

## The Effect of the 7E Cycle Learning Model on Students' Cognitive Learning Outcomes in Biodiversity Material

Annisa Muhaimin Hidayati, Kasman Arifin, Jahidin

Biology Education, University of Halu Oleo, Indonesia

annisamuhaiminhidayati.13@gmail.com

### ABSTRACT

This study aims to determine the extent to which the learning cycle 7E (*Learning Cycle 7E*) influences student cognitive learning outcomes in Class X biodiversity material. This type of research was *quasi-experimental* using a *nonequivalent control group design*. The research subjects were all class X students in the 2022/2023 semester, a total of 48 students. The research instrument was a cognitive ability test consisting of 20 multiple choice questions taken proportionally to the biology question bank. The data analysis technique used is descriptive analysis to provide an overview of cognitive learning outcomes and inferential analysis to test the research hypothesis based on the results of the descriptive analysis showing that cognitive learning outcomes in the experimental class are higher than the control class with a mean value of 82.5 and the control class 70, 13. The results of the hypothesis test show that the value of  $t_{hit} = 4.54$  greater than  $t_{tab} = 1.67$  which means that there is an influence of the learning cycle 7E model (*Learning Cycle 7E*) on students' cognitive learning outcomes in class X biodiversity material

**Keywords:** 7E Cycle, Cognitive Learning Outcomes, Biodiversity

### INTRODUCTION

Education is a scheduled effort in the mentoring and learning process for individuals so that they develop and grow into human beings who are independent, responsible, creative, knowledgeable, healthy, and have good morals both in terms of physical and spiritual aspects. Humans who have noble character, who have high morality are required to be formed or built. Whether you realize it or not, education is the most important thing to produce personality (Inanna, 2018: 28). Law no.20 of 2003. Explains that the national education system. Education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have religious spiritual strength, self-control, personality, intelligence, noble character, and the skills needed (Daki, 2020: 469).

Learning is not something static but something dynamic that demands continuous improvement. The world of education has goals that must be achieved in the learning process. Learning is not only emphasized by mastery of the material, but also emphasized on mastery of skills. Students must also have the ability to do something using processes and scientific principles that have been mastered, and *learning to know* and *learning to do* must be achieved in the learning process so as to obtain quality student learning outcomes (Suriani , 2018: 63).

Based on the results of observations carried out at the research location, it can be seen that the learning process on biodiversity material still does not involve class students. This is because the teacher has not optimally used the *Discovery Learning Model* . In biodiversity material, it has a Minimum Completeness Criteria (KKM) with a score of 75. The material is said to be completely understood by students if 90% of students have achieved KKM, but what is actually achieved for biodiversity material is only 60%, so 30% of students have not achieved KKM scores . Biodiversity material refers to material whose scope is very broad, so that students find it difficult to understand biodiversity material properly. So that it is necessary to apply a learning model that can help increase students' understanding of the subject matter of Biology for the discussion of Biodiversity.

One way to achieve success in the learning process is to connect old understandings with new understandings. This process is in accordance with the constructivism process in which students build their own thoughts based on their initial knowledge. The constructivist learning model originates from Piageat's theory of intellectual development where learning is a process of self-regulation carried out by a person in overcoming cognitive problems (Marfilinda, et al. 2020: 2). Cognitive problems arise when there is an interaction between students' prior knowledge and new phenomena. Therefore, the concept of Biology must emphasize student-centered learning ( *student center* ), so as to produce meaningful learning and not just rote learning. One of the learning models that apply constructivism is the 7E cycle learning model. The 7E cycle learning model is a student-centered model. Learning This cycle provides opportunities for students to develop self-confidence through active involvement of students during learning. (Polyiem , Nuangchalerm process, & Wongchantra, 2011:2)

The use of the 7E Cycle learning model can make the learning process more active and effective because this learning model is also called a student-centered learning model ( *student center* ) so that students can manifest an attitude of courage to be able to express their own opinions. A more effective learning process requires the use of appropriate learning methods and models in determining the quality of student learning outcomes. The learning model is a learning reference that is systematically carried out based on certain learning patterns or cycles.

Through the application of the 7E cycle learning model, it creates a pleasant classroom atmosphere, and improves students' cognitive learning outcomes with 7 seven stages namely; (1) *Elicit* is the phase of bringing in students' initial knowledge. (2) *Engange* are ideas, learning plans and experiences. (3) *Explore* is a phase that brings students to gain knowledge with direct experience related to the concept to be studied. (4) *Explain* is a phase

that contains an invitation to students to explain the concepts and initial definitions obtained during the exploration phase. (5) *Elaborate* is a phase that aims to bring students to apply symbols, and definitions, to problems from the lessons learned. (6) *Evaluate* is the evaluation phase of the learning outcomes that have been carried out. (7) *Extend* is a phase that aims to think, search, find and explain examples of the application of concepts that have been learned (Imaniyah, 2015: 3).

These seven stages are a number of things that must be done by teachers and students to apply the 7E learning cycle to learning in the classroom. The 7E cycle learning model has advantages including stimulating students to recall the subject matter they have previously received, motivating students to be more active and increasing students' curiosity, training students to learn to find concepts through experimentation, training students to convey orally the concepts they have learned, provide opportunities for students to think, search, find and explain examples of the application of the concepts they have learned (Muliana, 2018: 38). Based on the search results the 7E Cycle Learning Model has been applied by several researchers including: Kencana et al. . (2020), Marfilinda et al. (2020), Susilawati & Yuni Ahda (2019), Adesoji & Mabel (2015), Sari et al. (2020). However, in the application of the 7E Cycle learning model, especially in Biology subjects, the subject matter of Biodiversity is still very rare and has not been widely applied.

## METHOD

This research is a quantitative research with a quasi-experimental research type and a non - equivalent control group design. The research instrument was a cognitive ability test consisting of 20 multiple choice questions taken proportionally to the biology question bank . The samples in this study were two classes consisting of class X MIA 1 and X MIA 2 . This study used purposive sampling . The data analysis technique used is descriptive analysis to provide an overview of cognitive learning outcomes and inferential analysis to test the research hypothesis. The data analysis technique used is descriptive analysis and inferential analysis. Descriptive analysis is used to describe the values obtained by each class in the form of maximum value (Max), minimum value (Min), mean ( $\bar{x}$ ), median (Me), mode (Mo), variance (S<sup>2</sup>) , standard deviation (S) and N-Gain. Inferential analysis aims to test the research hypothesis, but first performs a normality test and homogeneity test as a prerequisite test to see the effect of the 7E cycle learning model on cognitive learning outcomes of class X students on biodiversity material

## FINDING AND DISCUSSION

**Table 1** Pretest Value of Students' Cognitive Learning Outcomes Using the 7E Cycle Learning Model and Without Using the 7E Cycle Learning Model

| Class | n | Max Value | Min Value | Average | mode | Median | Standard Deviation | Variance |
|-------|---|-----------|-----------|---------|------|--------|--------------------|----------|
|-------|---|-----------|-----------|---------|------|--------|--------------------|----------|

|            |    |    |    |       |    |      |       |        |
|------------|----|----|----|-------|----|------|-------|--------|
| Experiment | 24 | 50 | 20 | 36,45 | 25 | 37.5 | 9.94  | 103,21 |
| Control    | 24 | 60 | 20 | 37.08 | 30 | 35   | 10.69 | 119.38 |

Source: Researcher

**Table 2** *Posttest* value of cognitive learning outcomes of students who are taught using the 7E cycle learning model and without using the 7E cycle learning model

| Class      | n  | Max Value | Min Value | Average | mode | Median | Standard Deviation | Variance |
|------------|----|-----------|-----------|---------|------|--------|--------------------|----------|
| Experiment | 24 | 95        | 65        | 82.5    | 80   | 82.5   | 7.07               | 52,17    |
| Control    | 24 | 85        | 50        | 70,12   | 75   | 70     | 9,23               | 89.07    |

Source: Researcher

**Table 3** *Pretest* and *posttest* values obtained is processed so that the *N-gain value* is obtained from the cognitive learning outcomes of students who are taught using the 7E cycle learning model and without using the 7E cycle learning model

| Class      | n  | <i>N-gain Score</i> | Category  |
|------------|----|---------------------|-----------|
| Experiment | 24 | 0.71                | Tall      |
| Control    | 24 | 0.51                | Currently |

Source: Researcher

Based on the research that has been done and the collected research data and has been analyzed by researchers, it is known that the 7E cycle learning model has an effect on students' cognitive learning outcomes. This is known based on the results of the *N-Gain analysis* obtained for the value of cognitive learning outcomes of students taught using the 7E cycle learning model is higher with an average *N-Gain value* of 0.72 compared to *the Discovery learning learning model* with an average value of *N-Gain* 0.51, so the difference between *the N-Gain* control class and the experimental class of 0.21. This is because the 7E cycle learning model is an effective constructivism-based learning model, has 7 stages in organized and student-centered learning so that they can play an active role in discovering their own concepts. In line with (Adesoji & Mabel, 2015: 13) states that the 7E cycle learning model is known as the theory of pigment cognitive development. " *the learning cycle model derived from constructivist ideas from the nature of science, and the development theory of Jean Piaget*". Besides that, the 7E cycle learning model can help students by associating the initial knowledge possessed by students with new knowledge acquired by students. The 7E cycle learning model emphasizes the nature of science as a product, process, and tool to develop a scientific attitude where students can be directly involved in the learning process so that it can improve students' cognitive learning outcomes compared to students in classes taught using the Discovery learning model (Kencana et al , 2020: 361) states that the learning model is very influential in increasing students' initial knowledge and new knowledge that will be obtained by students.

The results of the inferential analysis of *N-gain data* aim to determine whether the hypothesis proposed in this study is accepted or rejected for cognitive learning outcomes using the 7E cycle learning model on biodiversity material and using the learning *Discovery Learning*. Before testing the hypothesis, first carry out the prerequisite test, namely the normality test and homogeneity test. The results of the normality test and homogeneity test in the experimental class and control class obtained data that were normally distributed and came from the same (homogeneous) population.

The proposed hypothesis results that there is a significant effect between the application of the 7E cycle learning model on biodiversity material *compared to the Discovery Learning* learning model so that it is said that the hypothesis is accepted. This happens because students who are taught using the *Discovery Learning* learning model emphasize more so that students make new discoveries while students who are taught using the 7E cycle learning model emphasize more on linking the initial knowledge possessed by students with new knowledge obtained by students so that students can put forward ideas newly discovered ideas. This model can also be used as a learning model where students can interact directly, giving rise to reciprocal interactions between students and teachers during the learning process. In line with (Susilawati & Yuni Ahda, 2019: 370) states that a learning model that involves students and teachers to play an active role in the learning process is very good for helping to improve student learning outcomes.

Based on the results and data obtained, it can be said that learning biology on biodiversity material using the 7E cycle learning model is an effective learning model that can be used in the learning process to achieve better biology learning outcomes. (Adilah, 2015: 213) stated that the 7E cycle learning *positive* effect on critical thinking skills and cognitive learning outcomes of students by applying each phase in the learning model cycle.

## CONCLUSION

Based on the results of the analysis, the results showed that there was a significant influence of the 7E cycle learning model on learning on biodiversity. This is in accordance with the results of the *N-gain test* which shows an increase in learning outcomes in students who are taught using the 7E Cycle learning model compared to the *Discovery Learning* learning model because by using the 7E Cycle learning model students are expected to be more active in gathering information and being able to find their own concepts.

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