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Improving Physics Learning Outcomes and Student Activities in Basic Competencies of Newton's Law and the Concept of Force with the Discovery Learning Method in Class X Students of Nursing Assistant Skills Competence at SMK Negeri 28 Jakarta in The Academic Year of 2018-2019

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ABSTRACT

The subject matter of Newton's law, is the material that students need to have basic competence in analyzing Newton's laws and the concept of force. This material is material that is concrete in nature and practical activities, experiments or demonstrations that must be carried out at the vocational high school level with nursing expertise programs and health expertise competencies. So that it is a fun material, but because students are less challenged and less supporting material for mathematics subjects about vector quantities, it causes student learning outcomes so far to be low. Thus, direct learning on the object being studied allows increasing the acquisition of knowledge in accordance with expectations. One of the teaching approaches that can be considered qualified in terms of the conceptual framework is the discovery learning method. The method is expected to improve student learning outcomes and activities in the basic competencies of Newton's law and the concept of force.

Keywords: Newton's Law and the Concept of Force, Discovery Learning Method.

INTRODUCTION

Physics is a science that seeks answers to the questions of what, why, and how natural phenomena related to the composition, structure and properties, changes, dynamics, and energetics of matter expressed mathematically involving skill and reasoning. Therefore, physics learning emphasizes on providing direct learning experiences through the use and development of scientific process skills and attitudes.

Physics learning ideally is not only an activity that focuses on efforts to gain knowledge of physics, but can raise awareness that; (1) Theories and methods of science have developed and will continue to develop as a result of group and individual work; (2) Study and work of science as social, economic, technological, ethical subjects and influence on culture; (3) Science is universal not limited by state and nation and has wide application.

Management of the teaching and learning process that can create an atmosphere of educative communication between teachers and students that includes cognitive, affective and psychomotor aspects, as an effort to learn something based on planning up to the evaluation and follow-up stages until learning objectives are achieved [1].

In general, physics subjects are considered the most difficult subjects, so this causes students' learning outcomes to be low. But for some students, physics is one of the favorite subjects, especially if the subject matter is presented with an interesting approach, students diligently and enthusiastically pay attention to the phenomena displayed by the teacher during

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teaching. But strangely, the results of students' daily tests or summative scores of students' average scores for physics subjects are still low. One of the causes is the passive attitude of students during the learning process, and when learning to understand but when given a test of competency they are confused.

The subject matter of Newton's law, is the material that students need to have basic competence in analyzing Newton's laws and the concept of force [2]. This material is material that is concrete in nature and practical activities, experiments or demonstrations that must be carried out at the SMK level with nursing expertise programs and health expertise competencies. So that it is a fun material, but because students are less challenged and less supporting material for mathematics courses about vector quantities, it causes student learning outcomes so far to be low.

The above problems need to be solved, one of which is taking actions that can change the learning atmosphere that involves students to be more active in learning, namely through learning by exposing students to real objects. Conducting experiments in learning is one way to instill concepts in students, because in experiments there are the following advantages; (1) students have more confidence in concepts that have been tried on their own; (2) student learning outcomes are retention (durable) and internalization (real in the soul of students); (3) enrich the experience with objective things. Thus, direct learning on the object being studied allows increasing the acquisition of knowledge in accordance with expectations.

In a situation where science and technology are developing so rapidly with such a large population, traditional learning planning no longer has to be maintained [3]. From various research and development programs through the right approach can provide more results, because one of the factors that can affect learning outcomes including the right learning approach [4]. Therefore, it is necessary to pursue a learning approach that can improve student learning outcomes and achievements. This effort is very important because only through the right learning approach students can increase their understanding of the concepts being studied.

One of the teaching approaches that can be considered qualified from a conceptual framework is the discovery learning method [5]. This method is expected to improve student learning outcomes and activities in the basic competencies of Newton's law and the concept of force. The discovery learning method is a component of educational practice which includes teaching methods that promote active, process-oriented, self-directed, self-seeking, and reflective learning [6]. According to the Encyclopedia of the Sciences of Learning, "discovery is a unique strategy that can be applied by teachers in various ways, including by teaching various research and problem-solving skills as a tool for students to achieve learning goals". Discovery learning is a teaching method that emphasizes the importance of helping students to understand the structure or key ideas of a discipline, the need for active student involvement in the learning process, and the belief that true learning occurs through personal discovery [7].

Newton's law subject is one of the subjects studied at SMK Negeri 28 Jakarta with the competence of Nursing Assistant expertise. In Newton's law material, it can be seen that many students lack mastery during the learning process. For this reason, the use of innovative learning methods is expected to help students in understanding Newton's laws. Based on the description above, it can be seen the importance of innovative learning methods to lead to improvement in each implementation. So, it is necessary to conduct a classroom action-research entitled "Improving Student Activity and Physics Learning Outcomes in Basic Competencies of Newton's Law and the Concept of Force with the Discovery Learning Method in Class X Students of Nursing Assistant Expertise Competence at SMK Negeri 28 Jakarta in the 2018-2019 Academic Year "

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RESEARCH METHOD

A. Types of Research

Research is the process of proving a theory (hypothesis) that is proposed to seek scientific answers through literature review, data collection, data management, analysis and inference.

This study uses an action research design, which focuses on classroom activities so that the research is in the form of classroom action research. The research is to describe the learning process in understanding Newton's law and the concept of force, which is the material to be able to have basic competence in analyzing Newton's law and the concept of force. This research was conducted in order to develop a learning model to improve student achievement and student activities. The research was designed based on a study of learning theory and input from the field. The solution design in question is a discovery learning model in teaching the subject matter of Newton's law and the concept of force in the Health Vocational School of Nursing Assistant class X.

The design of classroom action research procedures carried out in this study is a spiral or cycle learning model, according to Stephen Kemmis and MC, Taggaret. With found deficiencies, planning and implementation of improvements can still be in the next cycle until the desired target is achieved.

The Kemmis model design has four stages in each cycle, there are (1) making an action plan, (2) carrying out actions, (3) conducting observations or observations, (4) conducting reflection and evaluation.

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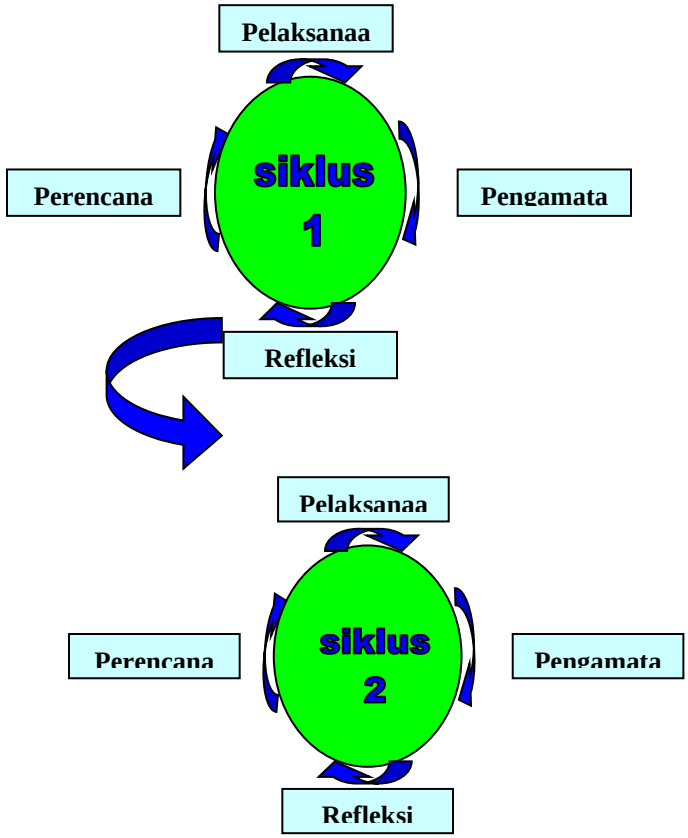
Research Flow :



B. Place and Subject of Research

The place for this classroom action research is at SMK Negeri 28 South Jakarta. The selection of SMK Negeri 28 South Jakarta as the research location was based on the following considerations. First, SMK Negeri 28 Jakarta is where the researcher works. The research subjects were selected for class X Nursing Assistants because in class X Nursing Assistants was the only class that received Physics subjects at SMK Negeri 28 Jakarta and was a class that had social, economic background, parental education level and school origin. many kinds of.

C. Research Schedule

This research was carried out in the 2018/2019 school year for four months starting from the 2nd week of August to November the 4th week of 2018, with the following details:

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No	Research Activities	Time
1	Research Preparation	
	a. Make a Research Schedule	2nd week on August
	b. Study Literature	3rd – 4th week on August
	c. Make a Research Instrument	1st – 2nd week on September
2	Implementation	
	1st Cycle	3rd – 4th week on September
	Evaluation and Reflection	1st week on October
	Planing 2nd Cycle	2nd week on October
	2nd Cycle	3rd – 4th week on October
	Evaluation and Reflection	1st week on November
3	Report Writing and Finishing	2nd – 4th week on November

D. Research Variables

1. Action Variable

In this study, the action variable is the application of the discovery learning model on the subject of Newton's law and the concept of force, which is the material needed by students in achieving basic competence in analyzing Newton's law and the concept of force.

2. Problem Variable

The problem variable is student achievement in the subject matter of Newton's law and the concept of force. This material is the material needed by students in achieving basic competence in analyzing Newton's laws and the concept of force.

E. Techniques and Data Collection Tools

1. Technique

In this study, the data collection techniques used are:

Observation: by observing student behavior in learning by using Observation Sheets and Field Notes

Test: that is to measure learning achievement that has been achieved by students in each cycle.

2. Data Collection Tools

Data collection tools in this classroom action research include:

Test: using multiple choice questions to measure student learning outcomes

Observation: using an observation sheet to measure the level of participation and activeness of students in the learning process.

F. Data Analysis Techniques

The data collected in each observation activity from the implementation of the research cycle was analyzed descriptively with the percentage technique to see trends that occur in learning activities.

1. Learning outcomes: by analyzing the average value of daily tests, then categorized into high, medium and low classifications.
2. Student activity in teaching the subject of Newton's law and the concept of force: by analyzing the level of student activity in the teaching and learning process. Then categorized into high, medium and low classifications.
3. Implementation of learning with discovery learning models: by analyzing the success rate of implementation of discovery learning models, then categorized into successful, less successful and unsuccessful classifications.

G. Research Procedures

The first cycle of this PTK consists of:

1. Planning
   a. Researchers conducted a curriculum analysis to determine the basic competencies possessed by students and the materials needed to master basic competencies, which will be delivered using a discovery learning model approach.

b. Create a discovery learning lesson plan
c. Making instruments used in the classroom action research cycle.
d. Develop learning equation tools.

2. Implementation

No	Teacher Activities	Student Activities	Time (minutes)
1	OPENING ➢ The teacher greets, then asks one of the students to lead the prayer. ➢ The teacher communicates the competencies and goals to be achieved. ➢ The teacher makes apperception related to the learning material.	1. Students answer greetings and pray together. 2. Students pay attention and listen. 3. Students pay attention and ask if necessary.	10
2	MAIN ACTIVITIES ➢ Students are grouped into several groups. ➢ The teacher gives problems in the form of questions as discussion material for each group (stimulus). ➢ The teacher provides opportunities for students to identify several problems related to the topic of discussion (problem identification). ➢ The teacher provides the opportunity to compile opinions based on the findings of existing problems (data collection). ➢ The teacher provides an opportunity for each group representative to express opinions so that the information obtained can be extracted, and the teacher can determine the students' ability to solve problems (proof).	1. Students sit according to their group division 2. Students and their groups conduct discussions to discuss the assigned problems. 3. Students identify problems related to the topic of discussion. 4. Students collect the data from the discussion. 5. Students look for references or sources to clarify opinions on answers to problems that have been obtained, the data obtained are then processed together (data processing) 6. Students draw conclusions from the opinions and results they find. The results are presented in front of the class (generalizing/drawing conclusions)	70
3	CLOSING ➢ Final learning activities	1. Students make a	10

include teacher and student activities in making conclusions about the material that has been studied.	summary of the topic. 2. Students make conclusions from the topic discussed.

3. Observation

To find out whether the procedures and results of the implementation of this class action research were in accordance with what was planned, observations were made. The things that were observed were:

a. Situation of learning activities
b. Student activities
c. Student's ability in group discussion

4. Reflection

This classroom action research is successful if it fulfills the following conditions:

a. Most students (76% of students) dared to respond and express opinions about other students' answers.
b. More than 80% of group members are active in doing their group assignments.
c. Students who achieve a minimum completeness score of more than 75%.

Second Cycle

Seperti halnya siklus pertama, siklus kedua juga terdiri dari yaitu :

1. Perencanaan, membuat rencana pembelajaran berdasarkan hasil refleksi siklus pertama
2. Pelaksanaan, guru melaksanakan pembelajaran dengan model discovery learning berdasarkan rencana pembelajaran.
3. Observasi, guru dan tim observasi melakukan pengamatan
4. Refleksi, guru melakukan refleksi terhadap pelaksanaan siklus kedua

RESULT AND DISCUSSION

a. Respondent Initial Condition

The state of the research subjects before the treatment was as follows:

1. Students have learning difficulties, especially in understanding learning concepts. This is evidenced by the ability to answer the teacher's questions at the time of the lesson which is still relatively low.
2. The ability to understand basic competencies that have not been maximized. This shows that the teaching conditions carried out by the teacher are less attractive to children, which results in non-optimal learning outcomes. The lack of a more varied way of delivering teaching and more to the use of classical methods so that students are not moved to increase their interest in learning.
3. Assignments completed by students have not been able to reach the essence of the actual task. This shows that the level of student understanding is still relatively low because both the condition of student interest and the concept of learning by the teacher are not in accordance with the actual situation and condition of the students.
4. The results of the average student learning test are still relatively low, it is 67,361. This is evidenced by the achievement of learning outcomes that are not in accordance with the expected minimum standard of completeness, which is 75.

Tabel 1. X Class Aspect Grade List Subject: Newton's Law

No	NIS	Student Name	Result	Description
1	8116	aisya putri jaenudin	80	Pass
2	8117	aliya shajali	75	Pass
3	8154	alriza mayuri sausa	70	Failed
4	8118	audita taza suryanata	65	Failed
5	8119	ayu febriyanti	55	Failed
6	8120	catherine dimukris	65	Failed
7	8121	cintya anggraeni	60	Failed

8	8122	dewi lindasari	70	Failed
9	8123	disty fithria sagita	75	Pass
10	8125	divada fitriani	75	Pass
11	8126	firzanah ghassani	50	Failed
12	8128	githa asyifa putri	75	Pass
13	8129	huwaidah fatiya rahma	65	Failed
14	8130	indang ayu safitri	70	Failed
15	8155	irma rohim	60	Failed
16	8131	jean paulina	50	Failed
17	8132	jessica anya angelica	55	Failed
18	8133	kezia averill emanuella	65	Failed
19	8134	khuzaimah fadhilah azhar	75	Pass
20	8135	muhammad ilham hasanuddin	70	Failed
21	8136	nanda ayu aisyah	65	Failed
22	8137	nur widiati	60	Failed
23	8138	preisela nataline kappuw	65	Failed
24	8139	pricillia andrea puspita yulianti	50	Failed
25	8140	putri natasya	50	Failed
26	8141	rahadatul aisy hakim	70	Failed
27	8142	rizka wahyu yulianto	70	Failed
28	8143	sabrina luandari	60	Failed
29	8144	salma rizka dewi	65	Failed
30	8145	salwa zaahi	50	Failed
31	8146	septia suci rahmanti	80	Pass
32	8147	sofia rahayu angelica	90	Pass
33	8148	syafira zahra rosyadi	80	Pass
34	8149	wilda nur rafika	85	Pass
35	8150	yulianti prasetya	80	Pass
36	8151	zahra khairunnisa	80	Pass
AVERAGE			67,3	

5. The students' interest or motivation to learn is still relatively low. This is based on all data or findings in the field through direct or indirect observations about student activities or activities that tend to be inappropriate or supportive of learning activities, even though without interest, it will be difficult for students to be able to understand or master the learning material provided. delivered by teacher.

b. Result

This research was conducted in class X Nursing Assistant at SMK Negeri 28 Jakarta in the 2018/2019 academic year with a total of 36 students. The results of the classroom action research conducted in this cycle are as follows:

a. First Cycle
   1. Planning Stage
      a. Researchers conduct curriculum analysis to determine the basic competencies possessed by students and the materials needed to master basic competencies, which will be delivered using a discovery learning model approach.
      b. Making a learning plan with a discovery learning model approach.
      c. Making instruments used in the classroom action research cycle.
      d. Develop learning evaluation tools.
   2. Implementation Stage

      At the time of the implementation of the first cycle, the implementation was not in accordance with the plan. This is due to:
      a. Most of the groups in carrying out the discussion were not yet alive and not all students were actively involved in the discussion.
      b. There has not been a caring attitude among group members.

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c. Some groups do not understand the steps of discovery learning in its entirety and thoroughly.

3. Observation and Evaluation
   a. The results of observing student activities in the teaching and learning process during the first cycle are presented in table 1 below.

Table 2. Student Activities Score in First cycle of PBM

No	Student Name	Score Gain	Score Ideal	Percentages	Description
1	aisya putri jaenudin	12	16	75	
2	aliya shajali	11	16	68,75	
3	alriza mayuri sausa	12	16	75	
4	audita taza suryanata	9	16	56,25	
5	ayu febriyanti	12	16	75	
6	catherine dimukris	16	16	100	Highest Score
7	cintya anggraeni	11	16	68,75	
8	dewi lindasari	12	16	75	
9	disty fithria sagita	8	16	50	
10	divada fitriani	8	16	50	
11	firzanah ghassani	11	16	68,75	
12	githa asyifa putri	13	16	81,25	
13	huwaidah fatiya rahma	12	16	75	
14	indang ayu safitri	12	16	75	
15	irma rohim	14	16	87,5	
16	jean paulina	10	16	62,5	
17	jessica anya angelica	11	16	68,75	
18	kezia averill emanuella	9	16	56,25	
19	khuzaimah fadhilah azhar	10	16	62,5	
20	muhammad ilham hasanuddin	11	16	68,75	
21	nanda ayu aisyah	14	16	87,5	
22	nur widiati	11	16	68,75	
23	preisela nataline kappuw	12	16	75	
24	pricillia andrea puspita yulianti	11	16	68,75	
25	putri natasya	10	16	62,5	
26	rahadatul aisy hakim	12	16	75	
27	rizka wahyu yulianto	12	16	75	
28	sabrina luandari	13	16	81,25	
29	salma rizka dewi	12	16	75	
30	salwa zaahi	8	16	50	
31	septia suci rahmanti	12	16	75	
32	sofia rahayu angelica	7	16	43,75	Lowest Result
33	syafira zahra rosyadi	10	16	62,5	
34	wilda nur rafika	10	16	62,5	
35	yulianti	12	16	75	

	prasetya			
36	zahra khairunnisa	11	16	68,75
AVERAGE		11,139	16	69,6188

a. Result of Observation of First Cycle Teacher Activities in PBM

The results of observations of teacher activities in teaching and learning activities in the first cycle are still relatively low with an average score of 27.5 or 62.5% of the maximum score of 44. This happens because the teacher is not used to applying the Discovery learning model, but also pays more attention to filling in the observation sheet, many stand in front of the class and do not give direction to students how to do discovery learning.

b. Evaluation Results in First Cycle Students' Mastery of Learning Material

In addition to teacher activities in PBM, student mastery of the subject matter is still relatively lacking. From the ideal value of 100, the average value achieved is 70.875. However, what is interesting is that there are several students who get a score of 100. Completely the results of the evaluation of mastery of the material are presented in table 3 below:

Table 3. The Results of Evaluation in The First Cycle Material: Newton's Law

No	Student Name	Result	Description
1	aisya putri jaenudin	75	Pass
2	aliya shajali	60	Failed
3	alriza mayuri sausa	100	Pass
4	audita taza suryanata	40	Failed
5	ayu febriyanti	70	Failed
6	catherine dimukris	70	Failed
7	cintya anggraeni	60	Failed
8	dewi lindasari	60	Failed
9	disty fithria sagita	85	Pass
10	divada fitriani	60	Failed
11	firzanah ghassani	60	Failed
12	githa asyifa putri	90	Pass
13	huwaidah fatiya rahma	70	Failed
14	indang ayu safitri	65	Failed
15	irma rohim	85	Pass
16	jean paulina	70	Failed
17	jessica anya angelica	70	Failed
18	kezia averill emanuella	60	Failed
19	khuzaimah fadhilah azhar	55	Failed
20	muhammad ilham hasanuddin	65	Failed
21	nanda ayu aisyah	65	Failed
22	nur widiati	70	Failed
23	preisela nataline kappuw	80	Pass
24	pricillia andrea puspita yulianti	75	Pass
25	putri natasya	75	Pass
26	rahadatul aisy hakim	90	Pass
27	rizka wahyu yulianto	80	Pass
28	sabrina luandari	75	Pass
29	salma rizka dewi	90	Pass
30	salwa zaahi	90	Pass
31	septia suci rahmanti	80	Pass
32	sofia rahayu angelica	75	Pass
33	syafira zahra rosyadi	55	Failed
34	wilda nur rafika	78	Pass
35	yulianti prasetya	55	Failed
36	zahra khairunnisa	75	Pass
AVERAGE		71,611	

4. Reflection and Re-Planning

The successes and failures that occurred in the implementation of the first cycle learning were as follows:

a. Teachers are not used to creating a learning atmosphere that leads to a learning approach with the Discovery Learning

model. This is indicated by the results of observations of teacher activities in PBM only reaching 62.5%.

b. Some students are not familiar with learning conditions using the discovery learning method. However, in PBM students show a sense of pleasure in learning. This can be seen from the observation of student activities reaching 69.6188%.
c. The evaluation results in the first cycle reached an average of 71,611.
d. There are still groups that have not been able to complete the task in the allotted time. This is because the members of the group have not been involved in active and critical and serious discussions.
e. In presenting the results of the discussion activities, it is still not going well.

To improve the weaknesses and maintain the success that has been achieved in the first cycle, then in the second cycle the planning is made as follows.

1. The teacher intensively gives understanding to students the conditions in groups, group cooperation, student participation in groups.
2. The teacher helps groups who do not understand the steps of discovery learning and students who have difficulty.
3. Motivate the group to be more active in learning.
4. Recognizing or rewarding active groups.

b. Second cycle

As in the first cycle, the second cycle consists of planning, implementation, observation and written tests, and reflection.

1. Planning

Planning in the second cycle is based on re-planning in the first cycle, there are:

a. Grouping students into 6 groups with the number of students in each group of 6 students.
b. Provide motivation to students both individually and in groups to be more active in learning.
c. More intensively guiding groups experiencing difficulties.
d. Making learning tools easier for students to understand, giving more opportunities for students to practice, demonstrating some experiments that interest students.

2. Implementation

Implementation in the second cycle has shown that the learning atmosphere has led to discovery learning. The task given by the teacher to the group can be done well. Students in groups show good cooperation and help each other to master the subject matter that has been given through question and answer and discussion among fellow group members. There has also been an effective and fun learning atmosphere.

3. Observation and Evaluation
   a. Observation
      1) Teacher Activities

The results of teacher observations in teaching and learning activities in the second cycle showed a very significant increase, indicated by an increase in the average score acquisition. In the second cycle, the average score was 36 or 81.818% of the ideal score of 44.

1) Student Activities

The results of observing student activities in PBM during the second cycle can be seen in table 4 below:

No	Student Name	Score Gain	Ideal	Percentages	Description
1	aisya putri jaenudin	14	16	87,5	

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2	aliya shajali	16	16	100	Highest Result
3	alriza mayuri sausa	16	16	100	Highest Result
4	audita taza suryanata	13	16	81,25	
5	ayu febriyanti	15	16	93,75	
6	catherine dimukris	16	16	100	Highest Result
7	cintya anggraeni	14	16	87,5	
8	dewi lindasari	14	16	87,5	
9	disty fithria sagita	13	16	81,25	
10	divada fitriani	14	16	87,5	
11	firzanah ghassani	15	16	93,75	
12	githa asyifa putri	13	16	81,25	
13	huwaidah fatiya rahma	10	16	62,5	
14	indang ayu safitri	11	16	68,75	
15	irma rohim	15	16	93,75	
16	jean paulina	15	16	93,75	
17	jessica anya angelica	14	16	87,5	
18	kezia averill emanuella	13	16	81,25	
19	khuzaimah fadhilah azhar	13	16	81,25	
20	muhammad ilham hasanuddin	14	16	87,5	
21	nanda ayu aisyah	16	16	100	Highest Result
22	nur widiati	13	16	81,25	
23	preisela nataline kappuw	13	16	81,25	
24	pricillia andrea puspita yulianti	12	16	75	
25	putri natasya	13	16	81,25	
26	rahadatul aisy hakim	15	16	93,75	
27	rizka wahyu yulianto	16	16	100	Hghest Result
28	sabrina luandari	12	16	75	
29	salma rizka dewi	13	16	81,25	
30	salwa zaahi	15	16	93,75	
31	septia suci rahmanti	13	16	81,25	
32	sofia rahayu angelica	8	16	50	Lowest Result
33	syafira zahra rosyadi	14	16	87,5	
34	wilda nur rafika	13	16	81,25	
35	yulianti prasetya	13	16	81,25	
36	zahra khairunnisa	13	16	81,25	
Rata -rata perolehan aktivitas		13,222	16	82,6375	

a. Evaluation

The results of the test on mastery of the subject

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matter are shown in table 5 below:

Table 4. Evaluation Results in The Second Cycle of Class X Nursing Academy

No	Student Name	Result	Description
1	aisya putri jaenudin	85	Pass
2	aliya shajali	85	Pass
3	alriza mayuri sausa	100	Pass
4	audita taza suryanata	70	Failed
5	ayu febriyanti	80	Pass
6	catherine dimukris	90	Pass
7	cintya anggraeni	85	Pass
8	dewi lindasari	80	Pass
9	disty fithria sagita	85	Pass
10	divada fitriani	75	Pass
11	firzanah ghassani	100	Pass
12	githa asyifa putri	90	Pass
13	huwaidah fatiya rahma	70	Failed
14	indang ayu safitri	70	Failed
15	irma rohim	95	Pass
16	jean paulina	85	Pass
17	jessica anya angelica	85	Pass
18	kezia averill emanuella	80	Pass
19	khuzaimah fadhilah azhar	80	Pass
20	muhammad ilham hasanuddin	85	Pass
21	nanda ayu aisyah	70	Failed
22	nur widiati	80	Pass
23	preisela nataline kappuw	80	Pass
24	pricillia andrea puspita yulianti	80	Pass
25	putri natasya	80	Pass
26	rahadatul aisy hakim	100	Pass
27	rizka wahyu yulianto	85	Pass
28	sabrina luandari	80	Pass
29	salma rizka dewi	90	Pass
30	salwa zaahi	95	Pass
31	septia suci rahmanti	85	Pass
32	sofia rahayu angelica	75	Pass
33	syafira zahra rosyadi	75	Pass
34	wilda nur rafika	80	Pass
35	yulianti prasetya	75	Pass
36	zahra khairunnisa	80	Pass
	AVERAGE	82,91667	

Evaluation of material mastery is carried out in writing in the form of a formative test [8]. The results of the formative test at the end of the second cycle the average value was 82,91667.

4. Reflection

In the second cycle experienced a very significant success, as for the successes obtained are as follows:

a. Applying the provision that student scores are the result of students' test scores and group average scores are very supportive and make students more active in the PBM process, care more about fellow group members and dare to express opinions. Also students managed to build good cooperation in discussing questions or problems given by the teacher so that discussions in groups were lively.
b. Student activities in the teaching and learning process (PBM) have led to better discovery learning. In the group there has been a good interaction in the learning process. This shows a significant change in the achievement of scores, namely the evaluation results at the end of the second cycle increased from an average of 71,611 to 82,91667.
c. Increased student activity in PBM is supported by increased teacher activity in maintaining student motivation, intensively guiding and encouraging students to be active in group discussions. The planned discovery

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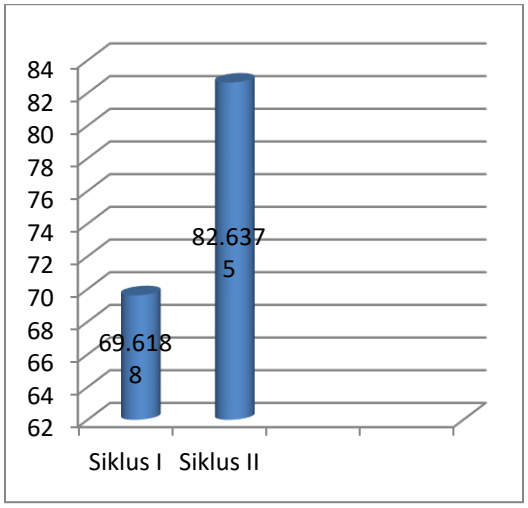
learning method can be implemented well.

c. Discussion

This classroom action research has been carried out in two cycles, in which the second cycle is an improvement in the refinement of the learning process in the first cycle. Based on observational data, the results of the material mastery test and linking the actions taken in the second cycle as an effort to improve or perfect the implementation of the first cycle, several successes and explanations can be stated as follows:

1. Student Activity is Very Good

There was a significant increase in activity in the second cycle, as shown by changes in activity as shown in graph 1 below:



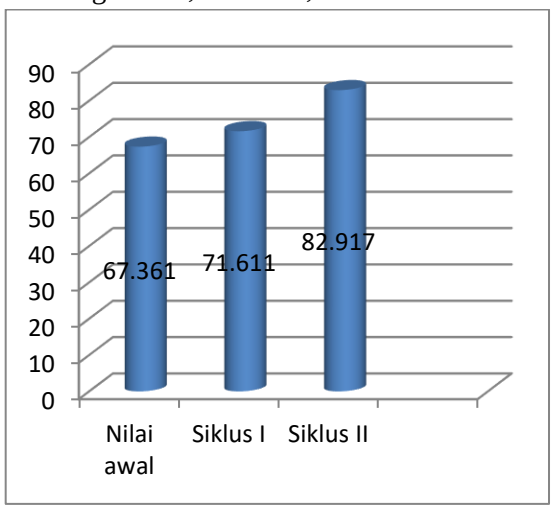
Picture 1. Significant Increase in Activity in The Second Cycle

This change in student activity is not only because the teacher already has experience in implementing the discovery learning model, the teacher's activity in maintaining student motivation, intensively guiding and encouraging students to be active in group discussions. The planned discovery learning method can be implemented

So that it motivates students well and can manage the course of learning in class effectively and efficiently. Besides, students have developed a caring attitude among group members as a result of the application of student scores which are the result of student test scores and group average scores with a certain weighting.

2. Increased Mastery of The Material by Student

This can be seen from the results of the material mastery test that experienced a significant change in the achievement of scores, namely the evaluation results at the end of the second cycle increased from an average of 71,611 to 82,91667.



Picture 2. Evaluation Result at The End of The Second Cycle

Student activities in the teaching and learning process (PBM) have led to better discovery learning, which this process did not appear in the first cycle. In the group there has been a good interaction in the learning process. Mastery of student knowledge which was originally the responsibility of students concerned with weighting values becomes the responsibility of the group as well. They will work together positively so that each member of the group has good mastery of the material.

SUMMARY

Based on the results of the classroom action research that has been carried out, it can be concluded as follows.

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1. The application of discovery learning methods can increase student activity in the teaching and learning process.
2. Learning this model is able to eliminate the impression of students that learning physics is far from pleasant.
3. Through the discovery learning method, students' self-confidence grows because through the planned stages students feel that students themselves have built their knowledge of Newton's laws and the concept of force through group discussions.
4. From the results of observations in the second cycle showed that student activity was very good, namely 82,6375 %.
5. Student mastery of learning materials showed a significant increase in learning that did not use this concept the average score was 67,361 while with this model the average value was 82,91667.

REFERENCES

[1] D. Hareva, "Peningkatan Strategi Hasil Belajar IPA Fisika pada Poses Pembelajaran Team Gateway," *J. Ilm. AQUINAS*, vol. 3, no. 2, hlm. 161–186, Jul 2020.

[2] A. L. Ratna Sari, P. Parno, dan A. Taufiq, "Pemahaman Konsep dan Kesulitan Siswa SMA pada Materi Hukum Newton," *J. Pendidik. Teori Penelit. Dan Pengemb.*, vol. 3, no. 10, hlm. 1323—1330, Oktober Tahun 2018.

[3] H. J. Lesilolo, "Penerapan Teori Belajar Sosial Albert Bandura Dalam Proses Belajar Mengajar di Sekolah," *J. KENOSIS*, vol. 4, no. 2, hlm. 186–202, Desember 2018.

[4] A. Syafi'i, T. Marfiyanto, dan S. K. Rodiyah, "Studi Tentang Prestasi Belajar Ssiswa Dalam Berbagai Aspek dan Faktor yang Mempengaruhi," *J. Komun. Pendidik.*, vol. 2, no. 2, hlm. 115–123, Jul 2018.

[5] U. I. Syahroni dan M. Mu'arifin, "Upaya Meningkatkan Hasil Belajar Tolak Peluru Gaya Ortodoks melalui Metode Discovery Learning Pada Siswa Smp Kelas VIII," *Sport Sci. Health*, vol. 2, no. 7, hlm. 367–375, 2020.

[6] M. Munir dan H. Sholehah, "Metode Pembelajaran Dengan Pendekatan Discovery Learning Dalam Mengembangakan Kemampuan Berpikir Kreatif," *Elem. J. Ilm. Pendidik. Dasar Islam*, vol. 1, no. 2, Nov 2019.

[7] R. Asmara dan E. A. Afriansyah, "Perbedaan Peningkatan Kemampuan Komunikasi Matematis Siswa antara Model Eliciting Activities dan Discovery Learning," *Suska J. Math. Educ.*, vol. 4, no. 2, hlm. 78–87, 2018.

[8] D. Kasiono, "Peningkatan Kemampuan Menyusun Soal Dengan Metode Pendampingan Berpola SP3R pada Guru SDN Sepanyul Kecamatan Gudo Kabupaten Jombang Tahun 2018," *J. Din. Manaj. Pendidik.*, vol. 4, no. 1, hlm. 33–41, 2019.