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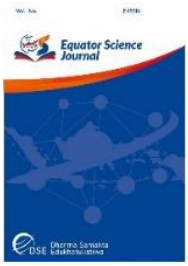

Implementation of Contextual Teaching and Learning (CTL) Strategies and Field Visit Techniques to Improve Students' Learning Outcomes

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PTK, Contextual Teaching and Learning (CTL), Field Visits, Learning Outcomes

ABSTRACT
This study aims to determine the effectiveness of the Contextual Teaching and Learning (CTL) learning model and Field Visit Techniques in Biotechnology learning for class IXC students of SMP Negeri 7 Sukabumi City in the 2022/2023, in terms of: (1) student learning motivation, (2) student learning outcomes in biotechnology learning by using Contextual Teaching and Learning (CTL) learning models and Field Visit Techniques. The research population was 25 class IXC students. The instruments used were student activity observation sheets and learning achievement tests. The data analysis technique uses a comparative descriptive analysis of test results between cycles with predetermined work indicators. The research results show that the effectiveness of the Contextual Teaching and Learning (CTL) learning model in science learning for class IXC students at SMP Negeri 7 Kota Sukabumi in the 2022/2023 academic year is effectively applied in learning. This research has obtained information regarding the effectiveness of the Contextual Teaching and Learning (CTL) learning model in biotechnology learning for students in IXC class, SMP Negeri 7 Sukabumi, in the 2022/2023 academic year.

INTRODUCTION

In essence, science is born because of the desire to know in humans. This desire arises because of the ever-evolving demands and needs in life. Science cannot be prevented because humans with their intellectual potential continue to think and produce findings that are in accordance with the problems faced and the needs at that time. Beside that, we are very happy to increase rapid development of science in various fields of scientific study so that it will further add to the meaning of life lived, on the other hand, the development of science that is not based on positive and moral values will result in misuse which will damage and destroy the order of things existing life (Gilang, 2020).

One of science and technology that is currently developing is biotechnology. Facing the rapid progress of biotechnology, what should be done to anticipate it, especially the negative impacts that may be caused to the environment. The application of biotechnology will be successful if it integrates several disciplines of natural science and technology. The natural sciences are microbiology, biochemistry, genetics, molecular biology, chemistry, genetic engineering and other chemical engineering. But unfortunately, not many students understand the application of biotechnology both in the school environment and in the community, students' knowledge of biotechnology is still lacking and the facilities available at schools are also minimal (Kodir, 2018)

Therefore a learning strategy is needed that contains techniques to improve students' self-concept so that they are better at learning and are able to assist teachers in connecting environmental material taught with reality, so that students are expected to better understand the benefits and negative impacts of biotechnology developments. Because most of the students have not been able to make a connection between what they are learning and how they can use/utilize that knowledge, it is necessary to have real experiences that are felt by students, and if this cannot be carried out in schools, field visits are carried out to see directly about the application of biotechnology in meeting the needs of society and also understanding the resulting negative impacts.

The Contextual Teaching and Learning (CTL) learning model applied by science teachers is still very simple. Thus, the ability of students also becomes limited in applying the knowledge they have. Based on the documents taken from the science subject teacher at SMP Negeri 7 Kota Sukabumi, the average score of the students during the daily test on biotechnology material was obtained in Table 1.

Table 1. Average daily test scores on Biotechnology Materials for class IX at SMP Negeri 7 Sukabumi City

No	Year of Study	KKM score	Students who achieve KKM	Students who have not reached KKM
1	2019/2020	7,70	23 %	77%
2	2020/2021	7,70	20 %	80% (pandemic)
3	2021/2022	7,70	17 %	87% (pandemic)

Based on the results of a preliminary study at the research location by class IX researchers in recent years several things were found, namely the low percentage of KKM scores in daily tests on biotechnology material in the past few years. The lack of achievement of student scores are due to the fact that in the learning process, especially in biotechnology material at SMP Negeri 7 Sukabumi City, there are still some learning problems that are not in line with educational expectations and goals. Starting from these problems, it can be concluded that the implementation of the science learning process in these schools is still less effective and optimal. Where, the implementation of the learning process is still less effective, the responses and activities of students in learning are still lacking, and student learning outcomes are still classified in the unfavorable category. Such learning conditions will have an impact on the effectiveness of science learning.

Based on this description, the researcher wants to know and prove the effectiveness of the Contextual Teaching and Learning (CTL) learning model combined with field visit techniques based on aspects of the implementation of the learning process, student responses, activities and student learning outcomes when learning biotechnology, especially at SMP Negeri 7 Sukabumi City. So, in the future the results of research related to the effectiveness of learning using the Contextual Teaching and Learning (CTL) learning model can be a reference for the school. Therefore, researchers are interested in conducting research with the research title "Application of Contextual Teaching and Learning (CTL) Strategies and Field Visit Techniques to Improve Student Learning Outcomes of IXC class on Biotechnology Materials".

METHOD

This research is a type of Classroom Action Research (CAR), which according to Arikunto (2010) is an examination of learning activities in the form of an action. These actions are given by the teacher or with teacher directions carried out by students who aim to solve problems or to improve the quality of learning in the class. The research was conducted from January to April 2023. The subjects in this study were 25 class IXC students at SMP Negeri 7 Sukabumi, consisting of 13 male students and 12 female students. Students in class IXC have less enthusiasm for learning compared to students in other classes. Based on data on daily test results in semester I of the 2022/2023 school year, IXC class has the lowest average score of 47.

Data collection technique
Data collection is done by: 1) Student learning outcomes, by carrying out a learning evaluation after the learning process has finished one cycle of the instrument in the form of 10 multiple choice test questions done individually; 2) Enthusiasm for student learning, by observing student activities during learning that are related to attitudes.

Data Validity
In this study the technique used by researchers in checking the validity of the data is by using content validity techniques. According to Sugiyono (2010) an instrument is said to be valid if the instrument can be used to measure what should be measured. According to Budiyono (2003), an instrument is valid according to content validity if the contents of the instrument are a representative sample of the entire contents of the thing to be measured. Determination of whether or not an instrument is valid is determined by the validator.

Data analysis technique
Data analysis used descriptive comparative analysis of test results between cycles, namely by comparing test scores between cycles with predetermined work indicators. Data in the form of test results are classified as quantitative data. The data were analyzed descriptively, the students' test scores were analyzed before using the Contextual Teaching and Learning Strategy (CTL) method and Field Visit Techniques and student test scores after using the Contextual Teaching and Learning Strategy (CTL) method and Field Visit Techniques, for two cycles. Then, the data in the form of test scores between cycles are compared until the results reach the predetermined achievement limits.

Performance Indicators/ Action Success
Students are said to be successful if the scores obtained by students after taking the first cycle test reach the Minimum Completeness Criteria (KKM). The Minimum Completeness Criteria (KKM) in Science at SMP Negeri 7 Sukabumi City for the 2022/2023 academic year for class 9 specifically for Biotechnology competency is 77. The research is categorized as successful with the following conditions: 1) Individual student learning outcomes can be said to be complete if the test score is ≥ 77 because the KKM set is 77; 2)The research target is 70% of the number of students in the class have achieved completeness according to KKM, namely 77.

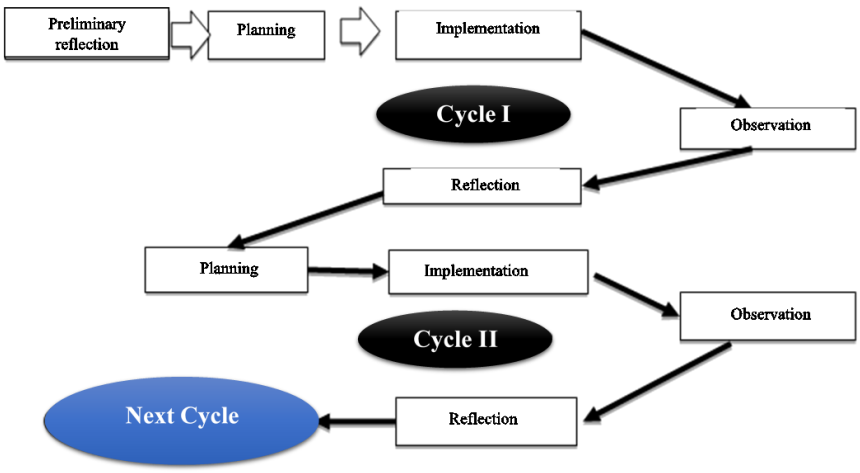

Fig 1. Research flow

RESULTS AND DISCUSSIONS

This research was carried out in two repeated cycles. The first cycle consisted of 2 meetings, namely 1 action of providing subject matter and 1 action of material enrichment and assessment. The second cycle consisted of 2 meetings, namely 1 meeting providing subject matter and 1 action of material enrichment and assessment. The stages in each cycle include: action planning, action implementation, observation, and reflection. The Competency Standards (SK) are the same but the Basic Competences (KD) are different. Cycle I with Competency Standards 3.7 Understand the concept of biotechnology and its role in human life. Cycle II with Basic Competency 4.7 Making one of the conventional biotechnology products through field visits.

Based on the results of observations on the process and learning outcomes of the principles of Biotechnology, an overview of the achievement of indicators in the implementation of cycle I was obtained, namely as follows:

1) There were 23 students (92%) who were active during learning while the other 2 students (8%) took part in the KBM but only participated and did not study seriously. Overall regarding student activity (enthusiasm) can be seen in the figure 2.

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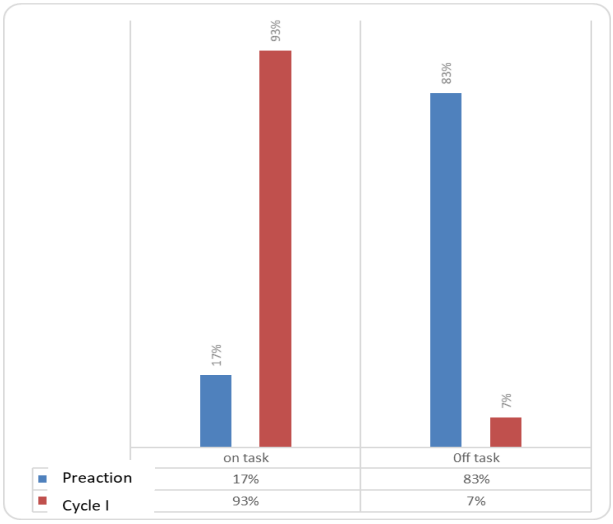

Fig 2. Percentage of Student Learning Enthusiasm

On task is a description of the enthusiasm of students in participation in learning, while off task is a description of the lack of enthusiasm of students in participation in learning. Compared before the action and after the action the enthusiasm of students in participation in learning experienced very high progress, before the action the enthusiasm for learning students was only around 17% while students who were not yet enthusiastic in participating in learning were around 83%. After carrying out the action in cycle I on task 93% and off task 7%.

2) Judging from the learning outcomes, there were 9 students (36%) who had achieved the KKM score or were categorized as having studied thoroughly in cycle I, while 16 students (64%) had not reached the KKM score or were categorized as having not completed their studies. In detail can be seen in the Figure 3.

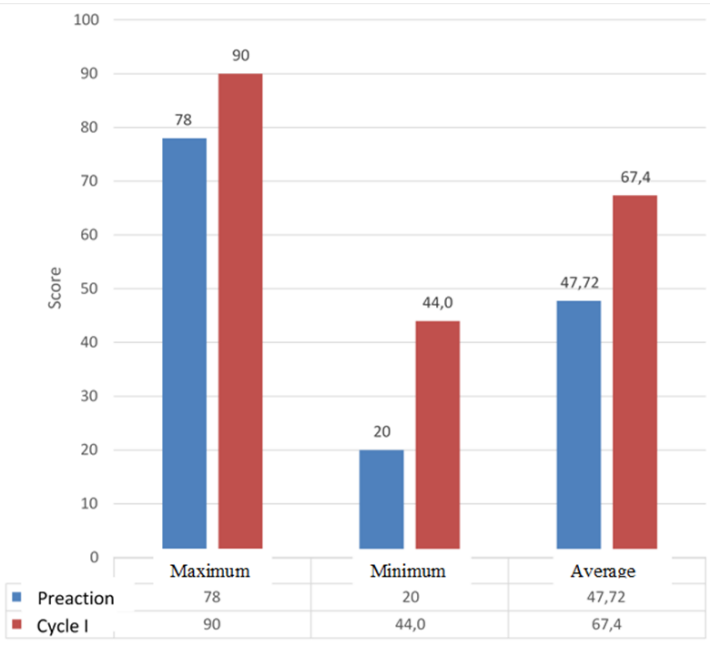

Fig 3. Student Learning Outcomes

Based on Figure 3, it can be seen that there is an increase in learning outcomes after being given action in cycle I, when compared to pre-action such as the average value from 47.72 to 67.40, meaning there is an increase of 19.68 point.

For the implementation of cycle II there is a difference with the implementation of cycle I, namely in the learning strategy used by the teacher. The teacher uses an additional strategy, namely field visits, where students are invited to make biotechnology products, namely making yogurt and unyil bread. Learning activities are carried out on Tuesday 21 March 2023 from 09.30 WIB to 11.30 WIB equivalent to 5 hours of lessons.

The apperception applied by the teacher to foster students' enthusiasm in participating in learning is also different, namely a brief explanation from the resource person and senior supervisor from SMKN I Cibadak, while drinking one of the meditation products that have been made before. It was seen that the students were very enthusiastic about following the course of learning. Based on these activities, an outline is obtained about the course of teaching and learning activities (KBM) on Biotechnology material using the Contextual Teaching and Learning (CTL) Strategy method and Field Visit Techniques as follows:

1) Before teaching, the teacher has made a Learning Implementation Plan which will be used as a guide in teaching
2) The resource persons also make learning scenarios according to the teacher's directions and also develop themselves.
3) Teachers and resource persons collaborate in carrying out learning activities according to an agreed plan.
4) By the time the resource person delivered the material, all students had paid close attention. The position of the resource person is also no longer focused on one point, meaning that the resource person is walking around when presenting the material, so that all students can be monitored by the resource person. The teacher facilitates students and resource persons in learning activities, while the observer observes the course of learning.
5) To facilitate students' understanding, the teacher approaches each group so that if there is something that is not understood by the students the teacher can immediately help.
6) Student learning outcomes in cycle II seen a significant increase. This is based on the results of observations and reports on the results of practicum compared to the previous cycle.
7) Teachers can better control and monitor students, so students can relax and focus on learning.

Based on the results of observations on the process and learning outcomes regarding the material mFor the manufacture of food products using conventional biotechnology, an overview of the indicators achieved in the implementation of cycle II is obtained.

The enthusiasm of students in participating in the learning conducted by the teacher reached 24 students (96%), while 1 student (4%) seemed less enthusiastic as indicated when the learning took place the student was lethargic and lacked enthusiasm, sometimes he was still seen behaving in annoyance to friends who were seriously studying. In detail can be seen in the Figure 4.

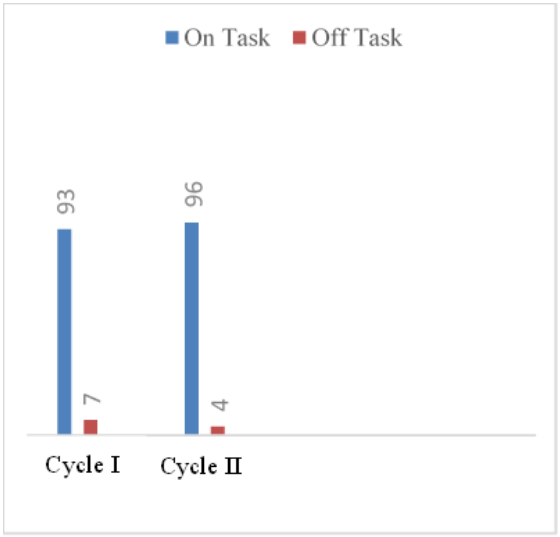

Fig 4. Percentage of Student Learning Enthusiasm

On task is a description of the enthusiasm of students in participating in learning, while off task is a description of the lack of enthusiasm of students in participating in learning. Compared to cycle I and cycle II, the enthusiasm of students in taking part in learning experienced very high progress, the first cycle of student learning enthusiasm was 93% while students who were not yet enthusiastic in participating in learning were around 7%. After carrying out the actions in cycle II on task 96% and off task 4%.

Students who have achieved KKM scores or are categorized as having studied in cycle II are well indicated with scores with students who have achieved a score of 78 as many as 20 students (80%), while 5 students (20%) students have not yet achieved a score of 78. In detail can be seen in the Figure 5.

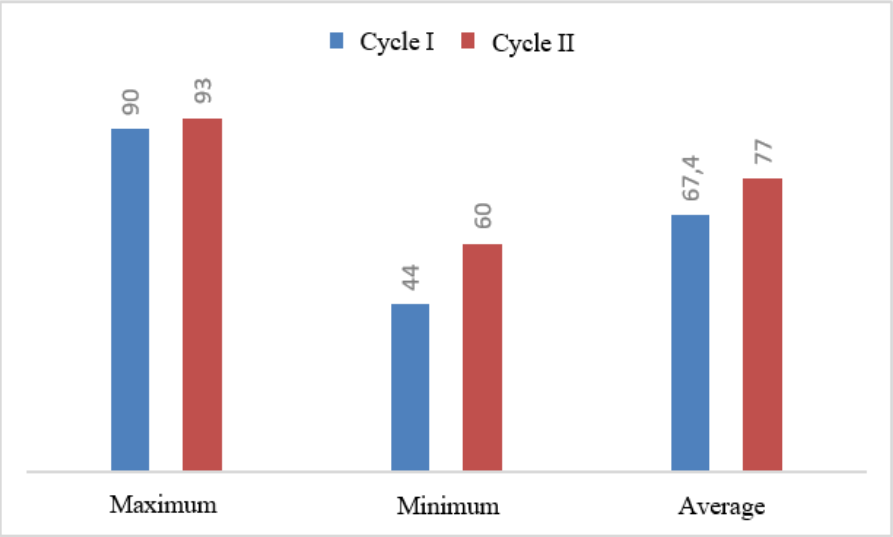

Fig 5. Student Learning Outcomes

Analysis and Reflection

Based on the results of observations, researchers can conclude that the quality of learning about manufacture food products using conventional biotechnology. in cycle II (both processes and results) increasingly shows a significant increase. This can be seen from the increase in each indicator that has been set by teachers and researchers.

Student activity during learning regarding the manufacture of food products using conventional biotechnology. through the application of a model using the Contextual Teaching and Learning (CTL) Strategy method and Field Visit Techniques in cycle II there was an increase from 23 students or around 93% (in cycle I) to 24 students or around 96% in cycle II.

Students who have obtained mastery in learning of making food products using conventional biotechnology in cycle II have reached 20 students (80%) compared to cycle I of only 61 students (64%). In this cycle the average value of students also increased by 9.64 points from 67.36 (cycle I) to 77.00 (cycle II). For more details, see the Figure 6.

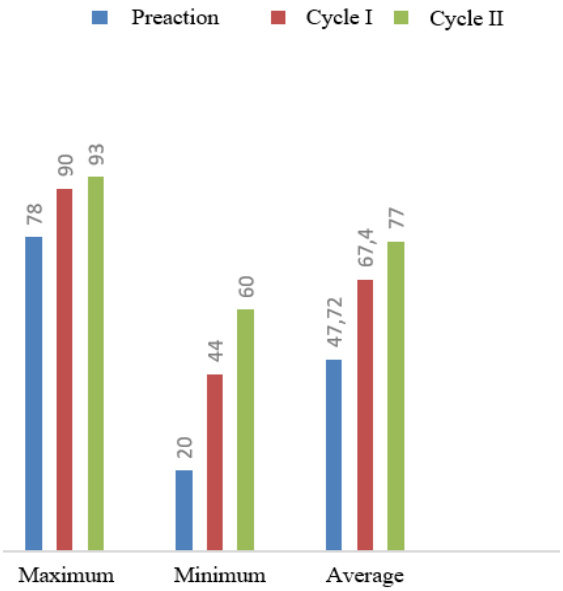

Fig 6. Student Learning Outcomes

Figure 6 shows that there was an increase in the highest score of 90 in cycle I and 93 in cycle II there was an increase of 3 points, as well as with the lowest score of 44 in cycle I and 60 in cycle II there was an increase of 16 points.

Seeing the indicators of the success of the learning process that students have achieved in the implementation of cycle II, this research is considered sufficient to be carried out, so there is no need to continue in cycle III. Over all it can be said that the implementation of cycle II has been successful and has reached the predetermined achievement indicator, namely 75%. Therefore, this research was completed in cycle II. The results of implementing the actions in cycles I to II above can be recapitulated in the Tabel 2.

Table 2. Achievement Recapitulation of Research Indicators Cycle I and Cycle II

No	Measured aspects	Percentage	
		Cycle I	Cycle II
1	Student learning enthusiasm	93%	96%
2	Student learning outcomes	64%	80%

Based on the Table 2, it can be stated that there has been an increase in the indicators that have been determined from the results of cycle I and cycle II. In cycle I to cycle II the percentage of success shows that the level of student activity during learning has increased by 3%, learning outcomes have also increased by 14%. Thus, it can be concluded that the application of the Contextual Teaching and Learning Strategy (CTL) method and Field Visit Techniques can increase enthusiasm and student learning outcomes in IXC class students of SMP Negeri 7 Kota Sukabumi.

Based on the results of observations of the actions taken in cycle I to cycle II, it can be stated that the application of the Contextual Teaching and Learning (CTL) Strategy and Field Visit Techniques has increased learning outcomes in class IXC, SMP Negeri 7 Sukabumi City. Thus, this study has succeeded in answer the problem formulation raised by the researcher.

This research was carried out in two cycles, with the description of the activities as follows: Before the first cycle was carried out, the researcher first conducted an initial survey to find out the actual problems that occurred in the field. Based on the results of the activities in the initial survey, the researchers found that student motivation and learning outcomes were very low in IXC class, SMP Negeri 7 Kota Sukabumi. Therefore, researchers collaborated with science teachers to overcome these problems by implementing Contextual Teaching and Learning (CTL) Strategies and Field Visit

Techniques. Before carrying out cycle I, the researcher together with collaborators discussed the lesson plan. Cycle I is the initial action to overcome the problems found in learning in the class. Based on the agreement between and collaborators in cycle I, the Contextual Teaching and Learning (CTL) Strategy and Field Visit Techniques. The details have been stated in the lesson plan.

From the implementation of the first cycle, a description of the learning outcomes was obtained which stated that there were still some deficiencies in the implementation of the action. These deficiencies come from teachers and students. Weaknesses from the teacher, namely:

(1) The teacher seems to be still a bit stiff in carrying out learning activities so that students look afraid to actualize,
(2) The teacher still takes a certain position (close to the teacher's desk), so it is difficult for students to ask for an explanation if something is not understood.

The weaknesses of students when learning takes place are as follows:

(1) Students do not seem to fully understand the material presented by the teacher. Based on the results of observations, students were confused about the difference between products result from biotechnology or not,
(2) Shiva also has not been able to explain the working principle of microorganisms in biotechnology products. It was proven that during the test students were still confused and asked or saw friends' work as well as when making reports students still saw the work of other groups.

The deficiencies found in the implementation of the action in cycle I were a factor causing unsatisfactory student learning outcomes, this was based on the number of students who had obtained a score of 77 (declared complete) in cycle I, only 16 people or 64% of the total number of students. Furthermore, the deficiencies contained in the first cycle were evaluated by researchers and collaborators to produce a new learning plan. Through this planning it is hoped that it will be able to overcome the deficiencies contained in the implementation of action I. The actions in cycle II are carried out to overcome the deficiencies contained in cycle I. In this cycle II the teacher also applies the Strategy Contextual Teaching and Learning (CTL) method and Field Visit Techniques in learning. In cycle II, the teacher uses the study location in the BLUD room of Cibadak Vocational High School, Sukabumi Regency to conduct experiments on making biotechnology products, namely making yogurt and unyil bread, with the media, tools and materials provided. The tasks carried out by students in cycle II were to make products and observe the work of microorganisms working on the products made. While the task in cycle I is to get to know the concept of biotechnology and observe the names of organisms that work on several conventional biotechnology products. The tasks carried out by students in cycle II were to make products and observe the work of microorganisms working on the products made. While the task in cycle I is to get to know the concept of biotechnology and observe the names of organisms that work on several conventional biotechnology products. The tasks carried out by students in cycle II were to make products and observe the work of microorganisms working on the products made. While the task in cycle I is to get to know the concept of biotechnology and observe the names of organisms that work on several conventional biotechnology products.

Based on observations on the implementation of the second cycle, it can be seen that there was an increase in student learning outcomes. This improvement can be seen from the increase in the acquisition of test results and the better the performance of students in conducting experiments, the better quality of student answers when asked questions by the teacher, and the more perfect reports made by students.

Based on the actions that have been taken, it can be said that the Implementation of Contextual Teaching and Learning (CTL) Strategies and Field Visit Techniques in science subjects in IXC class of SMP Negeri 7 Sukabumi has been successful. The successful implementation of the Contextual Teaching and Learning (CTL) Strategy and Field Visit Techniques in an effort to improve learning outcomes can be seen from the following indicators.

Student's motivation to study

Motivation to learn can be seen from the enthusiasm of students when participating in learning during the implementation of research in cycles I to II. This enthusiasm is shown by the willingness of students to take part in a series of activities during the Teaching and Learning Activities (KBM) in progress.

From the results of the research above, it can be said that the actions taken by the teacher can increase student enthusiasm even though at first the researcher's goal was not explicit to increase student learning enthusiasm, without ruling out the main objective of this research is to improve student learning outcomes. This proves that the application of Contextual Teaching and Learning (CTL) Strategies and Field Visit Techniques has an important role in increasing learning motivation and improving student learning outcomes.

According to Mulyono, (2011: 55), the advantages of the learning model using CTL in (Electrical Engineering Education Journal), namely:

1) Students will be able to feel that learning by themselves because students are given ample opportunities to participate.
2) Students have a strong motivation to participate in learning activities.
3) The growth of a democratic atmosphere in learning so that there will be dialogue and discussion for mutual learning among students and broaden the minds and knowledge of educators because something experienced and conveyed by students may not have been known beforehand by students.

Likewise according to Dzaki (2009: 119) in, (CTL approach journal) the advantages are:

1) Learning is more meaningful.
2) Learning is more productive and able to foster reinforcement.
3) Growing students' courage to express opinions about the material being studied.
4) Growing the ability to work together with other friends to solve existing problems.
5) Students can make their own conclusions from learning activities.

From the description above, it can be concluded that the advantages of the contextual teaching and learning model are learning that is more real because it relates it to real life, learning is more productive because students discover their own knowledge, fosters the courage of students to express opinions, collaborate, and can draw conclusions. the learning they have gone through, and also students feel that learning is their own, students have a strong motivation for learning activities.

In this study, Contextual Teaching and Learning (CTL) learning was combined with Field Visit techniques. So that learning is more passionate with a different location and atmosphere than usual. With field trips students can witness and be involved directly, in the process of making the product, experience how to manage various products so that they become valuable and useful product materials. So that with this visit students get direct knowledge and experience that is useful to be lived and practiced. (Tayar, 1995:84).

Learning outcomes

Improved student learning outcomes can be assessed from the results of student tests that have increased from one cycle to another, namely; improving student learning outcomes in learning "Understanding the concept of biotechnology and its role in human life.",Thisbased on student completeness in answering questions according to indicators, namely; explain the basic principles of biotechnology, explain the differences in the basic principles of conventional and modern biotechnology development, identify the application of biotechnology in various fields, explain the principles of genetic engineering and their products, explain the advantages and disadvantages of applying biotechnology in various fields, analyze the differences in the nutritional content of biotechnology raw materials with biotechnology products, find solutions in overcoming environmental pollution by applying biotechnology principles,.

Based on the explanation above it appears that the Application of Contextual Teaching and Learning (CTL) Strategies and Field Visit Techniques can improve student learning outcomes in science subjects in class IXC of SMP Negeri 7 Sukabumi City, especially Biotechnology material. This

increase is based on the increasing number of students who achieve KKM both from test results and from observation results.

CONCLUSION AND SUGGESTION

In accordance with the general objectives and specific objectives of this research and based on the processing and analysis of data from the results of the research that has been carried out, it can be concluded that in general the effectiveness of the Contextual Teaching and Learning (CTL) learning model in science learning for class IXC students at SMP Negeri 7 Kota Sukabumi in the 2022/2023 academic year is effectively applied in learning.

In particular, this research has obtained information regarding the effectiveness of the Contextual Teaching and Learning (CTL) learning model in biotechnology learning for students in IXC class, SMP Negeri 7 Sukabumi, in the 2022/2023 academic year, in terms of the effectiveness indicators as follows: 1) Strategy Implementation *Contextual Teaching and Learning* (CTL) and Field Visit Techniques can improve student learning outcomes on biotechnology material in class IXC SMP Negeri 7 Sukabumi City on Biotechnology material, with indicators explaining the basic principles of biotechnology, explaining the differences in the basic principles of conventional and modern biotechnology development, identifying the application of biotechnology in various fields, explaining the principles of genetic engineering and their product results, explaining the advantages and disadvantages of applying biotechnology in various fields, analyzing the differences in the nutritional content of biotechnology raw materials and biotechnology products, finding solutions to addressing environmental pollution by applying biotechnology principles; 2) Strategy Implementation *Contextual Teaching and Learning* CTL) and Field Visit Techniques effectively applied to science subjects in IXC class, SMP Negeri 7 Sukabumi, especially material Biotechnology in the indicator applies the principles of biotechnology in the manufacture the conventional biotechnology products.

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