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# EFFECTIVENESS OF PROBLEM SOLVING BASED LEARNING MODEL IN THE 21ST CENTURY IN IMPROVING CREATIVITY AND SCIENCE LEARNING OUTCOMES OF GRADE IV STUDENTS

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**ABSTRACT**

*This study aims to determine: (1) The application of the Problem Solving learning model based on 21st century learning in science learning for grade IV students of SD Negeri 1 Mbeleang. (2) How the Problem Solving learning model based on 21st century learning can improve the creativity and science learning outcomes of grade IV students of SD Negeri 1 Mbeleang. This study uses Classroom Action Research (CAR) with two cycles. Data collection techniques use learning outcome tests and observation sheets, analyzed quantitatively and qualitatively. The subjects of the study were 13 grade IV students, consisting of 5 boys and 8 girls. The results of the study showed an increase in the effectiveness of the Problem Solving learning model based on 21st century learning in improving creativity and learning outcomes with the average value of student learning outcomes increasing from 65.85% in cycle I to 79.69% in cycle II. Students' creativity also increased, with 2 students (15.38%) classified as very good, 8 students (61.54%) classified as good, and 3 students (23.07%) classified as sufficient in cycle II. The researcher concluded that the problem-solving model based on 21st century learning can improve creativity and learning outcomes of fourth grade students.*

## 1. INTRODUCTION

Education is defined as an effort to develop the quality of human personality and build national character based on religious, philosophical, psychological, socio-cultural and science and technology values that lead to the formation of human personalities who are moral, have good character, and are noble. Education can also be defined as an effort to develop human resources who have national idealism and professional excellence and competence that can be utilized for the benefit of the nation and state (Topan, 2021). Education is a continuous and never-ending process, so that it can produce

sustainable quality, aimed at realizing the figure of a future human being and rooted in the values of the nation's culture and Pancasila (Amanah, Setiawan, & Jusmaniar, 2023).

According to Natawidjaja ( dalam Nofrion, 2019). The formal and operational basis of education can be found in the Republic of Indonesia Law Number 20 of 2003 concerning the National Education System, Article 1 paragraph 1 states that: Education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have spiritual religious strength, self-control, personality, intelligence, noble morals, and skills needed by themselves, society, nation and state.

The law provides the concept that education is a process of personal formation which is interpreted as a systematic and directed activity towards the formation of the personality of students. With knowledge, one can elevate one's status and glory. This is in line with the word of Allah in the Qur'an, Surah Al-Mujadillah, verse 11.

يٰٓاَيُّهَا الَّذِيْنَ اٰمَنُوْٓا اِذَا قِيْلَ لَكُمْ تَفَسَّحُوْا فِى الْمَجٰلِسِ فَافْسَحُوْا يَفْسَحِ اللّٰهُ لَكُمْۚ وَاِذَا قِيْلَ انْشُزُوْا فَانْشُزُوْا يَرْفَعِ
اللّٰهُ الَّذِيْنَ اٰمَنُوْا مِنْكُمْۙ وَالَّذِيْنَ اُوْتُوا الْعِلْمَ دَرَجٰتٍۗ وَاللّٰهُ بِمَا تَعْمَلُوْنَ خَبِيْرٌ

Translation: O you who believe, if it is said to you: "Make room in the assemblies", then make room, surely Allah will give you space. And when it is said: "Stand up," surely Allah will elevate (the degree of) those who believe among you and those who have been given knowledge to a certain degree. And Allah SWT knows best what you do (Agama, 2014).

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Education has a very important role in creating quality human resources (HR). The education commission expressly stated that it would be able to contribute to the complete development of each person, body and soul, intelligence, sensitivity, sense of ethics, personal responsibility and spiritual values (Setiawan, 2017). Based on these principles, it is hoped that learning in schools can equip children from an early age with the ability to think, critically, creatively and in terms of the ability to work together. Learning is a natural process for everyone as a result of memory, cognition and metacognition which influence understanding (Huda, 2013).

The goal of education according to Law No. 20 of 2003 concerning the National Education System, article 3, the goal of national education is to develop students' potential to become human beings who believe in and fear God Almighty, are creative, independent, and become democratic and responsible citizens (Pelawi j tyson, Idris, & Is M Fadhlan, 2021).

The general goals of education relate to all educational events and perfect ideals of humans or society. The general goal of education is the goal of all types of activities and thei timei during which eiducational eiveints takei placei. Thei aim of eiducation is orieinteid towards creiating peirfeict humans, maturity, humans with characteir and social morals, compleitei humans and so on (Citriadin, 2014).

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Education (IPAS) is a scientific discipline whose specifications play a role in realizing the Pancasila Profile as a perfect one that reflects the profile of Indonesian students. Natural and Social Sciences (IPAS) is a simplification of natural science and social science subjects. So (IPAS) has two elements, namely (science and social), namely science which includes the interaction of living things and inanimate objects in the universe, as well as the interaction of human life as individual creatures and social creatures with their environment. In understanding environmental phenomena, elementary school students are in the concrete, simple, holistic and comprehensive thinking stages. In learning

science (science) or natural science (IPA), students are focused on simplifying science material which is expected to trigger students to understand the natural environment around them. Natural sciences are a group of sciences that have the characteristics of studying factual natural phenomena, namely in the form of events or realities and cause and effect relationships Wisudawati & Sulistyowati ( dalam Cahyani, 2023).

Education on learning natural and social sciences (IPAS) in elementary schools (SD) can improve basic science literacy skills and build students' abilities in understanding the relationship between natural phenomena and social life.

Based on the results of observations and interviews with class IV homeroom teachers conducted by researchers on December 25 2023 at SDN 1 Mbeleang, students' creative thinking abilities still do not meet the criteria for creativity, supported by the results obtained by information that students do not yet have the ability to develop and detail an idea or idea, nor are they able to express opinions spontaneously and without shyness, and student learning outcomes in thematic learning, especially in Natural and Social Sciences (IPAS) subjects are still relatively low or do not reach the criteria standards. Negligible Completeness (KKTP) is 75. From the results of observations made in class IV, the teaching and learning process has not been implemented optimally, so the learning objectives have not been achieved. Based on observations, this occurs because: masters rarely carry out variations in learning, apart from that masters rarely apply innovative learning models, there is no reciprocity between students and masters during the teaching and learning process, there is a lack of supportive learning media, masters rarely provide opportunities for students to strive for students' problem-solving abilities, both in the learning process and in providing practice questions, evaluations that emphasize the problem-solving process.

21st century learning is student-centered learning, meaning learning that provides greater opportunities for students to construct knowledge independently and mediated by peers. As professionals, teachers are required to be able to validate their knowledge, either through self-study or autodidactically or through training and development programs institutionalized by the government or society (Afni, Wahid, Hastati, Jumrah, & Mursidin, 2021).

Learning in the 21st Century emphasizes learning that allows students to develop their curiosity, teaches skills that are useful for students' future lives and allows them to work collaboratively in solving various problems. Thus, through learning students are expected to have various skills such as creative thinking, critical thinking, problem solving, communication and collaboration (Nisa, 2019).

Based on existing problems, changes need to be made which will be designed in such a way that they can overcome these problems. The solution needed is the use of learning shows that can improve student learning outcomes, namely by using issue solving learning shows.

The issue understanding learning show is a demonstration that emphasizes group work which focuses on learning and problem solving skills followed by the strength of thinking skills. This issue tackling learning show can be used as a fun learning show for students. Students tend to be challenged by participating in the learning process, because this show can familiarize students with skillful problem solving, and stimulate the development of students' thinking abilities creatively and comprehensively with various activities (Aris Shoimin, 2017).

The advantages of the problem solving learning model include the following:

1) Can make students more aware of everyday life

2) Can train and accustom students to face and solve problems skillfully
3) Can develop students' ability to think creatively
4) Students have begun to be trained to solve their problems
5) Train students to design a meeting
6) Think and act creatively
7) Solve problems faced realistically
8) Identify and conduct investigations
9) Interpret and evaluate observation results (Ummah, 2019).

Based on the opinion above, it can be concluded that the advantage of the problem solving model is that it invites students to think, not only just listen but also analyze problems, and find solutions to solve problems.

The use of problem solving learning models is expected to have an impact on student learning outcomes and increase student creativity in the learning process. By getting students used to solving problems creatively, it is expected to help students overcome various difficulties related to science to improve learning outcomes.

## 2. METHODS

The type of research used by the researcher is classroom action research. Classroom action research comes from English, namely, Classroom Action Research, which means action research carried out by teachers in their own classes through self-reflection, with the aim of improving their performance as teachers so that student learning outcomes increase (Wardah, 2020). This classroom action research is carried out to plan, implement and then observe the impact of the implementation of these actions on the research subjects. Classroom action research is carried out through two cycles of action where each cycle consists of the planning stage, implementation of actions, observation and reflection to make decisions in the implementation of the next cycle.

Classroom action research according to (Arikunto & Suhardjono, 2021), Classroom Action Research (CAR) is a combination of the meaning of the words "researcher, action, and class. Research is an activity of observing an object, using certain methodological rules to obtain data that is useful for researchers and others for the common good. Furthermore, action is a treatment that is deliberately applied to an object with a certain purpose which in its application is arranged into several periods or cycles. While the class is a place where a group of students learn together from a teacher in the same period.

The approach chosen in the study is a descriptive quantitative approach. The descriptive quantitative approach systematically describes the facts and characteristics of the objects and subjects studied precisely (Adil, 2023). This approach was chosen to describe the activities of students and teachers in implementing learning actions to improve creativity and student learning outcomes through the problem solving learning model in supporting 21st century learning in grade IV students of SDN 1 Mbeleang.

This research was conducted at SD Negeri 1 Mbeleang, the location of this research was chosen because there are still teachers who have not used 21st century learning performances, especially demonstrating problem-solving learning. The subjects in this study were students and homeroom teachers of grade IV at SD Negeri 1 Mbeleang semester 1 of the 2024/2025 academic year totaling 13 students. The researcher considered choosing grade IV as the research subject because students' learning abilities were still passive and student learning outcomes in thematic learning, especially in

the Natural and Social Sciences (IPAS) subjects, were still relatively low or had not reached the Learning Objective Completion Criteria (KKTP) standard, namely 75. Therefore, the application of 21st century learning performances, especially demonstrating problem-solving learning, to improve the creativity and science learning outcomes of grade IV students at SDN 1 Mbeleang.

## 3. RESULT AND DISCUSSION

### RESEARCH RESULTS:

The research showed an increase in creativity and learning outcomes of IPAS IV SD Negeri 1 Mbelang. The results and analysis of the two cycles of this research are described as follows: The test results were given to students after the first cycle and the second cycle, observing during the action of each cycle.

Observation activities were carried out simultaneously with the implementation of learning process activities, this observation was carried out by the fourth grade teacher of SD Negeri 1 Mbeleang, namely Sri Hastina S.Pd as an observer using an observation sheet that had been made by the researcher. The things observed were:

1. Observation of Teacher Activities cycle I

   Teacher activities during the learning process were carried out using the Problem Solving learning model which was carried out in two meetings and observed by observers, the results of observing teacher activities are presented in table 4.1 below:

Table 3.1 Results of Teacher Activity Observations Toward Learning Activities Through the Problem Solving Model at Meetings 1 and 2 Cycle I

| Indicator Implementation | Cycle I | | | |
|---|---|---|---|---|
| | meeting 1 meeting 2 | | meeting 1 meeting 2 | |
| | **Yes** | **No** | **Yes** | **No** |
| Score Acquisition | **10** | **6** | **11** | **5** |
| Presentation | **62,5%** | **37,5%** | **68,75%** | **31,25%** |
| Maximum Score | **16** | | **16** | |

Based on table 3.1 above, it can be seen that the percentage of teacher activity in cycle 1 which consists of two meetings, namely the first meeting of 10 or 62.5% which was carried out from the introduction, core and closing kagitain, while those that were not carried out from the introduction, core and closing activities, amounted to 6 or 37.5%. In the second meeting, it increased by 11 or 68.75% which was carried out from the introduction, core and closing kagitain, while it was not carried out from the introduction, core and closing kagitain, by 5 or 31.25%.

Figure 1. This is the learning process at meetings 1 and 2 of cycle I.


2. Observation of Student Learning Creativity Cycle I

Table 3.2 Observation Results of Student Learning Creativity in Cycle I

| N O | Category | Interval | Frequency | % Student |
|---|---|---|---|---|
| 1 | Very Good | ≥ 85 | - | - |
| 2 | Good | 70-84 | - | - |
| 3 | Enough | 60-69 | 6 | 46,15 |
| 4 | Poor | < 60 | 7 | 53,86 |
| **Amount** | | | **13** | **100%** |

Processed from research data 2024

During the learning process, in addition to observing teacher activities, the observer also observed students' learning creativity during the meeting in cycle 1. Based on the research data, it can be seen that the percentage of student creativity is 6 students or 46.15% of students who fall into the sufficient category while those in the less category are 7 students or 53.86%, creativity improvements are made in cycle II.

3. Evaluation IPAS Learning Outcomes in Cycle I

Evaluation is held at the end of the learning cycle of cycle 1, this is done to see the success of learning that has been carried out for 2 meetings and to measure the extent to which students' ability to understand a concept in learning after the teacher applies the Problem Solving learning model. The following are the results of the analysis of the student cycle test in cycle 1 can be seen in table 3.3 belo

Table 3.3 IPAS Learning Outcomes in Cycle I

| NO | Category | Interval | Frequency | Score Weight | % Student | Average |
|---|---|---|---|---|---|---|
| 1 | Very Good | ≥ 85 | - | - | - | 65,85% Good Category |
| 2 | Good | 70-84 | 4 | 308 | 30,77 | |
| 3 | Enough | 60-69 | 6 | 398 | 46,15 | |
| 4 | Poor | < 60 | 3 | 150 | 23,07 | |
| **Amount** | | | **13** | **856** | **100%** | |

Processed from research data 2024

Based on table 3.3 above, it is known that the average value of student learning outcomes in cycle I using the Problem Solving model is 65.85% in the poor category. Of the 13 students there were 4 students or 30.77% who got good grades. Students who get enough categories are 6 students or 46.15% while the category is less as many as 3 or 15.07%. Judging from the average value of student learning outcomes, there were 4 students who achieved KKTP and 9 students who did not achieve KKTP in cycle I, learning improvements were made in cycle II.

4. Reflection

At this reflection stage, the reflection stage is carried out through planning, implementation and observation stages at this reflection stage to find out whether there is an increase in cycle 1 with the initial conditions of previous learning. This can be seen from the increase in student learning outcomes after the research and teachers collaborated and discussed with data obtained from the implementation activities and the observation stage of student activities in cycle 1 as a whole is quite good. It's just that in terms of student activity in asking questions it is still lacking, in understanding the problem it is still lacking, there are still many students who are embarrassed to express their answers or opinions. In addition, in cooperation with their groups there are still students who do not want to work together with their groups and they prefer to play. Students still do not understand the learning process considering that the Problem Solving learning model has only just been used so that teachers need to improve in the next cycle II.

1. Observation of Teacher Activities cycle II

CTeacher activities during the learning process were carried out using the Problem Solving learning model which was carried out in two meetings and observed by the observer, the results of observing teacher activities are presented in table 3.4 below:

Table 3.4 Results of Teacher Activity Observations of Learning Activities Through the Problem Solving Method at Meetings 1 and 2 cycle II

| Indicator Implementation | Cycle II | | | |
|---|---|---|---|---|
| | meeting 1 meeting 2 | | meeting 1 meeting 2 | |
| | **Yes** | **No** | **Yes** | **No** |
| Score Acquisition | 14 | 2 | 15 | 1 |
| Percentage | 87,5% | 12,5% | 93,75% | 6,25% |
| Maximum Score | **16** | | **16** | |

Processed from research data 2024

Based on table 3.4 above, it can be seen that the percentage of teacher activity in cycle 1 which consists of two meetings, namely the first meeting of 14 or 87.5% which was carried out from the introduction, core and closing kagitain, while those that were not carried out from the introduction, core and closing kagitain, amounted to 2 or 12.5%. In the second meeting, it increased by 15 or 93.75%, which was carried out from the introduction, core and closing kagitain, while it was not carried out from the introduction, core and closing kagitain, by 1 or 6.25%.

Figure 2. This is the learning process at meetings 1 and 2 of cycle II


2. Observation of Student Learning Creativity Cycle II

Table 3.5 Observation Results of Student Learning Creativity in Cycle II

| NO | Category | Interval | Frequency | % Student |
|---|---|---|---|---|
| 1 | Very Good | ≥ 85 | 2 | 15,38 |
| 2 | Good | 70-84 | 8 | 61,54 |
| 3 | Enough | 60-69 | 3 | 23,07 |
| 4 | Poor | < 60 | | - |
| **Amount** | | | **13** | **100%** |

Processed from research data 2024

Based on the research data in cycle II, it can be seen that the percentage of student creativity shows an increase compared to cycle I, the value in the very good category increased to 2 students or 15.38%, the value in the good enough category increased to 8 students or 61.53%, and the value in the sufficient category increased to 3 students or 23.07%.

3. Evaluation IPAS Learning Outcomes in Cycle II

After using the Problem Solving learning model on the material concept of getting to know roots further and the benefits of plants for humans which was carried out in two meetings, then an evaluation was carried out at the end of the cycle II test action in the form of a written test in the form of a description. This evaluation was carried out after the cycle II meeting which aimed to determine the extent to which the learning was successful in improving students' understanding of thinking concepts. The following are the results of the student test analysis in cycle II which can be seen in table 3.6 below

Table 3.6 IPAS Learning Outcomes in Cycle II

| NO | Category | Interval | Frequency | Score Weight | % Student | Average |
|---|---|---|---|---|---|---|
| 1 | Very Good | ≥ 85 | 5 | 442 | 38,46 | 79,69% Less Category |
| 2 | Good | 70-84 | 5 | 391 | 38,46 | |
| 3 | Enough | 60-69 | 3 | 203 | 23,07 | |
| 4 | Poor | < 60 | - | - | - | |
| **Amount** | | | **13** | **1,036** | **100%** | |

Processed from research data 2024

Based on table 3.6 above, the average value of students' science learning outcomes using the Problem Solving model is 79.69%. This shows an increase compared to the average value in cycle I, the value with the very good category increased to 5 students or 38.46%, the value with the good category increased to 5 students or 38.46% and the value with the sufficient category increased to 3 students, or 23.07%. Judging from the average value of student learning outcomes, it increased to 9 students who achieved KM and 3 students who did not achieve KM.

4. Reflection

The results of teacher teaching observations using the Problem Solving learning model in each cycle showed a very significant increase, namely in cycle I, although there were still many shortcomings in the use of the Problem Solving learning model. Then in cycle II, teacher teaching activities using the Problem Solving learning model increased as expected.

The results of observations of student activities in each cycle increased. This can be seen in cycle I where many students still played around in the learning process, paid less attention to problems, asked less questions, worked less together in groups, and were less diligent in doing the tasks given by the teacher. In cycle II, observations of student activities increased, this can be seen from students looking active, interested in the learning carried out, willing to work together and discuss with their groups in working on LKPD.

In a structured manner, the percentage of completion of the results of each cycle in cycles I and II for class IV students at SD Negeri 1 Mbeleang can be seen in Figure 3.1

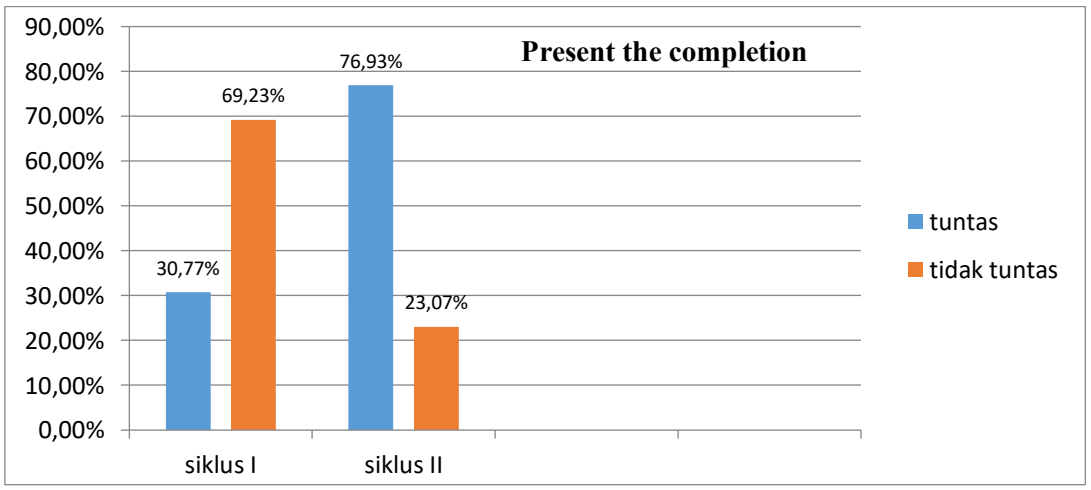


Figure: 3 Graph of Learning Outcome Completion Percentage

Based on Figure 3. above, it is known that in cycle I, 4 students completed the test with a percentage of 30.77%, while 9 students did not complete the test with a percentage of 69.23%. From the test results in cycle I, it was said to be unsuccessful because students had not obtained a score of 75% based on the established success indicator benchmark, so it was continued in cycle II.

**DISCUSSION :**

Based on data from the results of learning cycles I and II, it is proven that fourth grade students of SD Negeri 1 Mbeleang have the ability to solve problems better by using the Problem Solving learning model. This study focuses on.

1. Implementation of the Problem Solving Learning Model based on 21st Century Learning in Science Learning for Fourth Grade Students of SD Negeri 1 Mbeleang.

Based on the observation results, it can be seen that the percentage of teacher activity in implementing the 21st century-based Problem Solving learning model in science learning for grade IV students of SD Negeri 1 Mbeleang in cycle I which consists of two meetings. In the first meeting it was 10 or 62.5%, while the second meeting increased by 11 or 68.75%. In cycle II, the percentage of application increased significantly, namely in the first meeting it was 14 or 87.5% while in the second meeting it increased by 15 or 93.75%.

Thus, teacher activity in implementing the 21st century-based Problem Solving learning model in science learning for grade IV students of SD Negeri 1 Mbeleang has increased. The implementation of learning using the 21st century-based Problem Solving learning model is seen as making students more active in learning so that students will find it easier to learn so that students can understand the concepts taught. In addition, students can also develop thinking skills and can learn from other students and share their ideas with each other.

2. The 21st century-based Problem Solving learning model can increase the creativity of fourth grade students of SD Negeri 1 Mbeleang.

Based on the observation results, it can be seen that the percentage of student creativity in cycle I was 6 students or 46.15% of students who were in the sufficient category, while those in the less category were 7 students or 53.86%, while the observation results in cycle II showed that the percentage of student creativity showed an increase compared to cycle I, the value with the very good category increased to 2 students or 15.38%, the value with the good enough category increased to 8 students or 61.53%, and the value with the sufficient category increased to 3 students or 23.07. This shows an increase in student creativity in the Problem Solving learning model based on 21st century learning towards the creativity of grade IV students of SD Negeri 1 Mbeleang.

3. Problem Solving Learning Model can improve Science Learning Outcomes of Grade IV Students of SD Negeri 1 Mbeleang.

Based on the results of the study, science learning with the application of the Problem Solving learning model in grade IV of SD Negeri 1 Mbeleang on the science learning outcomes of grade IV students, this is evidenced by the value of the completion of science learning outcomes achieved by students after the application of the Problem Solving learning model in cycle I reached 4 students or 30.77% who obtained good or complete scores and 9 students or 69.23% who did not achieve KM, while in cycle II 10 students or 76.94% who achieved KKTP and 3 students or 23.07% who did not achieve KKTP, these results indicate that student learning outcomes have increased before being taught using the Problem Solving learning model.

The implementation of the Problem Solving learning model is intended to assist teachers in teaching the material and assist students in understanding the material being studied. Science learning by implementing the Problem Solving learning model in class IV of SD Negeri 1 Mbeleang can improve student learning activities. This is evidenced by the value of the science learning completion achieved after the learning model was implemented by 76.93% higher than the

results of the science learning completion achieved before implementing the Problem Solving learning model.

## 4. CONCLUSIONS AND SUGGESTIONS

### CONCLUSIONS

Application of Problem Solving Learning model based on 21st Century Learning in IPAS Learning for 4th grade students of SD Negeri 1 Mbeleang. It can be seen that the percentage of application in cycle I at the first meeting was 10 or 62.5%, while the second meeting increased by 11 or 68.75%. In cycle II, the percentage of application increased significantly, namely at the first meeting of 14 or 87.5%, while at the second meeting it increased by 15 or 93.75%. 2) The effect of the Problem Solving learning model based on 21st century learning on the creativity of fourth grade students of SD Negeri 1 Mbeleang. It can be seen that the percentage of student creativity in cycle I there were 6 students or 46.15% of students who were in the sufficient category. While in cycle II it can be seen that the percentage of student creativity shows an increase compared to cycle I, the value in the good category increased to 10 students or 76.92%. 3) The effect of the Problem Solving Learning model on IPAS Learning Outcomes of fourth grade students of SD Negeri 1 Mbeleang in cycle I reached 4 students or 30.77% who received good or complete grades while in cycle II there were 10 students or 76.94% who reached KKTP.

### SUGGESTIONS

Based on the conclusions above, the researcher provides the following suggestions: 1) For teachers, the Problem Solving learning model can be used as an alternative choice of model that can be applied in the learning process, because it can improve students' understanding of concepts. 2) For students to be more active in the learning process by using any model. 3) For further researchers to consider the use of the Problem Solving learning model based on 21st century learning in the learning process and pay attention to the allocation of learning time so that each stage of learning is carried out properly.

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