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**Article**

# Effectiveness of Socioscientific Issue-Oriented PBL Model to Improve Representation Ability

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**ABSTRACT**

Along with the development of dynamics in science education, the development of education and technology. Teachers are expected to apply a model of learning that can facilitate students so that they have the ability to think creatively, innovatively and critically. The results of a preliminary study conducted at MTs Ma'arif Al-Mukarom showed that representation skills were still relatively low with a learning model that was less varied. This study aims to determine 1.) the activity of students towards learning with a Socioscientific issues-oriented PBL learning model to improve representation ability, and 2.) the effectiveness of the Socioscientific issues-oriented PBL learning model to improve representation skills. This type of research is quantitative, namely experimental research. The population in this study were students in grade VIII with the research sample of class VIII-A as the experimental class and VIII-B as the control class at MTs Ma'arif Al-Mukarom Ponorogo. The data collection techniques in this study were observation of learning implementation, observation of students' activities, and pretest and posttest of representation skills. The results showed that the results of the student activity sheet showed that the percentage of activities in learning obtained an average of 91.67% which was included in the first criterion was very good. In the effectiveness test, the results of the ancova test showed that the class that used the socioscientific issues-oriented PBL model had high representation skills.



## INTRODUCTION

Education if interpreted in a broad sense is as a transition and transformation including knowledge, skills, and values that occur inside and outside the education unit and lasts a lifetime (Yeni Puji Astuti, 2020). Therefore, the content of education that is examined is not only in the form of achievements or results but also ways of thinking and character. Human resources are demanded from the paradigm of an education in order to have the ability to reason or think at a high level by using critical, logical and systematic reasoning, which later aims to be able to face various challenges of a dynamic, developing and advanced era. The existence of science learning is expected to be a milestone for the development of these abilities, where

science learning itself is a process to help humans internalize critical reasoning in developing themselves. The role of the teacher as a facilitator in learning activities, among others, will provide convenience to students in the learning process (Utami Dian Pertiwi et al, 2018). So that the teaching and learning process can be carried out in order to achieve student learning goals. Teaching and learning activities are conditions that are deliberately created by the teacher before and during the teaching and learning process. Science is a science based on natural knowledge that is found outside. The term "science" refers to a group of disciplines that study natural events and objects. This discipline is a product of ideas and research of scientists who are experts in conducting experiments and applying scientific procedures. Based on this affirmation, science can be defined as a field of study that relies on the observation and categorization of data, which is then collected and varied using quantitative laws. Science also connects mathematical inference and data analysis with natural phenomena. Thus, natural science can be defined as the study of natural signals through a series of scientific experiments and the application of facts, concepts, rules, and principles that have been proven true (Dinda Widyastika et al., 2022). This concept makes it possible to define science education as learning about a topic that is relevant to our daily lives and whose truth has been proven by science. This is one of the characteristics of science education. These characteristics are different depending on the learning environment.

The 2013 curriculum in education cannot be used fully to make students have individual thinking, such as being able to draw conclusions at the end of education without encouragement from education or mastering the core of the education that has been taught, so students need other encouragement that can provoke their thinking to be able to think critically so that they can formulate selrta draw the core of the education process that has been taught by students. The encouragement needed by students in the education process to be able to have this relprelselntation ability can be done by using the PBL (problem based learning) learning model assisted by LKPD (Learner Worksheet), this LKPD contains a guide for students in carrying out an observation.

LKPD (Learner Worksheets) are LKPDs that can bring learners to think at a deep level, and have good litration authenticity, LKPDs that are used to improve scientific representation ability are not separated from the initial goal of improving the scientific thinking of learners who are used to expand their knowledge in the field of science, but there are significant limitations that can limit the achievement of the level of science literacy. According to Velll as well as Lelndelrman in Jack Holbrrook said if the development of science can melndelsak telrbelntuknya growth of the nature of science from the results of human efforts. The success and progress of a country is measured by the quality of its education, as reported by Rellia and Sodikin in Ring Nohan Relmbulan. Because learning affects the ability of society to develop, high-quality education is a prerequisite for success (Cincin Nohan Relmbulan & Laily Yunita Susanti, 2021).

As with science education, education is an important science that cannot be separated from the process of improving learning for the benefit of a nation. At the current level of teaching quality, science education, which follows the advancement of technology, has emerged as a strong motivator for students. Students studying science are encouraged to explore their natural environment, with an emphasis on problem solving and research studies. Learners' authenticity is based on four factors in science that must be possessed by learners, namely, 1. Behavior includes honesty, compassion, a sense of curiosity and a bond between cause and effect 2. There are procedures, such as the ability to use elkspelrimeleln kinelrja to answer problems using scientific procedures 3. Produce goods that can be in the form of theories, laws, principles, or factual information and, 4. Use scientific procedures in everyday life. Students can have a scientific-minded personality and understand scientific phenomena based on these variables. Today's students are expected to have traits that are able to compete without having to leave the door that has been opened by the Ministry of Education and Culture.

For this reason, science education is considered to enhance students' characteristics through teaching not only about science through natural phenomena but also about current trends in science and technology issues. Of course, this process always involves the use of critical thinking ability to sift through data. The teaching of univelrsal personality is very much needed to meet Era 4.0.

According to Sabirin, one of the skills that must be possessed by learners is the ability to relate, this skill is used to describe science data that is difficult to be easier with the presence of visual or non-visual encouragement. According to Sabirin, the ability to relate is a tool or medium that helps learners understand and get an explanation of the lessons taught. Verbal or non-verbal phrases, graphs, mathematical symbols, tables, and other forms of media can be used as tools and resources (Muhammad Sabirin, 2014). According to Jonels and Knuth in Sabirin, relprelselntation ability is a problem-solving technique or other solution to a situation that requires a solution that can be given in the form of mathematical calculations, tables, or descriptions of objects in a verbal or non-verbal way.

This representation skill is very important in relation to Natural Science education because many of the modules in this education are difficult for students to understand. The need for descriptions of melbolelelntation skills enables students to improve their descriptions of scientific concepts. For example, a graph or a three-dimensional model can help students understand the structure of molecules or physical phenomenon better than a complex reading. Physical or mathematical models can be used to illustrate scientific concepts. Learners' analytical skills can be tested in a real-world setting while transmitting scientific relevance skills learned in literature or in real-world contexts. To help teachers in their role as educational facilitators, they need tools that allow them to communicate freely and effectively with learners of natural science education, which will be taught using more straightforward techniques.

In summary, the ability of relprelselntation is after that a new alternative in the world of learning through this relpselntation ability, the subjects that are more difficult than using numbers in the learning or delivery of the material can be understood to be easier again. However, Hudiono in Sabirin expressed his opinion on the description of the ability of relprelselntation, which is defined as an ability that goes beyond the scope of applying symbols or notations to explain or explain the solution of scientific problems to be studied, the reason other than the results of what is observed. Hudiono in Sabirin continued, the explanation of relprelselntation ability is an activity that can give meaning to each problem solving so that it produces a suitable answer. Students need to have three main indications to understand relation skills, the ability to connect experiences, problem solving skills, and information synthesis. These relation skills are closely related to the distinction between problem solving and elaborating the relation skills themselves. This relation ability is used to solve problems that are related to a conceptual problem.

Socioscientific issue-based learning to improve representation ability needs to be applied. However, the application of problem-based learning has not been able to run optimally. Moreover, students' representation ability is still rarely focused by educators in a lesson. The level of development of understanding with the ability of representation. In the discussion of socioscientific issues, students will search, examine, collect, and analyze. As a result, students will be more motivated, active, and more understanding in participating in learning so that they can achieve the target (Putriana et al., 2022).

Based on observations made on September 16, 2020 in class VIII MTs Ma'arif Al-Mukarom Kauman Ponorogo, students still have low relationship skills. This is evidenced by the average score of students who only get 62.5 which has not met the KKM of class VIII MTs Ma'arif Al-Mukarom Kauman Ponorogo, which is 70. The lowest score in the class was obtained with a result of 20. This can also be seen from students who are less enthusiastic about learning, and do not ask many questions to the teacher regarding learning material, do not find out many results from other groups. This situation is also exacerbated by how the teaching and

learning process is carried out by educators, where educators only rely on textbooks with the lecture method. This makes the learning that takes place tend to be boring and does not attract the attention of students. The low ability of relprelelntation in students is also caused by several interrelated factors, namely various educators who are very focused on the value of students in the implementation of learning which causes the authenticity of students in mastering mathematics in the learning process to be neglected. In addition, the absence of LKPD (Learner Worksheet) based on representation ability makes students less able to develop their representation ability, teaching materials or LKS used do not meet the standard indicators of representation ability.

Therefore, there must be a solution in the form of using a learning model that can improve students' representation skills. The representation ability of the learners obtained is not optimal, because the learners are lacking in literacy science training so that the learners do not understand the module of the digestive system in humans. Not only that, students are not able to do questions based on representation skills, in this case, it certainly requires further adaptation of the learning process to share descriptions with students as well as to invite students to get used to doing representation skills questions so that students in this school can explore the growth of learning standards with satisfactory results (Sulastri Marwan et al., 2017).

The educational program that is to be developed in this research to improve representation skills, that the representation ability of students are considered to be lacking. In this case, it is caused by the absence of guidelines or reference materials used to help students in carrying out critical thinking related to representation ability. Therefore, the PBL (problem-based learning) learning model assisted by Socioscientific Issue-oriented LKPD to improve representation ability, in this case, is considered very suitable for training students to get used to doing representation ability questions. The necessity for the development of this product originated from the phenomenon that often occurs, which is the inability of students to unpack the problem of representation ability. In addition, students do not understand representation skills. Meanwhile, educators believe that when our learning world becomes more standardized, learners will not be able to investigate how the learning world grows with talents that are considered inferior compared to today. Students will find it difficult to analyze the representation ability questions and education modules offered without an explanation for understanding representation ability, so it is possible that the current curriculum will lag behind the global learning standards that are developing, especially in the fields of science and technology. To help students in capturing the ideas that have been discussed previously.

The PBL (problem-based learning) learning model assisted by the Socioscientific Issue-oriented LKPD is designed to facilitate the educational process of learners in the form of a summary of modules, instructions, or tasks that must be carried out by students to achieve competenceThe purpose of implementing this representation ability is to facilitate students' ability to be more organized and meet the learning standards as they progress in school.

Representation ability is the ability to solve and describe a problem so that it becomes simpler in terms of its solution. Where solving this problem will encourage individuals to think, from here we can see the representation ability of students in solving and solving a problem. Each learner is different and is also a characteristic of the individual that only he has in it and we cannot find the same in other individuals. Due to the lack of resources or materials to help students develop their own scientific representation skills, students seem to lack these ability. Therefore, to ensure that students meet the standards of representation ability.

## METHODS

The type used in this research is quantitative method experimental research using quasi-experimental design. This type of experiment is a experiment in which the testing of independent variables and dependent variables on experimental and control group samples. This research design is a pretest postest control group design. In this design there are two

groups, namely the experimental and control groups and then each of them is given a pretest and posttest. To determine the initial condition of the experimental and control groups, a pretest was conducted. While for the postest to show the effectiveness of the treatment in the form of a problem-based learning model through discussion of socioscientific issues. The following is a table of quasi-experimental research design with a pretest postest control group design model. The research design is described in the following table:

**Table 1.** Experimental Research Design

| Class | *Pretest* | Treatment | *Posttest* |
|---|---|---|---|
| Experimental class | $O_1$ | $X_1$ | $O_2$ |
| Control class | $O_3$ | $X_2$ | $O_4$ |

Information
O1 : Initial test (pretest) given before treatment in the experimental class.
O2 : Initial test (pretest) given before treatment in control class
O3 : The final test (posttest) given after treatment in the experimental class
O4 : The final test (posttest) given after treatment in the control class
X1 : Classes that use socioscientific issue-oriented PBL model
X1 : Classes that do not use the PBL model

The population is all VIII grade students of MTs Ma'arif Al-Mukarom Kauman Ponorogo, totaling 40 consisting of VIII A class of 20 students and VIII B class of 20 students. The sample selection of researchers using sampling probability sampling technique using purposive sampling technique because in terms of the number of students met for research. The data analysis techniques used are Normality Test, Homogeneity Test, and Ancova Test.

## RESULTS AND DISCUSSION

This research is a study related to learning activities that take place at MTs Ma'arif Al-Mukarom Kauman Ponorogo. In the implementation of the study, researchers were directly involved in classroom learning activities. This study aims to determine the level of representation skills of students in science learning and to determine the effectiveness of the socioscientific issue-oriented PBL model to improve representation ability.

### 1. Students' Activities in Learning Using PBL Model Oriented to Socioscientific Issue.

The paldal of the learning process is not only the teacher's activity, but also the learners' activity which is monitored by the observer or the salalalt pengalmalt. The purpose of the Hall is to evaluate the effectiveness of the students' activities during the learning process using the problem-balanced learning model with a socioscientific issue orientation in accordance with the targets that refer to the synthesis paldal or the learning process that has been planned. All learning activities were evaluated by the IPAL teacher who acted as an observer using the learner activity observation sheet. The following are the results of the observers' assessment of the students' activities in the experimental class which was used as a sample in the research.

**Table 2.** Results of Assessment of Student Activities

| No | PBL Syntax | Aspects assessed | Meeting- | | | Total | Category | Percentage |
|---|---|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | | | |
| 1 | Orientation | Learners answer the greetings spoken by the teacher | 4 | 3 | 4 | 11 | 91,67% | Very good |
| 2 | Organize | Learners are easy to accept and understand the material | 3 | 4 | 4 | 11 | 91,67% | Very good |
| 3 | Mentoring | Learners can receive and carry out instructions by turning during the lesson | 4 | 4 | 3 | 11 | 91,67% | Very good |

| No | PBL Syntax | Aspects assessed | Meeting- | | | Total | Category | Percentage |
|---|---|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | | | |
| 4 | Develop | Learners are able to cooperate and collaborate in groups | 4 | 4 | 4 | 12 | 100% | Very good |
| 5 | Analyzing | Learners analyze and ask about material that they do not understand | 4 | 3 | 3 | 10 | 83,33% | Simply |
| Total | | | 19 | 18 | 18 | 55 | 91,67% | Very good |

Based on the results of the assessment by the observer of the students' activities, the percentage of 91.67% is included in the criterion of reciprocity. It can be concluded that the learning process using the PBL learning model with a socioscientific issue orientation is able to generate a learning process that turns back to students.

**2. Representation Ability Test Results Using the Socioscientific Issue-Oriented PBL Model**

The researcher got the results of the value of representation ability after conducting the learning process. The data obtained in the form of observation value of representation ability and previous observation from the teacher as the initial value of representation ability.

**Tabel 3.** PreTest and PostTest Values of Representation Ability of Experimental and Control Classes

| Student No. | Experiment Class | | Control Class | |
|---|---|---|---|---|
| | Value *pre-test* | Value *post-test* | Value *pre-test* | Value *post-test* |
| 1 | 50 | 79.17 | 50 | 70 |
| 2 | 62.5 | 83.33 | 58.33 | 75 |
| 3 | 54.17 | 87.5 | 54.16 | 75 |
| 4 | 58.33 | 100 | 50 | 75 |
| 5 | 58.33 | 91.67 | 50 | 79.17 |
| 6 | 66.67 | 87.5 | 50 | 79.17 |
| 7 | 75 | 79.17 | 66.67 | 75 |
| 8 | 50 | 87.5 | 50 | 70 |
| 9 | 62.5 | 87.5 | 41.67 | 62.5 |
| 10 | 45.83 | 100 | 45.83 | 50 |
| 11 | 66.67 | 87.5 | 33.33 | 70.83 |
| 12 | 58.33 | 91.67 | 41.67 | 79.17 |
| 13 | 58.33 | 87.5 | 45.83 | 62.5 |
| 14 | 54.17 | 83.33 | 45.83 | 58.33 |
| 15 | 62.5 | 91.67 | 45.83 | 66.67 |
| 16 | 70.83 | 83.33 | 50 | 66.67 |
| 17 | 58.33 | 83.33 | 41.67 | 58.33 |
| 18 | 66.67 | 91.67 | 41.67 | 66.67 |
| 19 | 58.33 | 79.17 | 45.83 | 66.67 |
| 20 | 66.67 | 91.67 | 50 | 62.5 |

In this statistical data analysis, researchers used two tests, namely the prerequisite test and hypothesis test (ancova test). Prerequisite analysis testing is a basic concept to determine which test statistics will be used in research, namely parametric and non-parametric statistical tests. This determination is based on the prerequisite test results. The prerequisite test consists

of normality test and homogeneity test. If the results of the next test are normally distributed and homogeneous, then the next test uses a parametric statistical test, while if the prerequisite test is not normally distributed and not homogeneous, then the next test uses a non-parametric statistical test.

The normality test of the value data was carried out to determine whether the initial ability value data (pretest) and the final value (posttest) of presentation skills in the experimental and control classes were normally distributed. This normality test uses the Kolmogrov Smirnov test using SPSS 25 software. The following are the results of the calculation of the normality test of the initial ability scores and the final presentation scores in the experimental and control classes.

**Tabel 4.** Normality Test Results for Pretest Posttest questions for Students

| | **Shapiro-Wilk** | | |
|---|---|---|---|
| **Class** | **Statistic** | **Df** | **Sig.** |
| Experiment PreTest | .969 | 20 | .734 |
| Experiment PostTest | .914 | 20 | .076 |
| Control PreTest | .913 | 20 | .074 |
| Control PostTest | .945 | 20 | .301 |

That the significance value of the pretest ability value in the experimental class is 0.734 and in the control class is 0.074 Both significance values of the pretest values in the experimental and control classes are greater than the alpha value (α = 0.05), so it can be concluded that the pretest values of the experimental and control classes are normally distributed.

As for the normality of the posttest value of students' presentation skills, based on the data in the table, it can be seen that the significance value of the posttest value of students' presentation skills in the experimental class is 0.076 and in the control class is 0.301. Both posttest values of presentation skills in the experimental and control classes are greater than the alpha value (α = 0.05), so it can be concluded that the posttest values of students' presentation skills in the experimental and control classes are normally distributed.

Furthermore, the homogeneity test of the value data is carried out to determine whether the variation of the initial value data and the final value of the presentation in the experimental and control classes is homogeneous. This homogeneity test uses the Levene statistical test using SPSS 25 software. The following are the results of the calculation of the homogeneity test of the initial ability and final ability scores in the experimental and control classes.

**Tabel 5.** Homogeneity Test Results of Student Pretest Questions

| **Test of Homogeneity of Variance** | | | |
|---|---|---|---|
| Levene Statistic | df1 | df2 | Sig. |
| .328 | 1 | 38 | .570 |

Based on the homogeneity test results above, it can be seen that the significance value in the experimental and control classes is 0.570. The significance value is greater than the alpha value (α = 0.05), so it can be concluded that the value data has a homogeneous variation.

After conducting the prerequisite test in the form of normality and homogeneity tests to determine whether the data is normally distributed and homogeneous, the next step is to conduct a hypothesis test or ancova test which aims to see whether or not there is a difference in representation ability between the experimental and control classes.

Based on the results of the ancova test, the posttest scores of the experimental and control classes of the paldal talbel above using SPSS 25 for windows software get a Sig. 0.000 < α = 0.05. With this, it can be concluded that there is a significant difference between the experimental class and the control class, which means that students with the application of the socioscientific issue-oriented PBL model have different learning outcomes from classes that are not treated with the socioscientific issue-oriented PBL model to improve representation skills.

**Tabel 6.** Ancova Test Result of Posttest of Experimental Class and Control Class

| Source | Type III Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Corrected Model | 3705.625[a] | 1 | 3705.625 | 75.413 | .000 |
| Intercept | 243884.442 | 1 | 243884.442 | 4963.270 | .000 |
| Kelas | 3705.625 | 1 | 3705.625 | 75.413 | .000 |
| Error | 1867.239 | 38 | 49.138 | | |
| Total | 249457.306 | 40 | | | |
| Corrected Total | 5572.864 | 39 | | | |

a. R Squared = .665 (Adjusted R Squared = .656)

From the statistical results and assessment of the observation sheet obtained, the following discussion will be presented.

**1. Learner Activities in Socioscientific Issue-Oriented PBL Model Learning**

One of the aspects in which learning goes back is the effective and efficient involvement of learners in learning. So that the activities carried out by learners determine how learning activities can be carried out properly. This is in line with the opinion expressed by Busrial, namely, the learning process can run optimally if there is and creates an activity in it (Busrial, 2022).

Learning activity is a process of learners actively building a construction of their abilities in learning. Learning activities by students are also one of the activities that involve physical and mental in the process of learning something. So that in learning activities students' activities take place in tandem between their physical and mental involvement.

When students are participating in learning in the classroom, especially science subjects, their enthusiasm for learning is still low, due to the lack of variety of teachers in delivering material and low motivation to learn. Thus, the activity of students can run back need to use an interesting learning model. To build students' activities in learning, it is applied by using a socioscientific issue-oriented PBL learning model which emphasizes more on involving students fully and actively (Pratiwi et al., 2020).

The activities of students with the use of PBL learning models oriented to socioscientific issues are carried out in accordance with the syntax altalu stages that have been determined, namely the stage of orienting students, the stage of organizing students, the stage of guiding group investigations, the stage of developing and presenting work, and the stage of analyzing and evaluating. In each of these activities, the learning steps or syntax of the socioscientific issue-oriented PBL learning model are contained.

The first activity is opening, when the teacher says greetings entering the class, students answer greetings from the teacher. Then when the teacher took attendance, each learner answered their attendance one by one. In this opening activity, students prepare themselves for the material and themselves to take part in learning and determine the direction of the expected learning objectives. This is because learners are required to be able to take responsibility for their learning process independently. Learners have the responsibility to manage their own learning process (Untari et al., 2017).

Furthermore, motivational activities, when the teacher asks a question, learners are asked to answer according to their knowledge. So that students are able to foster an attitude of courage to argue in teaching and learning activities. In this activity, students indirectly foster an attitude of critical thinking in accordance with the demands of the 21st century (Jihannita et al., 2022).

The second learning activity is the core activity. In this core activity, learning is carried out by referring to the syntax of the PBL model. The first syntax is learner orientation. After the teacher asked questions to students, students spontaneously answered questions or questions about the material given by the teacher. This ability to answer and argue is a form

of developing learning activities, by stating, asking, answering, expressing opinions, and the like is a variety of learning activities.

After the thinking activity is complete, it is continued with the next syntax, namely the stage of organizing students. In this activity, students are grouped according to the division by the teacher. Then they are given the task of working on the LKPD that has been given by the teacher together with their group members. This discussion activity is able to develop an attitude of collaboration and cooperation in learning. Discussing will build students' social skills. The form of social skills is by cooperating between members in the group (Nalilal Filalhaltin et al., 2018).

The highest indicator of representation ability at the beginning of learning in the control class is the indicator "Connecting the ideas of students' experiences" with an with a percentage value of 68.75%, while the lowest indicator is the "Interpret information" indicator with a percentage value of 45.00%. Then at the end of learning there was a significant increase in each indicator of representation ability in the control class. The highest indicator was the indicator "Connecting the ideas of students' experience" with a percentage score of 69.37%, and the lowest indicator was the indicator "Skills in solving problems" with a percentage score of 66.25%.

**2. Effectiveness of Socioscientific Issue-Oriented PBL Learning to Improve Representation Ability**

The effectiveness of the application of the socioscientific issue-oriented PBL learning model to improve students' representation ability carried out at MTs Ma'arif Al-Mukarom Kauman Ponorogo on the malnusial paldal pencernaln system, is a realization of the validity of the learning activity. The learning activity is a process of learning in which the malnutrition subject and object are the teacher and the learner.

The effectiveness of the application of the socioscientific issue-oriented PBL learning model to improve students' representation skills carried out at MTs Ma'arif Al-Mukarom Kauman Ponorogo on the malnusial paldal pencernaln system, is a realization of the validity of the learning activity. The learning activity is a process of learning in which the malnutrition subject and object are the teacher and the learner. The PBL learning model is a learning model that focuses on solving a problem that allows students to construct their own knowledge by identifying the problem, collecting information, researching, summarizing, and taking the necessary actions. These activities are directed by the teacher. The teacher is also responsible for guiding the students to the right process of solving the problem, providing guidance, giving feedback, and assessing the learning outcomes. By shortening the learning process based on malsallalh, students are encouraged to think critically and find solutions to real malsallalh. During the process of solving the problem, students build their knowledge and develop the ability to solve the problem in the classroom (Linda Feni Haryati et al., 2023).

Learning with a socioscientific problem-oriented PBL learning model is an integral part of the problem, the ability of learners to investigate together to find problems in relevant real-life situations such as that experienced by Arya Permana, an Indonesian boy who went viral on the internet when he was only 11 years old, after attention-grabbing photos showed his 192kg weight. The boy from West Java was dubbed the world's fattest child and he had to be bathed in a specially made pool as he was too big for regular bathing. He was gobbling up 7000 calories a day with the help of an absurd amount of junk food and fizzy drinks. However, a hospital stay changed the course of his life after a bodybuilder who ran a fitness center nearby offered to help. Three years later with the help of exercise and diet. Aria turned her life around by losing tens of kilograms. She now weighs 87kg and can finally kick a ball again with her friends". Second is exploration or formulating concepts where learners are given the opportunity to find their own solutions to problems that arise. Third is conceptualization, where the concepts that have been formulated by learners are asked to

implement them in calculations to find the most relevant concept. Furthermore, the fourth step is conceptualization, where students and teachers discuss by showing problems and how to solve these problems so that teachers and students have the same view to solve any problems that arise. Finally, assessment or evaluation. After the teacher and learners have the same view of the problems that arise from the problem being solved, then to measure it, students are given representation questions.

Based on the results of the analysis conducted that the representation ability of students before the implementation of learning (pre-learning) and after learning takes place (post-learning) has a significant difference. Where the post-learning average difference is higher than the pre-learning hall this is seen with the implementation of this PBL learning model. The N-Gain test was conducted to determine the improvement of students' representation ability. Representation ability is the ability to solve or describe a problem so that it becomes simpler in terms of its solution. Where solving this problem will encourage individuals to think, here we can see the representation ability of students in solving or solving a problem. Each learner is different and is also a characteristic of that individual that only he has and we cannot find the same in other individuals (Eka Wulandari et al., 2021).

This representation ability has three main indicators as a measuring tool for understanding the representation ability of students, namely connecting students' experiences, ability in solving problems, interpreting information. This representation ability is considered very important for students to have. This representation ability will bring learners to be able to develop ideas and thoughts which will then be used flexibly in the process of solving problems in everyday life (Ita Sapitri et al., 2019). The effectiveness of learning by using a socioscientific issue-oriented PBL learning model to improve representation ability based on the results of data analysis there are differences between experimental and control classes. Especially in the aspect of representation ability in thinking about the answer to a problem and being able to understand the problem well. So that the application of learning with this model is effectively applied in overcoming students' representation ability. In addition, with this learning model, understanding of material concepts based on learning achievement indicators is well achieved.

## CONCLUSION

The activities of students by applying the socioscientific issue-oriented PBL learning model are carried out in accordance with the syntax that has been prepared with a percentage value for three meetings has a percentage of 91.67% which has a very good percentage category. The use of this model gives students the opportunity to learn actively. One of them solves by grouping and discussing, can present well and correctly according to the indicators of representation ability. The PBL learning model emphasizes more on the active discussion in learning activities so that knowledge will be absorbed more quickly based on the socioscientific issue-oriented PBL model to improve representation ability. The effectiveness of learning by using a socioscientific issue-oriented PBL learning model to improve representation ability based on the results of data analysis there is an average difference between the experimental class and the control class. Especially in the aspect of representation ability to think about the answer to a problem and can understand the problem well. So that the application of learning with this model is effectively applied in overcoming the representation ability of students. In addition, with this learning model, the understanding of the concept of material based on the indSelalin that, with this learning model, the understanding of the concept of malteries based on the calpalialn indikaltor of learning is multiplied by turning.

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