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IMPROVING BIOLOGICAL SCIENCE LEARNING OUTCOMES WITH USED A CONTEXTUAL-BASED INQUIRY APPROACH THE CONCEPT OF PHOTOSYNTHESIS IN CLASS VIII STUDENTS OF JUNIOR HIGH SCHOOL NEGERI 2 AMBON

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ABSTRACT

The inquiry approach is one of the approaches proposed by experts to be developed in the learning process. Where inquiry learning teaches students how to research problems or questions of facts. Learning used an inquiry approach requires a classroom environment where students feel free to create, make assumptions and draw conclusions. The aim of this research is to determine the improvement in biological science learning outcomes regarding the concept of photosynthesis used a contextual-based inquiry learning approach for class $VIII_3$ students at Junior Hight School Negeri 2 Ambon. This type of research includes descriptive research using a PTK design. This research was conducted at a Junior High School Negeri 2 Ambon. The subjects in this research were students in class $VIII_3$ as many as 26 students. Data analysis uses qualitative data, then the final value is converted using completeness criteria. Based on the tests gived in cycle I, the final test results for each group were not significant. In group I, only 4 students (15.4%) had not reached the completion criteria and 5 other students were able to achieve completion with a percentage (19.2%). The number of students who achieved completeness in group II was 7 students (27.0%), and 2 other students (7.7%) did not achieve completeness. Meanwhile in group III, there were 5 students who were able to achieve completeness with a percentage of (19.2%) and 3 students (11.5%) who did not achieve completeness. Thus, there were 9 students (34.6%) who had not achieved completeness and 17 students (65.4%) had achieved completeness. Meanwhile, in cycle II the test results increased. In group I, there were 5 students who met the completion criteria with a percentage of 19.2%, 4 other students still had not completed it. Group II increased even more, 7 students (27%) met the criteria for completion while 2 students (7.7%) still did not complete. In group III there were 5 students (19.2%) who met the criteria for completion, and 3 other students (11.5%) who still had not completed it. The final test seems to show very good results. The conclusion of the research was taught used a contextual-based inquiry approach to the concept of photosynthesis can improve student learning outcomes, seen in cycle I and cycle II because the cognitive, affective and psychomotor aspects can improved.

Keywords: *biological science, inquiry, photosynthesis, learning.*

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INTRODUCTION

Education is always undergoing renewal in order to find effective and efficient curriculum structures, education systems and teaching methods. These efforts include improving facilities and infrastructure, improving the quality of educators and students as well as changing and improving the curriculum. Based on

research conducted by Yogianto (2020), it was found that the learning process in schools still tends to apply a unidirectional learning model, namely teacher to student or teacher as the center (teacher center) so that students tend to only receive material from the teacher. This shows that one of the problems of education in Indonesia lies in the learning process, namely that students are less motivated to develop thinking skills (Sanjaya, 2020). Learning is a part or element that has a very dominant role in realizing the quality of both educational processes and graduates. Learning also has an influence that causes the quality of education to be low. This means that learning really depends on the teacher's ability to carry out the learning process. Learning that is carried out well and precisely will make a very dominant contribution to students, whereas learning that is carried out in a bad way will make it difficult for students to develop or be empowered (Muchith, 2020). Therefore, efforts to improve the quality of education should start from improving teacher capabilities. One of the abilities that teachers must have is how to design a learning strategy using methods, approaches, that are in accordance with the goals or competencies to be achieved (Sanjaya, 2020).

Based on the results of observations at Junior High School Negeri 2 Ambon, the ongoing learning process has progressed. Even though it is not significant, efforts have been made to actively involve students in the learning process. Opportunities for students to develop thinking and reasoning abilities already exist, although on a small scale. This can be seen clearly in class $VIII_3$ where when the learning process takes place and is supported by practicum activities, students are not yet able to independently analyze, answer and conclude what happened in the practicum through student worksheets. But still using the book as a reference to draw a conclusion. In fact, if we look at it, schools have the potential to improve the quality of learning that prioritizes student creativity and innovation. Apart from that, the minimum completeness criteria standards set by schools require teachers to more optimally activate learning so that ultimately they can achieve the minimum complete criteria and must even be above average. Achieving the minimum complete criteria is not only an academic requirement for school but the most important thing is to form students' ability to critically analyze the application of each theory studied to everyday life.

The inquiry approach is one of the approaches proposed by experts to be developed in the learning process. Learning where inquiry teaches students how to investigate problems or questions of facts. Learning using an inquiry approach requires a classroom environment where students feel free to work, make assumptions and draw conclusions. This atmosphere is very important, because the success of learning depends on the state of students' thinking. Inquiry provides the opportunity, space and encouragement to learn various skills-determining when to give a touch, determining when to observe, hypothesizing, determining how to tolerate doubt. In carrying out inquiry, attitudes are needed that are objective, open, honest, full of curiosity. One of the concepts raised from biology learning material is the concept of photosynthesis. This concept is in the second to last part of all second semester biology subject concepts in class VIII. And this is one of the factors in the incompleteness of this material. This is because the teacher's preoccupation with class X students is more dominant in preparing for the exam, so that class VIII students are only given a summary. This of course will affect students' memory, and make students unable to develop their abilities. Both from an affective and psychomotor perspective. Basically, class VIII Junior High School students who study the concept of photosynthesis not only know the process that occurs but can observe it directly and are able to demonstrate the application of the process that takes place. For example, by showing the factors that influence photosynthesis or the products of the photosynthesis process through practical activities. And this can indirectly motivate students to be more active, creative and independent to be able to develop thinking and analyzing skills and be able to draw conclusions from an incident according to the facts they see and observe.

METHOD

This type of research includes descriptive research using a PTK design. This research was conducted at a junior high school Negeri 2 Ambon. The subjects in this research were students in class $VIII_3$ of Junior High School Negeri 2 Ambon as many as 26 students.

The research instruments used are:

1. Syllabus
2. Lesson plan
3. Student worksheet
4. Learning outcomes test consisting of an initial test and a final test
5. Observation sheet

Research procedure

This research uses classroom action research used 2 cycles. Where the first cycle consists of four stages, namely:

Cycle I

1. Planning

At this stage, the research teacher together with the students regulates the class conditions and creates comfortable classroom conditions to support learning activities at that time. For example, by preparing learning tools that are relevant to the learning material such as a learning implementation plan (RPP), which explains the learning objectives and logistics required, guiding students in discovering a phenomenon that occurs, encouraging students to be able to hypothesize themselves, collect information, test hypotheses and be interesting, conclusions and then prepare worksheets and observation sheets.

2. Action

The research teacher then carries out and provides action in the form of applying the concepts that are the learning objectives according to the RPP. This research was conducted in 2 meetings in one cycle. The learning process is carried out according to the Inquiry learning model, where the teacher conveys the competencies to be achieved. The teacher presents the initial material, then divides the students randomly into 3 groups (each group of 5-6 students). After that, the teacher gives students worksheets containing work instructions and introductory questions. The teacher directs students to work in groups according to existing instructions. Where students can discover a real phenomenon, then students are given the opportunity to hypothesize temporarily, then students will look for the information needed to strengthen their hypothesis. And in the end students will draw conclusions about their answers. At the first meeting, the teacher begins the learning process by providing apperception and motivation in the form of questions that can help students understand the material being taught. After giving an apperception, the teacher then conveys the competency standards, basic competencies, indicators and learning objectives to be achieved. Then the researcher gave an initial test to test students' initial readiness and understanding of the material being taught. Based on the results obtained, it shows that the initial test in cycle I was still low. After carrying out the initial test, the researcher then continued with the core activities by applying a contextually based inquiry learning approach.

At the second meeting, the learning process continued to use the same learning approach, namely Contextual Based Inquiry. At the end of the second cycle learning process, the researcher gave a final test to test students' understanding of the photosynthesis material taught by the teacher.

3. Observation and evaluation

Observations are carried out simultaneously while carrying out the action. And what was observed were students carrying out learning activities and research teachers carrying out actions. Observations of students were carried out by research teachers who taught, while research teachers were observed by tutor teachers or colleagues. The results of observations of research students and teachers were then evaluated.

4. Reflection

The reflection stage is the final stage of a cycle. This stage includes an evaluation of the actions that have been carried out in cycle I and is based on the results of the analysis of the initial test, final test, affective assessment sheet, psychomotor assessment sheet, and assessment sheet of the researcher's abilities when carrying out the learning process. From the results of this analysis as a whole, students have not been able to reach the minimum criteria standard, so the results will be used as an action plan in cycle II.

Cycle II

In the second cycle the stages carried out are the same as in the first cycle. However, in the second cycle, the stage was preceded by a redesign based on the results obtained in the first cycle. So that the weaknesses in the first cycle can be overcome in the second cycle.

1. Planning

At this stage it is still the same as the first cycle where the teacher and students regulate the class conditions and create a comfortable learning atmosphere. By preparing learning tools that are relevant to the learning material. And material or indicators that have not been completed in the first cycle will be repeated in the second cycle by starting to modify the learning process. Prepare worksheets and observation sheets.

2. Action.

The research teacher then provides action in the form of applying the concepts that are the learning objectives according to the RPP. The learning process still uses a contextual-based inquiry approach. Where the teacher provides apperception or questions that can help students remember the lessons that have been taught. After that the teacher divides the students into 3 large groups, each group consisting of 5-6 people.

After that, the teacher distributes LKS to students to carry out practical activities, and students will work independently according to the work steps that are on the LKS. This stage is slightly different from the first cycle, where in the first cycle students will work together in groups according to the instructions on the LKS, but in the second cycle students will work individually in groups. This is intended so that individual students can better understand and comprehend what is found. Students who have carried out practical activities record what they found and what hypotheses can be put forward. After that, students together in groups look for information related to their hypothesis and jointly express their final conclusions. In the second cycle, two meetings were held. At the first meeting several learning indicators that were not successful in the first cycle were discussed, and at the second meeting a final test was carried out.

3. Observation and Evaluation

Observations are carried out simultaneously while carrying out the action. And what was observed were students carrying out learning activities and research teachers carrying out actions. From the results of observations it can be said that there is an improvement in students. Students are increasingly active and confident to be independent in the learning process which is supported by practical activities. Observations of students were carried out by research teachers who taught, while research teachers were observed by tutor teachers or colleagues. The results of observations of research students and teachers were then evaluated.

4. Reflection

The reflection stage is the final stage of a cycle. This stage includes an evaluation of the actions carried out in cycle II based on the results of the affective assessment sheet, psychomotor assessment sheet, and assessment sheet of the researcher's abilities when carrying out the learning process and the results of the final test. And from the results of the analysis obtained, it turns out that students as a whole have understood and comprehended the concept taught, namely the concept of photosynthesis using a Contextual Based Inquiry approach. This can be seen clearly by the increase in students' final test results which have reached or even exceeded the minimum criteria, the increase in student assessment results on affective and psychomotor sheets.

Data Analysis

Data analysis used qualitative data. Then the final score is converted using the following completion criteria:

Classification of value achievement percentage

Achievement Criteria	Classification
90%-100%	Very good
70%-89%	Good
60%-79%	Enough
40%-59%	Less
≤ 39%	Bad

RESULTS AND DISCUSSION

Cycle I

1. Cognitive assessment results.

Based on the evaluation in cycle I, the results can be described as follows:

Tabel 1. List of test scores students class VIII$_3$ Junior High School Negeri 2 Ambon

Group	Value	Pretest			Value	Final Test		
		Frequency	Percentage (%)	Info		Frequency	Percentage (%)	Info
I	≥ 63	0	0	Complete	≥ 63	5	19,2	Complete
	< 63	9	34,6	Not complete	< 63	4	15,4	Not complete
II	≥ 63	0	0	Complete	≥ 63	7	27	Complete
	< 63	9	34,6	Not complete	< 63	2	7,7	Not complete
III	≥ 63	0	0	Complete	≥ 63	5	19,2	Complete
	< 63	8	30,8	Not complete	< 62	3	11,5	Not complete
Amount		26	100			26	100	

Table of initial test results, groups I and II, each of which had 9 students, all did not meet the criteria for completion with a percentage of 34.6%. In group III, which consisted of 8 students (30.8%), had not yet achieved completion. So, in the initial test all students (100%) did not meet the completeness criteria. For the final test results, there was a change in each group, although it was not significant. In group I, only 4 students (15.4%) had not reached the completion criteria and 5 other students were able to achieve completion with a percentage (19.2%). The number of students who achieved completeness in group II was 7 students (27.0%), and 2 other students (7.7%) did not achieve completeness. Meanwhile in group III, there were 5 students who were able to achieve completeness with a percentage of (19.2%) and 3 students (11.5%) who did not achieve completeness. Thus, there were 9 students (34.6%) who had not achieved completeness and 17 students (65.4%) had achieved completeness.

At the start of a classroom action research, an initial test is carried out to determine students' initial abilities. It is important for teachers to know students' initial abilities before they start learning, because in this way they can know whether students have the knowledge that is a prerequisite for participating in learning. Students' initial abilities can be measured through initial tests (AL-Kadiri, 2020). From the results of the initial test analysis, students' overall initial ability to understand the concept of photosynthesis is still below average because they do not meet the minimum completeness criteria. Students have difficulty with the third indicator, namely explaining the parts of the leaf that play a role in the photosynthesis process; fourth indicator, conducting photosynthesis experiments; and the fifth indicator, namely explaining the benefits of photosynthesis in relation to energy transformation. The three indicators mentioned above have a comprehensive principle. Because it is classroom action research, based on the initial test results, the researcher then designed a learning process using an inquiry learning approach. During the learning process, students seemed enthusiastic about learning and there was an increase in their results on the final test, although not significantly and comprehensively. According to Purnomo (2020), minimum completeness criteria are used as a reference for teachers in assessing student competency according to the basic competency of the subjects being followed. Each basic competency and indicator sets minimum criteria that must be achieved and mastered by students.

2. Affective Assessment Results

The results of affective research based on observations during cycle I for each group of all indicators are as follows:

Tabel 2. List of test scores students class $VIII_3$ Junior High School Negeri 2 Ambon

Intervals	Group						Classification
	I		II		III		
	Frequency	Percentage (%)	Frequency	Percentage (%)	Frequency	Percentage (%)	
85-100	0	0	0	0	0	0	Very good
70-84	7	27	1	3,8	3	11,5	Good
60-69	1	3,8	7	27	3	11,5	Enough
40-59	1	3,8	1	27	2	7,7	Less
<39	0	0	0	0	0	0	Bad

The table above shows that there is no group that occupies the 85-100 interval with a very good classification score. In good classification with an interval of 70-84, group I has a frequency of 7 students (27%), group II 1 student (3.8%) and group III 3 students (11.5%). In the 60-69 interval with sufficient classification, group I had a percentage of 1 student (3.8%), group II had 7 students (27%) and group III had 3 students (11.5%). Poor classification with an interval of 40-59, group I and group II have the same percentage, namely 3.8% (1 student), while group III has a percentage of 7.7% (2 students). Thus, the highest score for the entire group was in the interval 70-84 (good classification) and interval 60-69 (fair classification) with a total percentage of 42.3%, followed by the interval 40-59 with a poor classification with a percentage of 38.5%.

The comparative percentage in the affective domain based on the level of classification achieved by each group shows that even though the classification of good grades is at the top because it has the highest percentage, this does not mean that students' affective abilities are considered complete. In fact, there are still students who are classified as having low grades. Sudrajat (2020) classifies the affective domain into 5 characters, namely attitudes, interests, self-concept, values and morals. Attitudes, interests and self-concept

as characteristics are closely related to the inquiry learning model implemented in the learning process. Where in the learning process students are required to be more critical, and have a high interest in being able to investigate an event or phenomenon and be able to formulate their own hypothesis as a self-concept. Thus, from the results of observations during the presentation of photosynthesis material and accompanying practical activities to the assessment results obtained in the value classification, the three characteristics above are in the good category and need to be developed.

3. Psychomotor Assessment Results

The results of the psychomotor assessment based on observations during cycle I by each group of all indicators are as follows:

Tabel 3. List of test scores students class $VIII_3$ Junior High School Negeri 2 Ambon

Intervals	Group						Classification
	I		II		III		
	Frequency	Percentage (%)	Frequency	Percentage (%)	Frequency	Percentage (%)	
85-100	0	0	0	0	0	0	Very good
70-84	2	7,7	1	3,8	3	11,5	Good
60-69	4	15,4	2	7,7	1	3,8	Enough
40-59	3	11,5	6	23	3	11,5	Less
<39	0	0	0	0	1	3,8	Bad

The psychomotor assessment for all indicators by each group based on the table above shows that there is no group that is in the 85-100 interval with a very good classification. In the 70-84 interval good classification, group I had a frequency of 2 students (7.7%), group II had 1 student with a percentage of 3.8% and group III had a frequency of 3 students (11.5%). In the 60-69 interval, the classification is sufficient, group I has a percentage of 15.4% (4 students), group II has 2 students with a percentage of 7.7%, and group III has only 1 student (3.8%). Then for the interval 40-59 the classification was poor, group I and group III both had a frequency of 3 students (11.5%), and group II had a percentage of 23% (6 students). In the last interval, namely 39 and below, there were no classifications in either group I or group II, while in group III there was 1 student (3.8%). Thus, the 40-59 interval of poor classification has the highest percentage, namely 46%, followed by the interval 60-69, good classification has a percentage of 26.9%, then the interval 70-84, good classification has a percentage of 23%, and the last is interval 39 and below the classification is not good with a percentage of 3.8%.

Psychomotor learning outcomes were put forward by Simpson (2020) who stated that psychomotor learning outcomes appear in the form of individual skills and ability to act. These psychomotor learning outcomes are actually a continuation of cognitive learning outcomes (understanding something) and affective learning outcomes (which only appear in the form of behavioral tendencies). Cognitive learning outcomes and affective learning outcomes will become psychomotor learning outcomes if students have demonstrated certain behavior or actions in accordance with the meaning contained in the cognitive domain and affective domain with disciplinary material.

Cycle II

1. Cognitive outcomes

The results of the cognitive assessment in cycle II can be seen in table 4 below.

Tabel 4. List of test scores students class $VIII_3$ Junior High School Negeri 2 Ambon

Group	Value	Pretest			Value	Final test		
		Frequency	Percentage (%)	Info		Frequency	Percentage (%)	Info
I	≥ 63	5	19,2%	Complete	≥ 63	9	34,6	Complete
	< 63	4	15,4	Not complete	< 63	0	0	Not complete
II	≥ 63	7	27	Complete	≥ 63	9	34,6	Complete
	< 63	2	7,7	Not complete	< 63	0	0	Complete

III	≥ 63	5	19,2	Complete	≥ 63	8	30,8	Complete
	< 63	3	11,5	Not complete	< 63	0	0	Not complete
Amount		26	100			26	100	

The table above shows that the student test results have increased compared to cycle I. In group I, there were 5 students who met the completion criteria with a percentage of 19.2%, 4 other students still had not completed it. Group II increased even more, 7 students (27%) met the criteria for completion while 2 students (7.7%) still did not complete. In group III there were 5 students (19.2%) who met the criteria for completion, and 3 other students (11.5%) who still had not completed it. The final test seems to show very good results. All students divided into three groups succeeded in meeting the completion criteria. From the results of this final test it can be stated that students are able to achieve the criteria for 100% completeness.

Bloom (1982:11) suggests three main factors that influence learning outcomes, namely cognitive ability, achievement motivation and learning quality. Learning quality is the quality of learning activities carried out and this concerns the learning model used (Kiranawati, 2020). Cognitive ability which is said to be an external factor in influencing learning outcomes is a form of mastery of concepts possessed by students during the learning process. In cycle II, the learning process continues to use a contextual-based inquiry learning approach, but researchers have made changes to teaching methods and techniques that were considered lacking in cycle I. Students' ability to think critically and students' courage to draw a hypothesis continues to be developed. so that students are able to independently solve a phenomenon through direct observation. And the teacher is only a complement in explaining the material to students.

2. Affective Assessment Results

The results of the affective assessment based on observations during cycle II for each group of all indicators are as follows:

Tabel 5. List of test scores students class $VIII_3$ Junior High School Negeri 2 Ambon

Intervals	Group						Classification
	I		II		III		
	Frequency	Percentage (%)	Frequency	Percentage (%)	Frequency	Percentage (%)	
85-100	7	26,9	6	23	4	15,4	Very good
70-84	2	7,7	3	11,5	4	15,4	Good
60-69	0	0	0	0	0	0	Enough
40-59	0	0	0	0	0	0	Less
<39	0	0	0	0	0	0	Bad

Table 5 shows that group I is in the very good classification (interval 85-100) with a frequency of 7 students (26.9%), 2 other students (7.7%) are in the 70-84 interval good classification. In group II, 6 students with a percentage of 23% had a very good score classification in the 85-100 interval, 3 students (11.5%) had a good score classification in the 70-84 interval. In group III, students were evenly distributed in very good and good classifications (15.4% each with a frequency of 4 people). So there are no groups that are classified as sufficient, poor or not good.

Each indicator assessed in the affective domain, in principle, has the same value as the overall assessment in the affective domain above. All groups were classified as good to very good, while the classification as fair, poor and not good had a percentage of 0%. What is different is that the assessment results are analyzed for each indicator in each group, while the previous results above are assessed as the final results of all assessment indicators. The first and second assessment indicators in the affective domain, namely class attendance and group attendance, have the same grade classification, namely very good. Regarding mutual respect for individual differences as the third indicator assessed, the three groups are in the same value classification, namely the good value classification. This happens because teacher guidance which emphasizes the importance of respecting individual differences to enrich students' insight has been well understood by students. In the fourth indicator, namely active listening attitude, the attention of students in group I and group III is very high, seen from the classification obtained, which is in the very good score classification. Meanwhile, group II is in the good value classification. This shows that students have begun to focus their full attention on the teacher's explanation. Active listening is the highest level of listening and

requires the largest portion of the listener. Gendhotwukir (2020), defines listening as the process of interpreting what is heard and mentally organizing it so that it can be accepted by reason.

3. Psychomotor Assessment Results

The results of the psychomotor assessment based on observations during cycle II by each group of all indicators are as follows:

Tabel 6. List of test scores students class $VIII_3$ Junior High School Negeri 2 Ambon

Intervals	Kelompok						Classification
	I				III		
	Frequency		Frequency	Percentage (%)	Frequency	Percentage (%)	
85-100	7	Very good	5	19,2	6	23	Sangat baik
70-84	2	Good	2	7,7	2	7,7	Baik
60-69	0	Enough	2	7,7		0	Cukup
40-59	0	Less	0	0		0	Kurang
<39	0	Bad	0	0		0	Tidak baik

Table 6 above shows that all psychomotor assessment indicators in each group have increased. Group I which has a very good score classification in the 85-100 interval is 7 students with a percentage of 26.9% and 2 students (7.7%) who are in a good score classification in the 70-84 interval. Group II, there are 5 students (19.2%) who have a very good score classification in the 85-100 interval, 2 students (7.7%) in the 70-84 interval have a good score classification and 2 more students are in the fair score classification. percentage of 7.7% in the 60-69 interval. Meanwhile in group III, the very good score classification (interval 85-100) has a frequency of 5 students, 6 students (23%) and 2 other students (7.7%) are in the 70-84 interval, good score classification. So, there are no students who are in the poor or poor classification for the 40-59 and 39 and below intervals.

Makmun (2020) states that there are two factors that influence diversity in personality and skills, namely, birth and experience of interaction with the environment, including through the learning process. So based on the assessment results, the emergence of various variations in achievement apart from individual characteristics which are essentially different, the interaction of the learning environment in the classroom also influences it. However, this diversity does not provide bad value for students' psychomotor skills. With the developed learning approach, students become more skilled at improving their thinking abilities.

CONCLUSION

Research conducted on class $VIII_3$ students of Junior High School Negeri 2 Ambon, taught used a contextual-based inquiry approach to the concept of photosynthesis can improve student learning outcomes, seen in cycle I and cycle II because cognitive, affective and psychomotor aspects can be improved

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