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Improvement of Learning Outcomes and Psychomotoric Activities Using Quantum Teaching and Learning Models in Ecosystem Materials for Class X Students of Public 1 Senior High School In Amurang Minahasa District North Sulawesi

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Abstract- This research is also a quantitative-qualitative research. Quantitative data to be collected is in the form of cognitive learning outcomes scores that assess students' conceptual understanding. This quantitative data is processed using the statistical correlation test. Quantitative data will be supported by qualitative data in the form of descriptions of observation sheets and interviews about improving psychomotic learning outcomes and student responses to the implemented Quantum Teaching and Learning model. In cycle I, the researcher obtained information that the level of psychomotor activity of students in the group was high because none of the groups had a percentage value below 75%. The classically average psychomotor activity level has also met the research target of at least 70%. Whereas in cycle II the researcher obtained information that the level of psychomotor activity of students in the group was high because there was no group whose percentage value was below 75%. The classically average psychomotor activity level has also met the research target, which is at least 75%. This study succeeded in improving learning outcomes by emphasizing students' conceptual understanding through variations in learning activities and learning environments based on the Quantum Teaching and Learning Model.

Keywords*:* Quantum Teaching, Learning, cognitive and psychomotor

I. INTRODUCTION

In the world of education today, the application of various approaches, strategies, methods and learning models does not only aim to improve student learning outcomes, but also touches deeper aspects of learning. Each of these learning procedures has its own advantages which are expected to provide maximum achievement of learning objectives. This learning objective must be adjusted to the characteristics of the field of study being studied.Biology is a scientific study that contains interconnected concepts about living things and their life processes. The concept as a mental symbol that contains an idea (Winkel, 1987: 75), is formed through direct experience with objects or events in their world (Santrock, 2009: 3). The formation of this concept is in accordance with the character of Biology who studies natural events that students have faced. This makes Biology learning requires a learning process that provides real experiences for students. Giving real experience means that students get information with various senses directly, so that it supports the formation of a more understandable concept.

Currently, learning Biology in schools is often not enriched by providing real experiences to relate every concept in the form of natural events that occur in students' daily lives. Students only learn textually without being directed to have a conceptual understanding. Good conceptual understanding occurs when students are able to form relationships between concepts and organize various concepts in the material being studied, it will be easier to remember and apply them later (Ormrod, 2008: 344). This ability is not limited to only supporting students in mastering learning outcomes according to the instructional goals recorded in the educational curriculum. This ability also supports students to apply learning experiences in their daily lives as true learning outcomes. This learning outcome is called true because it is not only in the form of learning outcomes shown by students in the classroom, but also its application is shown by students outside the classroom in the daily life of students outside the classroom.

In the scope of classroom learning, the things above need to be considered because the level of conceptual understanding of Biology material greatly affects learning outcomes. This is in line with the results of

observations made at Negeri 1 Senior High School Amurangin class X during the 2019/2020 academic year. The results of these observations illustrate that the teaching and learning process has not supported the maximum conceptual understanding. The teacher has tried to build students' conceptual understanding by conducting question and answer and literature study. However, students have not been invited to "find the light" in understanding the concepts being studied by combining cognitive, psychomotor and affective aspects in a balanced manner. This has an impact on student learning outcomes that are still unsatisfactory. The average learning outcomes achieved by students were 67.41; while the minimum completeness standard set is 73.

Based on the above situation, it is necessary to make an effort to improve. One way that can be done is to use the Quantum Teaching and Learning model. The word quantum itself means "the interaction that converts energy into light". DePorter (2010: 34) states that teaching quantum is the composition of the various interactions that exist in and around the learning environment that is effective for students. These interactions will transform students' natural abilities and talents into light, meaning that they can be used optimally in supporting learning activities. Learning interactions that involve the learning environment can provide real experiences that support learning not only from the cognitive aspects but also psychomotor and affective aspects.Quantum Teaching and Learning rests on 5 principles, namely (1) Everything Talks, (2) Everything Aims, (3) Experience before Naming, (4) Acknowledge Every Effort, and (5) If It Is Worth Studying, Then It Is Worth Celebrating (DePorter , 2010: 36-37). These five principles support the creation of meaningful learning. The first and second principles emphasize the student learning environment which is fully used as a means of supporting student learning. According to the third principle, this experience will help students to build concepts. The fourth and fifth principles in the form of appreciation for student learning efforts can foster students' positive emotions towards learning activities which can indirectly increase student learning achievement.

II. LITERATURE REVIEW

Learning and Types of Learning

Winkel (1987: 56) states the human ability to carry out various activities in everyday life that was not previously owned, but later obtained. The process of changing behavior patterns from a state of incapacity to being able to occur within a certain period of time indicates the occurrence of learning. Winkel (1987: 59) formulates the following definition of learning:"Learning is a mental / psychic activity that takes place in active interaction with the environment, which results in a number of changes in knowledge-understanding, skills and values-attitudes. These changes are relatively constant and lasting. "

Driver and Bell (in Suyono and Hariyanto, 2011: 13) state that learning is an active process in organizing meaning through interaction with the environment by forming relationships or links between existing conceptions and the phenomena being studied.Ausubel and Robinson (in Suyono and Hariyanto, 2011: 135-137) describe the types of learning, including: Learning to Accept, Learning to Memorize, Learning to Find and Learn to Mean.

Learning outcomes

The learning process experienced by students in school requires a learning outcome. The learning outcome in question is the achievement or mastery of instructional goals. Instructional goals are changes in the desired behavior of students (Sudjana, 1989: 2). Instructional goals (educational objectives) vary so greatly by educational expertsclassified into 3 domains, namely cognitive, affective and psychomotor.1. The cognitive domain according to Bloom and friends (in Winkel, 1987: 274-276) includes knowledge, understanding, application, analysis and evaluation.2. The affective domain according to Bloom and friends (in Winkel, 1987: 276-277) includes acceptance, participation, assessment, organization and the formation of life patterns.3. The psychomotor domain according to Simpson (in Winkel, 1987: 278-279) includes perception, readiness, guided movements, accustomed movements, complex movements, adjustment of movement patterns, and creativity.

The success of students in learning in the form of achievement of learning outcomes is influenced by several factors divided into 2 groups, namely internal factors and external factors (Dalyono 2007: 55-60).1. Internal factors or those that come from within, including: health, intelligence and talents, interests and motivation as

well as learning methods.2. External factors or those that come from outside themselves, including: family, school, community and the surrounding environment.

Conceptual Understanding

The concept as a unit of meaning or mental symbol that contains an idea, represents a number of objects that have the same characteristics. The objects represented by the concept are many and varied, so they are grouped into groups. This classification helps humans to more easily understand their environment. All concepts can be expressed in a verbal symbol or a word that points to an object and is stored in memory. All words are remembered and connected to each other and become tools in thinking (Winkel, 2005: 75-76).Santrock (2009: 3) states that a concept is a category that classifies objects, events and characteristics based on the same forms. Conceptual understanding is knowledge about a topic that is studied meaningfully and is well integrated, including the logical relationship between various concepts and specific ideas in it. Students who increasingly form relationships between concepts or organize all concepts properly regarding the material being studied, the easier it is for them to remember and apply them later (Ormrod, 2008: 343-344).

Quantum Teaching and Learning Model

The main principle in Quantum Teaching is "Bring Their World to Our World, and Deliver Our World to Their World" (DePorter, 2010: 35-36). This principle recommends that teachers take the first step when teaching by entering the world of students to get the "right to teach". The teacher must first build an authentic (real) bridge to enter student life. The right to teach is needed by the teacher, because basically learning is a full-contact activity, which involves all aspects of human personality (especially students), starting from thoughts, feelings and body language in addition to knowledge, initial belief attitudes and future perceptions.Quantum Teaching adheres to five principles (DePorter, 2010: 36), which are considered as the basic chord structure of a learning symphony, including everything speaking, all purposes, experiences before giving names, acknowledging every effort, and if it is worth learning, it is also worth celebrating.1. Everything Talks2. Everything Aims3. Experiences before giving names4. Acknowledge Every Effort5. If it's worth studying, it's worth celebrating too.

The teacher recognizes students' completion, participation, and skills to honor their efforts, persistence and success.

1. Surrounding Environment

The view around students can help their memory. The human eye has a wide range of perception, so a picture means more than a thousand words. Students tend to more easily grasp a concept with the help of pictures. The surrounding view is a very powerful unconscious learning tool, because learning occurs both consciously and unconsciously. The surrounding environment can be modified by adding the following elements:

- Affirmation posters

Teachers can make or ask students to make affirmative motivational posters containing messages or achievements, for example "I can do!" or "I'm Smarter". Students can also draw as symbols or symbols of these messages and achievements. The posters convey affirmations to reinforce beliefs about learning. Use

- Color

The use of color can strengthen teacher teaching and student learning. Striking colors like green, blue, purple and red are used to write important words and bright colors like orange and yellow to highlight.

2. Tools

Assistive tools can represent an idea or ideas. Assistive devices not only help with visual learning, but also help with kinesthetic modalities. Kinesthetic modality is a way of learning for students to absorb information in the form of accessing and expressing experiences through various physical movements. Students can hold the tools and get a sense of the real experience and the ideas conveyed through these tools. Examples of aids are: arrows visually to point at the point the teacher intended.

3. Bench Arrangement

The manner in which the bench is arranged plays an important role in orchestrating learning. Teachers can ask students to rearrange their stools to facilitate the type of learning interaction required. An arrangement that keeps students facing in one direction and staying focused, whether for student presentations or video playback. Setting the seats so that students face each other is better for discussion and group work.

4. Placement of Organic Elements, for example: plants.

Plants will provide oxygen in the classroom environment, as a supply for the brain to develop. Some plants also improve the aesthetic value of a room, especially for rooms with little or no natural light.

5. Music

Music can be useful for setting moods, changing mental states, and supporting a learning environment. Music helps students do better and remember more. Music stimulates, rejuvenates and strengthens conscious and unconscious learning. Music also allows teachers to build relationships with students, because through music they can speak their language. Students can also learn more easily and quickly if it occurs in a relaxed and receptive condition.

DePorter also introduces ways to regulate the environment that can spur learning and improve student memory by adjusting the learning environment as follows (DePorter, 2010: 103-116).

Ecosystem Material

Ecosystems are formed from reciprocal relationships between living things and other living things, as well as with inanimate objects in their environment. Based on its nature, ecosystem components are divided into biotic components and abiotic components. Biotic components consist of living things that have levels of organisms consisting of: individuals, populations, communities in the ecosystem and the biosphere. Biotic components based on their functional position can be divided into: producers, consumers, decomposers and detritivores.

III. RESEARCH METHODS

This research is designed as a Classroom Action Research (CAR), which is conducted by the teacher as a researcher when he finds a problem in the learning process. Sukidin, Basrowi and Suranto (in Taniredja, Pujiati and Real; 2010: 16) define Classroom Action Research as follows."A form of reflective research review by taking certain actions in order to improve and / or enhance learning practices in a more professional manner."This research is also a quantitative-qualitative research. Quantitative data to be collected is in the form of cognitive learning outcomes scores that assess students' conceptual understanding. This quantitative data is processed using the statistical correlation test. Quantitative data will be supported by qualitative data in the form of descriptions of observation sheets and interviews about improving psychomotic learning outcomes and student responses to the implemented Quantum Teaching and Learning model.

This study used Kemmis& McTaggart's research model, each research cycle includes several repetitive stages, namely:

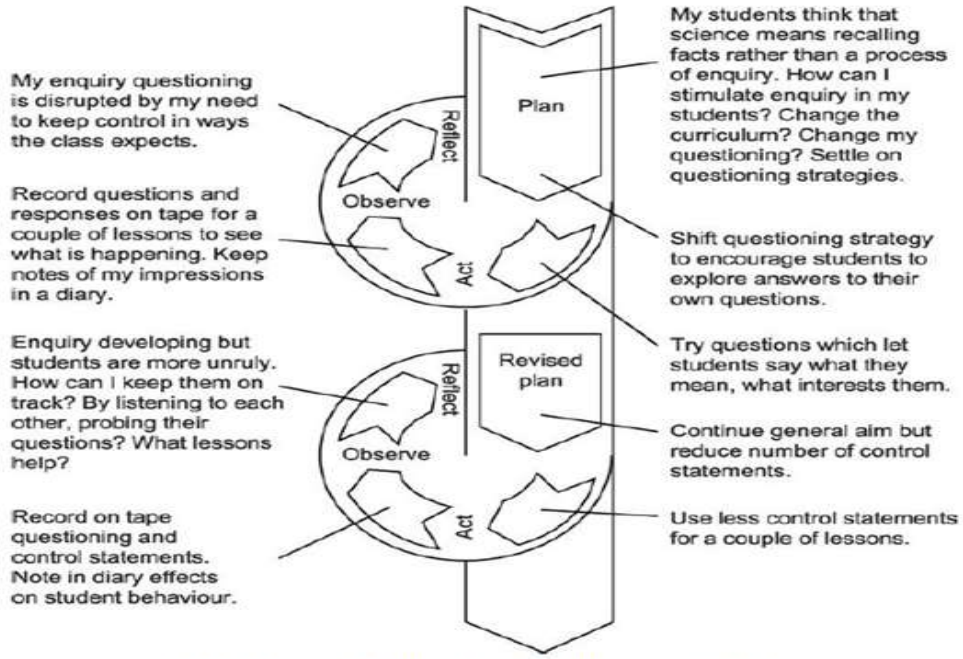

Figure 1. Cycles in PTK according to Kemmis and McTaggart

This research is designed by carrying out a learning process which will be divided into at least 2 research cycles. The description of the series of activities that will be carried out during the research process are as follows:

1. Cycle I

a. Planning (planning)

Activities that will be carried out to prepare for this research include:

- Researchers discuss with subject teachers and fellow students to prepare for research.
- Researchers make learning instruments, namely syllabus, lesson plans and worksheets in accordance with the 6 TANDUR learning strategies, including (1) Grow, (2) Natural, (3) Name, (4) Demonstrate, (5) Repeat, and (6)) Celebrate.
- Researchers prepared research instruments in the form of pretest and posttest questions (quiz I), observation sheets, and interview guides.
- Students and researchers as teachers prepare equipment that will be needed during learning activities.

b. Acting and Observation

At this stage, the researcher acts as a teacher or learning provider. The teacher carries out the learning process in accordance with the learning implementation plan (RPP), which in general is as follows.

- Students work on pretest questions as data about students' initial abilities.
- Teachers make apperception to foster interest in learning about the material by asking questions and linking the subject matter with everything in the classroom environment and in student life. (Grow)
- The teacher explains the activities that will be carried out during the learning process and listens to songs.
- Students in groups make concept maps using mind-map techniques regarding ecosystem terms and components. (Natural and Name)
- One of the groups is asked to present a mind-map made from the results of the discussion in front of the class. (Repeat and Experience)
- Students in groups are asked to do role-playing demonstrations about interactions between components in the ecosystem. (Demonstrate and Experience)

- The teacher accompanies students to fill in the worksheets according to the results of previous discussions, presentations and demonstrations. (Name) Students from other groups provide responses, questions and rate the presentations and demonstrations of other groups by giving stars.
- The teacher acknowledges students' learning efforts and celebrates the learning process by giving praise, giving thumbs up, and inviting students to applaud. (Celebrate)
- Students work on quiz I as data on student cognitive learning outcomes from cycle I. (Repeat)
- During learning, researchers as teachers, subject teachers and peers observe learning by filling out observation sheets to collect data on student psychomotor learning outcomes in cycle I.

c. Reflection

Researchers with subject teachers discussed cognitive and psychomotor learning outcomes of students based on quiz I and observation sheets. Researchers also saw the successes and obstacles that occurred during the learning process that had been implemented.

d. Evaluation

Researchers evaluated the entire process of cycle I by processing all student learning outcomes observation sheets. These results are compared with the targets that must be achieved in the study. The results of the evaluation are used as a consideration in carrying out the next learning process in cycle II.

IV. RESEARCH RESULTS AND DISCUSSION

Research Implementation Cycle I

The implementation of the Cycle I action was carried out on Monday, May 4 2015 and Tuesday, May 5 2015. At this meeting, the researcher introduced himself and informed the student's activities, namely the pretest. Students work on the pretest for 15 minutes. The next researcher collected students' responses to the pretest. Students expressed difficulties in working on the pretest due to several reasons, including: not preparing themselves (previously students did not know there was a pretest), had not studied the material being asked in the pretest (Ecosystem) and the working time was narrow. Before closing the lesson, researchers appreciated the efforts students had made in working on the pretest and invited students to study Ecosystem material at home.

There were 18 students attending the pretest, because one student who was included in the research subject did not take the pretest. Pretest data is used as data to determine students' prior knowledge of the material. The pretest results can be seen in table 1. below.

Table 1. Students' Pretest Analysis Results

No.	Types of Data Observed	Results Obtained
1.	The highest score	65
2.	Lowest score	10
3.	Number of students with grades reach	0 student
4.	The number of students with no gradesreach	18 student
5.	Average Value	39,17
6.	Classical Completeness	0%

The pretest value data shows that the class average score is 39.17 and no student has been able to achieve score classically or individually. This means that students' understanding of the Ecosystem material is still very low.At the second meeting, learning activities last for 90 minutes or for 2 lesson hours (4th and 5th lesson hours). Researchers act as teachers or teachers by applying the principles and strategies of Quantum Teaching and Learning. Researchers are assisted by research partners consisting of biology subject teachers and fellow students in the role of observing students' psychomotor activities. Research partners make observations using the observation sheet provided by the researcher. Researchers have also arranged

classrooms to support student learning comfort by placing ornamental plants and an aquarium containing ornamental fish and playing inspiring instrumental music.
At this meeting, the teacher starts the learning activity with an introduction. The teacher expresses apperception by asking questions about objects in everyday life as components of a complex life form. The teacher also provides an example of the relationship between ecosystem components by asking about the relationships that occur between students in class. Students gave quite a variety of responses on this topic. This activity is intended to foster student motivation and curiosity, because interactions in the ecosystem can be analogous to social relationships that occur in everyday life. Furthermore, the teacher conveys the learning objectives. This preliminary activity lasts for 10 minutes.
The core activity begins with a brief interactive information activity, in which the teacher provides an initial understanding of the various components that make up the ecosystem and the relationships between components based on previous perceptions. Furthermore, the teacher presents a quantum description of the learning process that will be carried out by students. The teacher divides students into 4 groups, with members of each group of 4-5 students. The teacher motivates students to be more enthusiastic about learning by asking each group to make a group name or slogan that reflects a positive value from that group. The results of the student's creativity are then posted in front of the class. The initial series of activities lasted 10 minutes.
In the core activity, students are given the opportunity to gain experience in every learning activity as best as possible, be it discussion activities, literature review, making concept maps, presentations, demonstrations and responding to presentations / demonstrations. After the students are in groups, the teacher distributes and term / picture cards for each group. The teacher asks each group to discuss and conduct a literature study to compile a concept map from the several term cards that are given. Furthermore, each study group must present the concept map that has been made in front of the class, on certain sub-topics the group must also demonstrate to provide a clearer picture. There are 4 student study groups, who have the opportunity 2 times to give presentations / demonstrations because there are 8 sub-topics.
To see cognitive learning outcomes, the teacher does a posttest. Students work on the posttest for about 20 minutes. There were 18 students following the posttest, because one student who was included in the research subject did not attend school. Data on the posttest value of Cycle I can be seen in table 2. below.

Table 2. Results of Posttest 1 Cycle I Analysis

No.	Types of Data Observed	Results Obtained
1.	The highest score	90
2.	Lowest score	46
3.	Number of students with grades reach	9 student
4.	The number of students with no gradesreach	9 student
5.	Average Value	71,67
6.	Classical Completeness	50%

Based on the posttest value above, the mean (mean) is 71.67 and the classical KKM-complete score is 50%. The results of Cycle I Posttest scores indicate that the research target has not been achieved in the form of cognitive learning outcomes (tests) at least 65% of students have a Posttest score ≥ 73.Based on these conditions, Cycle II will be carried out to achieve the research target.Cycle I ends with a reflection activity on new knowledge and capturing student responses to the atmosphere and learning activities that have been implemented. In addition to learning activities, this research also includes observing the psychomotor aspects of students and filling out reflective questionnaires by students.

Observation of Students' Psychomotor Activities
Observations of the psychomotor aspects of students were carried out by research partners during learning activities. Research partners make observations based on the psychomotor observation format for the study group on the provided observation sheets.

The attitudes and behavior of students that indicate the existence of psychomotor learning activities observed in this study include several aspects, including: the ability to use tools and work attitudes, the ability to read pictures and / or symbols, the ability to analyze a job and sort the work process, the speed of the task, and working result. Table 3.The following lists the level of student psychomotor activity according to the results of observations.

Table 3. Levels of Psychomotor Activity of Cycle I Students

No.	Study groups	Total Group Score	Percentage of Group Score
1.	Group 1	45	93,75%
2.	Group 2	43	89,58%
3.	Group 3	42	87,50%
4.	Group 4	41	85,42%
Percentage of Grade Average			**89,06%**

Based on table 3, the researcher obtained information that the level of psychomotor activity of students in the group was high because there was no group whose percentage value was below 75%. The classically average psychomotor activity level has also met the research target of at least 70%.

Research Implementation Cycle II

The implementation of the Cycle II action was carried out in two meetings. The first meeting was held on Monday, 11 May 2015; while the second meeting on the following day was Tuesday, May 12 2015. As in Cycle I, researchers acted as teachers by applying the principles and strategies of Quantum Teaching and Learning. Research partners whose role is to observe students' psychomotor activities. Researchers also continue to organize the class by placing ornamental plants and an aquarium filled with ornamental fish and playing inspiring instrumental music.At the first meeting, learning activities last for 45 minutes or for 1 lesson hour. The teacher starts the learning activity by repeating some of the material points that have been learned in the previous meeting for 5 minutes. The teacher then gives apperception by discussing with students about the connection between energy and eating and eating events. This activity aims to foster learning motivation because the subject matter is the things that happen every day in the student environment.

The teacher then explains briefly the quantum learning process that will be carried out at this meeting. The teacher invites students to join in groups as in the previous meeting. Each group will make a concept map according to the assignment that the teacher has previously given. This explanation and group division lasted about 5 minutes.The teacher distributes and concept cards to each study group. As in the previous learning process in Cycle I, students were still given the opportunity to gain experience from various activities. The teacher then gives students the opportunity to carry out discussions and literature studies on the topic that is the task of each group. The teacher asks each group to present the results of the discussion at the next meeting. At this meeting there are 4 sub-topics, so that each group gets 1 chance to make a presentation / demonstration.The presentation activity lasts for about 20 minutes. Each group is tasked with answering questions in the LKS related to the sub-topics discussed in the presentation, so that the presentation / demonstration activities are also integrated with the filling out. The questions that were not answered by the students in the presentation were discussed jointly by the teacher and students. During the presentation, students from other groups are allowed to ask questions, argue or give suggestions on the group presentation. Another group also assessed the presentation performance by giving stars. The maximum rating given is 5 stars.The teacher then summarizes the learning points and gives an assignment to study the biogeochemical cycle according to the presentation assignment that has been previously divided. The teacher also gives appreciation for students who take part in learning well, because class conditions tend to be less conducive. This condition is possible because this class is the last class, so students want to go home.

To see the cognitive learning outcomes, the teacher does a posttest. Students work on the posttest for about 20 minutes. Students who took the posttest were 19 students (all research subjects). Data on the posttest value of Cycle II can be seen in table 4 below.

Table 4. Results of Posttest 2 Cycle II Analysis

No.	Types of Data Observed	Results Obtained
1.	The highest score	90
2.	Lowest score	54
3.	Number of students with grades reach	16 student
4.	The number of students with no gradesreach	3 student
5.	Average Value	78,84
6.	Classical Completeness	84,21%

Based on the Posttest value above, the mean (mean) was 78.84 and the complete score was classically 84.21%. The results of Cycle I Posttest scores indicate that the research target has been achieved in the form of cognitive learning outcomes (tests) at least 70% of students have a Posttest score ≥ 73.Cycle II ends with reflection activities on new knowledge and capturing student responses to the atmosphere and learning activities that have been implemented. In addition to learning activities, this study also includes observing the psychomotor aspects of students and filling out reflective questionnaires by students as well as interviews with students' responses.

Observation of Students' Psychomotor Activities

As in Cycle I, observations of the psychomotor aspects of Cycle II student learning were carried out by research partners during the learning activities. Research partners make observations based on the psychomotor observation format for the study group on the provided observation sheets. The attitudes and behavior of students that showed learning activities from the psychomotor aspects observed in this cycle were also similar to the previous cycle.

Tabel 5. Tingkat AktivitasPsikomotorikSiswaSiklus II

No.	Study groups	Total Group Score	Percentage of Group Score (%)
1.	Group 1	44	91,67
2.	Group 2	42	87,50
3.	Group 3	46	95,83
4.	Group 4	41	85,42
Percentage of Grade Average			**90,11%**

Based on table 8, the researcher obtained information that the level of psychomotor activity of students in the group was high because no group had a percentage value below 75%. The classically average psychomotor activity level has also met the research target, which is at least 75%.

V. DISCUSSION OF RESEARCH RESULTS

Cognitive Learning Outcomes

The increase in conceptual understanding is known from the comparison of test scores that have been carried out, namely Pretest, Posttest 1 and Posttest 2. The pretest in the form of multiple choice questions is used to determine students 'initial knowledge, while the posttest in the form of essay questions is used to measure students' conceptual understanding. Based on the indicators of achievement in increasing conceptual understanding, the target that must be achieved is that at least 70% of students achieve the minimum completeness score (KKM) 73, and at least an average grade score of 75.Comparison of pretest and posttest 1

values as in the previous discussion shows the results of the learning process in the form of increasing student knowledge and understanding. The increase in these results has not met the research target, because in Posttest 1 students were only 50% and the average new score reached 71.67. This can be because students are not used to answering questions that require a good understanding of concepts. Students are more accustomed to answering questions with more textual answers or just memorizing.

Comparison of Posttest 1 and Posttest 2 scores shows a significant increase in students' conceptual understanding, after a variation of activities, namely students are involved in choosing their own concepts to be presented. The results of Posttest 2 showed that the number of students who reached the was 84.21% and the average score reached 78.84. These results have exceeded the research targets, so it can be concluded that the use of the Quantum Teaching and Learning model can improve students' conceptual understanding.This conclusion is strengthened by the results of reflective questionnaires and interviews. From the results of the reflective questionnaire, students expressed a positive response in cycle I, which means that students expressed a positive perception of learning outcomes because they could understand the material well. In cycle II, some students stated that they were not able to understand the material because of the material that was difficult to understand.

This is in line with the results of the interviews which showed students felt they did not understand the material of the Biogeochemical Cycle and the results of the Cycle II questionnaire which showed that some students had negative perceptions of learning outcomes because they experienced difficulties in learning. This difficulty is caused by the existence of foreign terms that are just known to students and concept maps that must be understood tend to be more complicated and complex. The test results on the students' Posttest 2 were still good, this could be possible because students were accustomed to answering questions that required conceptual understanding and the level of understanding tested for students was actually simpler than the material that had to be presented during learning.

Psychomotor activity

Increased psychomotor activity that can support conceptual understanding is known from the results of observations which show that in Cycle I students had high psychomotor activity and increased activity in Cycle II. These results are also supported by the results of the reflective interview questionnaire which shows a positive student response to activities during learning.This study succeeded in improving learning outcomes by emphasizing students' conceptual understanding through variations in learning activities and learning environments based on the Quantum Teaching and Learning Model. Researchers first made observations of the interaction of students and subject teachers, so that researchers could see the reciprocal relationship that occurs between subject teachers and students when studying biology. Researchers observe students' attitudes and responses during learning to find out how to build closeness with students later. Researchers as teachers also teach according to the five principles of Quantum Teaching. The teacher invites students to learn by using objects in the learning environment for learning purposes, for example by classifying living and non-living things in the classroom. Students are invited to experience the information learned through simple role-playing. Students are asked to act out some of the organisms that are eaten and eaten so that students can then name the process as a food chain. The teacher also acknowledges the students' learning efforts by giving praise to their abilities and self-confidence during presentations in front of the class, as well as gratitude if students participate in learning actively and enthusiastically. Students also learn to acknowledge other friends' presentation efforts by giving stars, the presentation group that gets the most stars as well as awards in front of the class.

The learning environment is also designed to make the learning atmosphere more enjoyable. Students make study group names according to the uniqueness of group members and slogans that reflect the strengths of the group. The results of student creativity are displayed in front of the class to encourage student motivation. Visual aids in the form of images and terms in the form of concept cards are used to support students' kinesthetic modalities in making concept maps, so that it is easier for students to understand and assemble various concepts. This is because students absorb information through physical movements by holding and adjusting these aids. Benches are also arranged according to student study groups so that discussions are more effective, but students can still face the front of the class to pay attention to teacher instructions and presentations of other groups. The class is equipped with several small ornamental plants and an aquarium containing ornamental fish to provide an aesthetic atmosphere, natural light from outside the room can also freely enter because of the location of the room on the 3rd floor with sufficient windows.

Researchers also play instrumental music which makes students more excited and enjoy learning. From the explanation above, it can be concluded that the use of Quantum Teaching and Learning can support students' conceptual understanding.

VI. CONLUSION

Based on the description of the analysis of the research results previously described, the conclusion can be drawn that the use of the Quantum Teaching and Learning model has succeeded in improving cognitive learning outcomes and psychomotor activities on Ecosystem material. This conclusion obtained the following research results:1. The results of Posttest 1 show that the number of students who fulfill by 50% increases to 84.21% in Posttest 2. The average student score also increases from 71.67 in Posttest 1 to 78.84 in Posttest 2.2. The observations show that all study groups have a high level of learning activity both in Cycle I with an average of 89.06% and increasing in Cycle II to 90.11%.

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