, implement them, observe their impact, and then reflect on the results obtained (Yeni et al., 2020). The results of this reflection become the basis for planning the second cycle, in which the corrective actions are refined.

Thus, PTK with two cycles allows researchers to keep improving the learning quality and achieve the set goals. The advantages of this design are its flexibility in responding to dynamic classroom conditions and its ability to produce relevant findings that can be directly applied in learning practices. Classroom action research conducted in class VII-G on science subjects on Classification of Living Things was carried out offline. The results of the research in cycle 1 can be seen in the table below.

Results of Students Score in Cycle 1

Table 2 *Result of Sutdent Score in Cycle 1*

Number	Students score	Category
1.	70	Uncompleted
2.	90	Completed
3.	70	Uncompleted
4.	80	Completed
5.	90	Completed
6.	70	Uncompleted
7.	100	Completed
8.	60	Uncompleted
9.	90	Completed
10.	90	Completed
11.	60	Uncompleted
12.	100	Completed
13.	70	Uncompleted
14.	60	Uncompleted
15.	70	Uncompleted
16.	70	Uncompleted
17.	90	Completed
18.	80	Completed
19.	90	Completed
20.	70	Uncompleted
21.	90	Completed
22.	70	Uncompleted
23.	80	Completed
24.	80	Completed
25.	80	Completed
26.	70	Uncompleted
27.	80	Completed
28.	90	Completed
29.	90	Completed
30.	80	Completed

Description:

Number of students with completed grades = 18 students

Number of students with unfinished scores = 12 students

Total number of students = 30 students

From the score data based of Table 2, data analysis was carried out by calculating the percentage of student score completeness in cycle 1 with the formula below:

$$P = \frac{T}{n} \times 100\%$$

Description:

P = percentage of Learning Completeness

T = Many Students Complete Learning

n = Number of Students

Percentage of student scores completed in cycle 1

$$P = \frac{18}{30} \times 100\%$$

$$P = 0{,}6 \times 100\%$$

$$P = 60\%$$

Percentage of uncompleted student scores in cycle 1

$$P = \frac{12}{30} \times 100\%$$

$$P = 0{,}4 \times 100\%$$

$$P = 40\%$$

Table 3 *Result Data Category of Cyle 1*

Number	Category	Frequency	Percentage (%)
1.	Completed	18	60%
2.	Uncompleted	12	40%

Based on Table 3. the results of analyzing student score data in cycle 1, it was noted that 60% of students had reached the criteria for learning completeness. Meanwhile, the other 40% of students were still classified as Uncomplete in achieving the learning objectives that had been set. The percentage of students who have not completed this indicates that there are several obstacles in the learning process that need to be identified and addressed. The high percentage of students who have not completed this can be a starting point for evaluating the learning strategy that was applied in Cycle 1 (Azhariyah H. F., 2018). It was identified that one of the main factors causing the low level of student achievement was the lack of understanding of the steps contained in the PjBL e-LKPD. This resulted in difficulties for students in completing the tasks given, including formative tests. Some factors that may be the main cause include: (1) Lack of clarity of instructions: The instructions in the e-LKPD may be too complex or ambiguous so that students have difficulty interpreting what is expected of them. (2) Lack of concept understanding: Students have not mastered the basic concepts related to the learning material, making it difficult to apply them to project tasks. (3) Lack of teacher support: Teachers may not have provided sufficient guidance to students in using e-LKPDs, especially for students who experience difficulties.

To overcome these problems, some reflections need to be done in the second cycle. First, the e-LKPD needs to be improved by simplifying the language, providing more concrete examples, and using clearer visualizations. In addition, it is necessary to adjust the level of difficulty of the tasks to suit students' abilities. Second, the teacher's role as a facilitator needs to be improved. Teachers can provide individual or group guidance to students who are experiencing difficulties, as well as create a conducive learning atmosphere to encourage active student participation (Kartika & Arifudin, 2024). Third, learning evaluations need to be conducted more frequently to monitor the development of students' understanding and provide constructive feedback. Thus, it is expected that students can better understand the steps in the PjBL e-LKPD and reach the learning goals that have been set.

Results of Students Score in Cycle 2

Table 4 *Results of Students Score in Cycle 2*

Number	Students Score	Category
1.	90	Completed
2.	90	Completed
3.	80	Completed
4.	80	Completed
5.	100	Completed
6.	70	Uncompleted
7.	100	Completed
8.	70	Uncompleted
9.	100	Completed
10.	100	Completed
11.	70	Uncompleted
12.	100	Completed
13.	90	Completed
14.	70	Uncompleted
15.	80	Completed
16.	90	Completed
17.	100	Completed
18.	90	Completed
19.	100	Completed
20.	80	Completed
21.	90	Completed
22.	80	Completed
23.	90	Completed
24.	100	Completed
25.	80	Completed
26.	90	Completed
27.	90	Completed
28.	100	Completed
29.	100	Completed
30.	80	Completed

Description:

Number of students with completed grades = 26 students

Number of students with unfinished scores = 4 students

Total number of students = 30 students

From the score data based on Table 4, data analysis was conducted by calculating the percentage of

student score completeness in cycle 2 with the formula below:

$$P = \frac{T}{n} \times 100\%$$

Description:

P = percentage of Learning Completeness

T = Many Students Complete Learning

n = Number of Students

Percentage of student scores completed in cycle 2

$$P = \frac{26}{30} \times 100\%$$

$$P = 0{,}8667 \times 100\%$$

$$P = 86{,}67\%$$

Percentage of student scores uncompleted in cycle 2

$$P = \frac{4}{30} \times 100\%$$

$$P = 0{,}1333 \times 100\%$$

$$P = 13{,}33\%$$

Table 5 *Result Data Category of Cycle 2*

Number	Category	Frequency	Percentage (%)
1.	Completed	26	86,67%
2.	Uncompleted	4	13,33%

Based on Table 5. the results of data analysis in cycle 2 showed a significant increase in the percentage of student learning completeness, which reached 86.67%. This figure has increased significantly compared to the previous cycle. This increase indicates that the improvement efforts made based on the evaluation results in cycle 1 has a positive effect on the learning process. The increase in the percentage of completeness can be attributed to several factors, one of which is the reflection conducted on the e-LKPD. Reflections that include simplifying language, providing more concrete examples, and using clearer visualizations have contributed to improving students' understanding of learning materials (Negretti & McGrath, 2018).

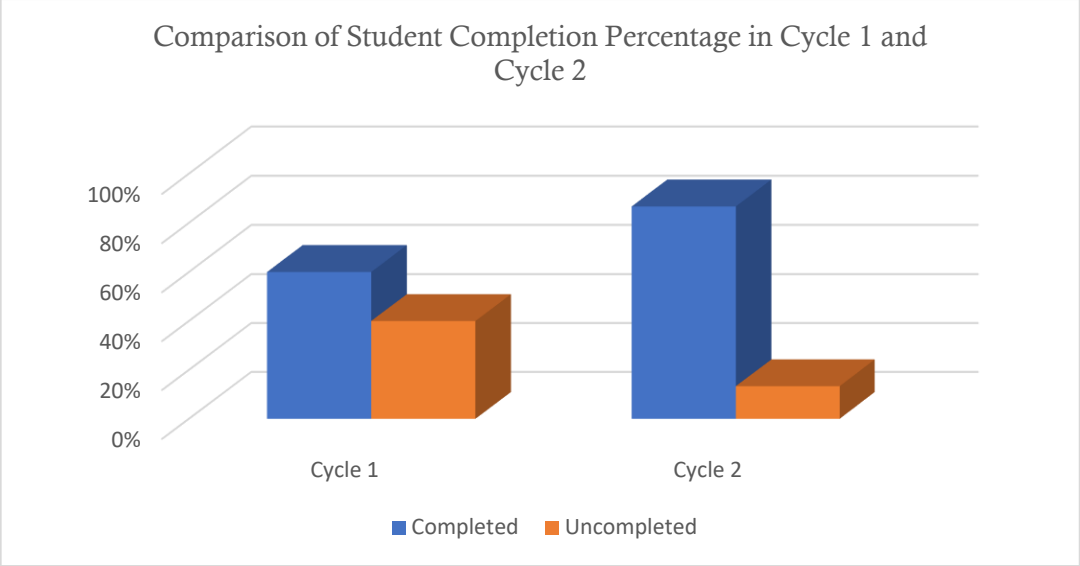

Figure 1 *Comparison of Student Completion Percentage in Cycle 1 and Cycle 2*

The increase in the percentage of student learning completeness in cycle 2 can be explained as follows. First, the simplification of language in the e-LKPD made the learning material easier for students to understand, thus reducing the obstacles experienced by students in interpreting instructions. Second, the provision of more concrete examples helps students in connecting abstract concepts with real situations, thus strengthening their understanding. Third, the use of clearer visualizations makes the learning material more interesting and interactive, thus increasing students' learning motivation. The combination of these three factors has created a more conducive learning environment for students to actively engage in the learning process and achieve the learning goals that have been set (Juliya & Herlambang, 2021). Based on Figure 1, it can be concluded that the reflection carried out on the e-LKPD has made a significant contribution to improving student learning result.

By combining the flexibility of digital technology and a student-centered learning approach, PjBL e-LKPDs can provide a more interactive and meaningful learning experience. Through well-designed projects, students can be actively engage in the lesson process, starting from formulating research questions, collecting data, analyzing information, to presenting work results (Fadilasari et al., 2024). This media not only helps students understand classification concepts more deeply, but also develops critical thinking, communication, and collaboration skills that are needed in the 21st century (Endaryati et al., 2021). In addition, E-LKPD PjBL can also overcome some of the shortcomings of conventional learning methods. By utilizing various interactive features such as videos, simulations, and quizzes, PjBL E-LKPDs can make classification material more interesting and easy to understand (Ramadhani et al., 2023). In addition, E-LKPD PjBL can also be adapted to the learning style of each student, so that each student can learn optimally (Martatiyana et al., 2024). Based on this, it can be concluded that E-LKPD PjBL can increase the value of science learning result on the material Classification of Living Things.

CONCLUSION

Based on the results of analyzing student score data in Cycle 1, it was noted that 60% of students had reached the learning completeness criteria, 40% of other students were still classified as Uncomplete in achieving the learning objectives that had been set. It was identified that one of the main factors causing the low level of student achievement was the lack of understanding of the steps contained in the PjBL e-LKPD. The results of data analysis in cycle 2 showed a significant increase in the percentage of student learning

completeness, which reached 86.67% and 13.33% of students were not complete. Reflections that include simplifying language, providing more concrete examples, and using clearer visualizations have contributed to improving students' understanding of learning materials. Based on this, it can be concluded that E-LKPD PjBL can increase the value of science learning result on the material Classification of Living Things.

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