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Increasing Students' Physics Learning Outcomes through Experiential Learning Model

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Abstract *– This research is a classroom action research which involves planning, action, observation, reflection, and re-planning. This study aims to find out: 1) the application of the experiential learning model to physics learning at MAN Pinrang; and 2) the improvement of students' physics learning outcomes at MAN Pinrang through the application of the Experiential Learning Model. The location of this study is MAN Pinrang, Paleteang District, Pinrang Regency. The subjects of the study were students of class X MIPA MAN Pinrang consisting of 40 people. This research was conducted through 2 cycles. The results show that the in the first cycle, 72.5% of the students' scores exceeded the Minimum Completion Criteria (KKM) score with the highest score of 90 and the average score of 74.1. This result indicates that the students' physics learning outcomes improved compared to the test results on the pretest. Furthermore, the students' physics learning outcomes increased again in cycle II, with the highest score of 98 and the average score of 84.05 while the minimum completion percentage was 95%. Having the success in fulfilling the learning indicators and the completion value of 80%, it can be concluded that the experiential learning model was effective for improving the students' Physics Learning outcomes at MAN Pinrang. Hence, this experiential learning model should be applied to improve student physics learning outcomes in the future.*

Keywords: *classroom action research; experiential learning model; physics learning outcomes*

I. INTRODUCTION

Physics is a fundamental science that is essential for the development of thinking abilities needed to address difficulties in daily life. (Nurnaifah & Razzaq, 2022). The majority of physics instruction in schools involves listening to lectures, the traditional learning environments that don't address self-dimensions (Nurhayati, 2014), so students are more fixated on textbooks (Yulindar et al., 2017). In order to improve students' learning mastery, students' mental processes must be integrated into the learning process (Nurfadilah, 2019; Destini, 2020).

High final physics scores indicate learning success (Anggriani & Jumrah, 2022).

Another essential thing in determining the student's learning outcomes is learning style (Rahman et al., 2016). According to Widayanti in Nurnaifah & Razzaq, (2022) learning outcomes are influenced by any factors like study space and teacher's way of teaching. Only a great learning process may result in high-quality learning outcomes (Saregar et al., 2017).

The national acknowledgment of learning and the national qualifications system are related (Jatmiko et al., 2016). There are some external factors affecting the fine of training in Indonesia for example instructors and curriculum (Sutiani & Silitonga, 2017). The government is trying to make improvements and renewal of the education system by updating the curriculum which regulates learning methods (Sanjata et al., 2022; Tawil & Said, 2022).

The development of innovative teaching strategies is a responsibility for educators (Kadir & Permana, 2022). Learning through participation in and interaction with the immediate environment is known as experiential learning (Cotič et al., 2020).

Providing learning only by reading the meaning of learning can reach 20% by hearing, 30% by seeing, 50% by hearing and seeing, 70% by communicating, and 90% by learning by doing and communicating. The use of mercury in experiments for experiential learning has the potential to enhance scientific reasoning abilities (Johari & Muslim, 2018). With teachers acting as facilitators, the experiential learning model places an emphasis on the learning experiences of the students (Rasmitadila et al., 2019).

Based on the results of observations at MAN Pinrang through interviews with physics teachers, the learning outcomes of students towards physics subject matter were low. It is known that during the physics learning process students very rarely do practicum. In addition, teachers rarely make variations in using learning models during the physics learning process. This situation will certainly affect students' learning outcomes while attending physics lessons, the impact is that student learning outcomes are below the Minimum Completion Criteria.

Previously, a similar study had been carried out by Lestari et al. (2014) with the results obtained stated that learning using the experiential learning model has an influence on students' critical thinking skills. Then research conducted by Anggara, (2012) states that the experiential learning model is very relevant to be applied to develop self-concept and conceptual understanding. In addition, research conducted by Munif & Mosik, (2009) states that the experiential learning model can be used as an alternative in choosing variations of learning strategies in the classroom to improve student learning outcomes.

Based on this background, the writer was keen on researching the Implementation of the Experiential Learning Model to enhance Physics Learning Outcomes at MAN Pinrang.

The objectives of this study are to: 1) find out the application of the Experiential Learning model to learning physics at MAN Pinrang; and 2) find out the increase in students' physics learning outcomes at MAN Pinrang through the application of the Experiential Learning model.

II. METHODS

This research employed a classroom action research, located at MAN Pinrang, Paleteang District, which took place in the odd semester. The research subjects were 40 students of class X MIPA 1 MAN Pinrang, consisting of 22 girls and 18 boys.

The implementation of this research was carried out in two cycles, namely Cycle I and Cycle II. The implementation of cycle I and cycle II was held 4 times each with 3 meetings with and one cycle test.

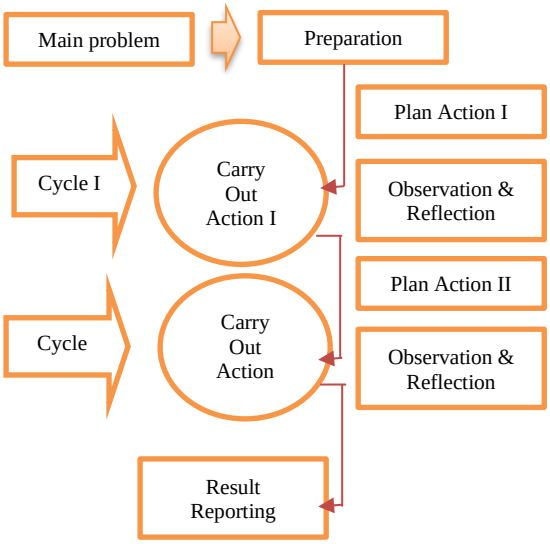

Figure 1. The action stage of each cycle

The instruments used in this research was test. In this study, the tests used were descriptive questions which were undertaken at the beginning of the meeting (pretest) and at the end of each cycle. The results of this test were then processed to determine the level of success of students in the applied learning process. The test was given to students in order to obtain data on students' physics learning outcomes.

Data analysis technique

The collected data were analyzed using quantitative analysis techniques using descriptive statistics in each cycle. The observation sheets of students' learning activities were analyzed using descriptive analysis techniques. The percentage of learning interactions between students was (Purwanto, 2009):

$$NP = \frac{R}{SM} x\ 100\ \% \qquad (1)$$

Information:

NP = The percentage value sought
R = Average student activity
SM = Maximum score

Assessment criteria:

≥ 75 % = Very good (A)
55-75% = Good (B)
35-55% = Enough (C)
<35 = Low (D)

Data on students' learning outcomes for each cycle are processed using tabulations of the average percentage and mastery of classical and individual learning.

1. Calculation of average score

To calculate the average score, we used the following formula (Sudijono, 2009):

$$x = \frac{\sum x}{N} \quad (2)$$

Information:
x : Average score
N : Number of students.
∑ x : Total number of students

2. Calculation of individual learning completion score

To calculate individual learning completion, we used a descriptive analysis of the percentage with the calculation (Depdiknas, 2004):

$$= \frac{Total\ value\ obtainedh}{Total\ number} X\ 100\% \quad (3)$$

Criteria:

a. If the level of achievement is < 85%, then the students has not completed learning yet.
b. If the level of achievement is ≥ 85%, the student has completed learning.

3. Calculation of classical learning mastery

To calculate the mastery of classical learning using a descriptive analysis of the percentage with the calculation (Depdiknas, 2004):

$$= \frac{Number\ of\ stud.who\ complete\ the\ study}{Total\ number} X\ 100\% \quad (4)$$

4. Data Verification

In this stage the researcher re-examines the data that has been reduced, scrutinized, edited, and data that has been organized. This is done to re-check the validity and validity of the data.

5. Conclusion Description

The conclusion is drawn from the data that has been found and processed carefully and systematically. In drawing conclusions to know whether the Experiential Learning model is effective or ineffective, the success indicator is when 85% of students have obtained a minimum score of 70. A student is said to have achieved individual learning mastery if the student has achieved individual learning requirements and scored > 70.

III. RESULTS AND DISCUSSION

Learning Outcomes of Cycle I

Regarding cycle I, a test of learning outcomes was carried out in the form of an essay. The test is carried out after the presentation of Work and Energy using the Experiential Learning model.

The results of the learning tests from cycle I were analyzed by descriptive analysis using the IBM SPSS Statistics 21 program.

The average score of physics learning outcomes for class X MAN Pinrang students after using Experiential Learning is 74.15 out of an ideal score of 100, where the highest score is 90 and the lowest score is 60 with a standard deviation of 8.417.

The scores of the students' physics learning outcomes are grouped into five categories, the frequency and percentage distributions are obtained as presented in table 1.

Table 1. Distribution of Frequency and Percentage of Physics Learning Outcomes Cycle I

Mastery Level	Category	Frequency (f)	Percentage (%)
85 – 100	Very high	5	12.5
65 – 84	High	29	72.5
55 – 64	Fairly High	6	15
35 – 54	Low	0	0
0 – 34	Very low	0	0
Total		**40**	**100**

Referring to table 1 it can be seen that the percentage of students' learning outcomes after using Experiential Learning is 15% in the medium category, 72.5% is in the high category and 12.5% is in the very high category.

Thus, it can be concluded that in general that the results of students' physics learning after using Experiential Learning are categorized as high. This is shown from the results of the acquisition of scores in the high category of 72.5% out of the 40 students.

After the student learning outcomes after using Experiential Learning are analyzed, the percentage of students' learning completion can be seen in table 2 below.

Table 2. Description of Learning Mastery in Cycle I

Interval Class	Category	Frequency (f)	Percentage (%)
70 – 100	complete	29	72.5
< 70	Not Completed	11	27.5
Total		**40**	**100**

The table 2 shows that the percentage of classical completeness in cycle I is 72.5% of the students are in the "complete" category and 27.5% od the students are in the "not completed" category. From the results obtained, it can be concluded that in the first cycle the students' physics learning outcomes had not yet achieved the intended mastery.

Learning Outcomes of Cycle II

In cycle II, a test of learning outcomes was carried out in the form of an essay. The test was carried out after the presentation of the material on the Law of Conservation of Energy using the Experiential Learning model.

The results of the learning tests from cycle II were analyzed by descriptive analysis using the IBM SPSS Statistics 21 program. The average score of physics learning outcomes for class X MAN Pinrang students after using Experiential Learning in cycle II is 84.05 from the ideal score of 100, where the highest score is 98 and the lowest score is 68 with a standard deviation of 7.706.

Providing the scores of the students' physics learning outcomes are grouped into five categories, the frequency and percentage distributions are obtained as presented in table 3.

Table 3. Distribution of Frequency and Percentage of Physics Learning Outcomes Cycle II

Mastery Level	Category	Frequency (f)	Percentage (%)
85 - 100	Very high	22	55
65 - 84	High	18	45
55 – 64	Fairly High	0	0
35 – 54	Low	0	0
0 - 34	Very low	0	0
Total		**40**	**100**

From table 3, it can be seen that the percentage of students' learning outcomes after using Experiential Learning in cycle II of 45% is in the high category and 55% is in the very high category.

Thus, it can be concluded that in general the physics learning outcomes after using Experiential Learning in cycle II are categorized as very high. This is shown from the results of the acquisition of scores in the very high category of 55% of 40 students.

After the student learning outcomes after using Experiential Learning in cycle II are analyzed, the percentage of students learning completeness can be seen in table 6 below.

Table 4. Description of Learning Mastery in Cycle II

Interval Class	Category	Frequency (f)	Percentage (%)
70 - 100	Complete	38	95
< 70	Not completed	2	5
Total		**40**	**100**

Table 4 shows the percentage of classical completeness in cycle II, namely 95% (38 out of 40) students are in the "complete" category and 5% (2 out of 40) students are in the "Not complete" category. From the results obtained, it can be concluded that in cycle II the students' physics learning outcomes have achieved classical learning mastery.

Looking at the increase toward the students' physics learning outcomes from cycle I to cycle II after using the Experiential Learning model, it will be described in diagram 1 below.

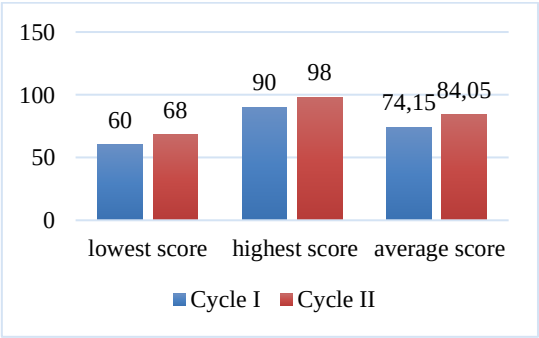

Figure 2. Diagram Comparison of Learning Outcomes between Cycle I and Cycle II

Figure 2 shows that the lowest score obtained by students has increased from cycle I to cycle II, namely 60 to 68 and the highest score obtained by students has increased from cycle I to cycle II, namely from 90 to 98.

Furthermore, the average score has increased from cycle I to cycle II, namely 74.15 to 84.05.

The completeness of students' physics learning outcomes in cycles I and II after using Experiential Learning will be described in figure 3.

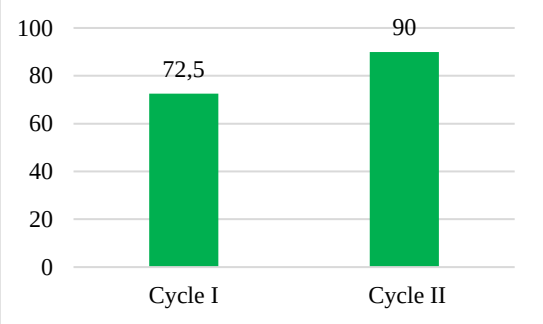

Figure 3. Percentage of Completeness of Physics Learning Outcomes in Cycle I and Cycle II

Looking at diagram 2, the completeness of physics learning outcomes has increased from cycle I to cycle II, from 72.5% to 95%. It can be concluded that students' physics learning outcomes have increased from cycle I to cycle II after using the Experiential Learning model.

Discussion

This research was conducted with the aim of improving students' learning outcomes by using Experiential Learning model. The students' were given tasks and they were examined (graded) and commented on by the teacher and then returned to the students for correction. The results of these improvements are checked and assessed by the teacher and then put in each student's folder.

Overall, the Experiential Learning was able to improve student learning outcomes in each cycle. In addition, this learning model has been able to activate teachers and students in learning and has been able to change the teacher's teaching patterns that have been used so far.

The learning pattern which has always been oriented towards achieving the target of completing the material so that it pays little attention to the competence of students has resulted in students being less able to express opinions, ideas and questions both to the teacher and to their fellow friends. Students are used to listening to teacher or friends' explanations, as well as memorizing formulas.

The inactivity of some of these students was caused by the management of the teacher's learning. Overall, the teacher's ability to manage learning through Experiential Learning for students is quite good, but the indicators directing students to have good discussions with teachers and friends still need to be improved.

However, the achievement of students' learning outcomes obtained from the first cycle test was high. Of the 40 students as research subjects, there were 29 students who achieved the completeness criteria and 11 students who had not been able to achieve the learning completeness criteria. Based on the results of students' achievement in cycle I, researchers and teacher partners discussed to find solutions to the underachieved targets set

in this study in the first cycle. The results of the discussion suggest continuing learning activities through Experiential Learning with an emphasis on aspects that have not been achieved, namely the teacher needs to increase efforts to motivate students in asking questions or opinions and their thoughts by conducting special assessments from the teacher, maximizing efforts to encourage students to improve understanding on the lessons. From the results of this discussion, the second cycle of learning activities was carried out.

The second cycle was carried out at the fourth to the sixth meeting including the administration of cycle II tests. In this cycle, learning activities are getting better. This is in accordance with the results of observations on students' activity in learning indicating that there was an increase in activities carried out by students from cycle I to cycle II. Thus it can be said that Experiential Learning can increase students' activity when learning took place.

Students' activities resulted in good student learning outcomes. Overall, 40 students of class X MAN Pinrang who were used as research subjects were able to achieve the completeness criteria. Because the indicators of the success of this study has been achieved (the increase in students' physics learning outcomes and the completeness of 80%), the researcher decided to stop or not continue the learning activities to the next cycle.

This results of this study is in accordance with research conducted by Munif & Mosik, (2009) stating that the experiential learning model can be used as an alternative in selecting variations of learning strategies in class to improve student learning outcomes. Also a similar study by Lestari et al. (2014) found that learning using the experiential learning model had an effect on students' critical thinking abilities.

IV. CONCLUSION AND SUGGESTION

A. Conclusion

To sum up, the data analysis show that in cycle I, 72.5% of the students exceeded the Minimum Completeness Criteria score, with the highest score being 90 and the average score of 74.1. These results indicate that learning outcomes Physics students improved compared to the test results on the pretest. Then, students' physics learning outcomes increased again in cycle II, with the highest score being 98 and the average score of 84.05 while the minimum completeness percentage was 95%. It means that the Experiential Learning Learning Model is effective to improve the students' physics learning outcomes at MAN Pinrang.

B. Suggestion

Teachers are highly recommended to apply Experiential learning model in teaching suitable physics material to improve students' learning outcomes. In addition, this research is expected to be the reference for the other researchers who intend to carry out research

related to the use of Experiential Learning learning model.

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