



## Effectiveness of the Think Talk Write Learning Strategy toward Concept Mastery of Cell for High School Biology Students

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**Abstract:** In cells, many phenomena occur such as metabolism to protein synthesis, these become abstract and cause students to have difficulty understanding them. A good learning experience is needed so that students can understand the concept correctly. One learning strategy that provides a learning experience to discover and understand concepts is the Think Talk Write learning strategy. This study uses a pre-experimental design method. The subjects in this study were students of class XI science at Muhammadiyah 5 Rancaekek high school. Mastery of concepts measured in this study were C1 (memorization), C2 (understanding), C3 (application), and C4 (Analysis). Based on the results of data processing, the pretest value was 47.22 while the posttest value was 65.28. The results of the analysis using the paired sample T-Test obtained from the pretest and posttest values of 0.00, this value indicates that  $\text{sign} < \alpha = 0.00 < 0.05$ . Based on the results of the data analysis, it can be concluded that there is an effectiveness of using the Think Talk Write learning strategy on mastery of concepts in cell material.

**Keywords:** think talk write, concept mastery, cell

**Abstrak:** Di dalam sel banyak fenomena yang terjadi seperti metabolisme hingga sintesis protein, hal ini menjadi abstrak dan menyebabkan siswa mengalami kesulitan dalam memahaminya. Diperlukan sebuah pengalaman belajar yang baik sehingga siswa dapat memahami konsep secara benar. Salah satu strategy pembelajaran yang memberikan sebuah pengalaman belajar untuk menemukan dan memahami konsep adalah strategy pembelajaran Think Talk Write. Penelitian ini menggunakan metode pre-experimental design. Subjek dalam penelitian ini adalah siswa kelas XI IPA di SMA Muhammadiyah 5 Rancaekek. Penguasaan konsep yang diukur dalam penelitian ini adalah C1 (hafalan), C2 (pemahaman), C3 (penerapan), dan C4 (Analisis). Berdasarkan hasil pengolahan data diperoleh nilai pretest sebesar 47,22 sedangkan nilai posttest sebesar 65,28. Hasil analisis dengan menggunakan uji paired sample T-Test diperoleh dari nilai pretest dan posttest sebesar 0,00, nilai ini menunjukkan bahwa  $\text{sign} < \alpha = 0,00 < 0,05$ . Berdasarkan hasil analisis data tersebut dapat disimpulkan terdapat efektivitas dari penggunaan strategy pembelajaran Think Talk Write terhadap penguasaan konsep pada materi sel.

**Kata kunci:** think talk write, penguasaan konsep, sel.

### ▪ INTRODUCTION

Biology is a branch of science that must be studied at the elementary to high school level in Indonesia because it has a goal to make students understand biological concepts, be able to associate a concept with other concepts, be able to apply concepts that have been learned and be able to solve problems in everyday life (Rahmawati, Prayitno, & Indrowati, 2013). This is in accordance with the basic competency objectives of the 2013 curriculum, namely; students are required to have factual, conceptual, and procedural knowledge. Students can obtain a concept based on individual experience and the results of their own thinking. A concept can be formed

from the influence of the social environment, explanations from the teacher, and student reading books (Hajiriah, Mursali, & Dharmawibawa, 2019).

Learning biology in cell material provides an understanding to students with various abilities about how to know and understand a concept or fact in depth. In learning cell material students are asked to be able to remember the characteristics, shapes, similarities, differences and other characteristics of cells. Many phenomena that occur in cells, such as metabolism to protein synthesis, become abstract and cause students to have difficulty understanding them, which is indicated by the low score of mastering the concept (Juanengsih, Rahmat, Wulan, & Rahman, 2021).

Knowledge of cell biology provides an understanding of dynamic life processes, starting from the cellular level as the basic unit of life to the level of organisms and even communities and ecosystems (Carlan, Sepel & Loreto, 2014). A research study shows that students aged 16 to 19 have inadequate understanding of cell structure and concepts related to genetics, such as: nucleic acids, alleles, chromosomes, and cell division (Kılıç, Taber, & Winterbottom, 2016). In mastering the basic concepts of cell biology there are at least three levels: (1) misunderstandings and obstacles in managing scientific concepts acquired during learning (2) the characteristics of cell biology material have the complexity and properties of cellular structures that cannot be observed directly by the human eye (3) Modern cell biology materials are developing rapidly, this creates challenges for teaching (Suwono et al., 2019).

Concepts according to Djamarah & Zain (2013) are the main requirements needed in mastering knowledge and cognitive processes. To be able to master the concept, students must be able to distinguish between one object and another object, by mastering the concept students can classify the objects around them. Concepts are obtained in two ways, namely through concept formation and concept assimilation. Concept formation is an inductive process, that is, a person learns specific concepts first because the process of developing concepts acquired as a child is modified by experiences throughout individual development, while concept assimilation occurs deductively because it involves how students can associate material or information with cognitive structures. existing ones (Dahar, 1996). The teacher plays a role in making students understand and learn a concept taught in class.

Judging from these problems, a good learning experience is needed so that students are able to master and understand the concept correctly. Social interaction plays a fundamental role for students' cognitive development in building a concept (Topçiu & Myftiu, 2015). One way to achieve this that students must have in studying cell biology is to use a learning strategy that includes activities that stimulate student learning experiences so as to make abstract concepts easy to understand (Hidayati, 2017). One learning strategy that provides a learning experience to discover and understand concepts is the Think Talk Write learning strategy. According to Huinker & Laughlin (1996) this learning strategy builds thinking, reflection, and organizing ideas, then tests these ideas before students are expected to write. The flow of the Think Talk Write starts with students' involvement in thinking or reflective dialogue with themselves, then talking and sharing ideas with their friends, before students write. This learning strategy is a learning strategy that allows students to be trained to analyze a phenomenon, discuss their findings, and rewrite the correct concept (Hamdayana, 2014). Research conducted by Martini & Nainggolan, (2018) by applying the Think

Talk Write on enzyme material (metabolism) oral communication ability which was initially 53.80% then became 73.02% and written communication which was initially 71.55% then showed a yield of 83.97%. Based on the results obtained, that this learning strategy can improve students' communication skills in enzyme material.

Therefore, based on the problems above, a study was conducted to see whether there was effectiveness in using the Think Talk Write for mastering concepts in cell material. The benefits expected in this study are the application of the Think Talk Write which can be used as a reference for learning in class and assisting students in improving their mastery of concepts in other materials.

## ▪ **METHOD**

### **Participants**

The population of this study was SMA in Rancaekek, Bandung Regency, while the sample for this study was SMA Muhammadiyah 5 Rancaekek. The sampling method used a purposive sampling technique and the number of samples was 36 students of class XI for the 2022/2023 academic year. Sampling method for certain considerations.

### **Research Design and Procedures**

This study used a pre-experimental design method. The research design used was one group pretest-posttest design (Sugiyono, 2006). This research consists of three parts, namely the preparation, implementation, and post-implementation stages. The preparatory stage is in the form of identifying problems regarding students' mastery of concepts. at this stage the preparation of research instruments and activity steps contained in the Think Talk Write. The prepared instruments were tested.

The implementation stage is in the form of a classroom learning process to analyze the effectiveness of using the Think Talk Write. the first step taken by students is to do a pretest, after doing the pretest students are given treatment in the form of learning activities with the Think Talk Write. After being given treatment, students did a posttest to find out the difference before and after. The post-implementation stage is in the form of collecting all the necessary data then processing and analyzing the data, so that the data obtained can answer the research questions that have been formulated. From the results of data analysis and discussion, conclusions were drawn from the research.

### **Instrument**

Instrument in this study was in the form of 20 multiple choice questions. The instrument used to measure students' mastery of concepts in cell material. According to Bloom, (1956) mastery of concepts is included in the cognitive domain, which means the ability to restate the concepts or principles that have been learned and intellectual abilities (knowledge). Concept mastery measured in this study is knowledge (C1), understanding (C2), application (C3), and analysis (C4) (Anderson & Krathwohl, 2014). This instrument is given at the pretest and posttest.

Before the test instrument was used, this instrument was first tested on students in the biology education study program. This trial is to determine the feasibility of the instrument. The analysis used in this trial includes a reliability test, validity test, discriminatory test, and difficulty test. Trial analysis was carried out using ANOTES

V4. The trial results yielded a reliability test of 0.91, a validity test of 0.497 (significant), a discriminating power of 0.6 (good), and a difficulty level of 0.59 (medium). This indicated that the instrument was feasible to use.

### **Data Analysis**

The data obtained from this study is quantitative data in the form of pretest and posttest from multiple choice questions on mastery of cell material concepts. data posttest and Pretest were used to see differences in mastery of concepts based on cognitive dimensions, topics and final grades before being given treatment and after being given treatment using the Think Talk Write. Then the data were analyzed using a statistical approach with the Paired sample T-Test with a significance value of 0.05 and also using the n-gain test.

### **▪ RESULT AND DISSCUSSION**

The results of the study were obtained from the pretest and posttest of 20 multiple choice questions on concept mastery in cell material conducted at Muhammadiyah 5 Rancaekek High School. Based on the contents of Table 1. the data from the pretest and posttest values obtained were tested for normality first using the Shapiro-Willk test with a significant value of 0.05 and the pretest was 0.104 and posttest was 0.077, which means ( $p > 0.05$ ) then the sample data is normally distributed so that it can use the paired sample T-Test learning strategy Think Talk Write.

**Table 1.** Statistical analysis of differences in pretest and posttest mastery of cell concepts

<b>Data Type</b>	<b>Pretest</b>	<b>Posttest</b>
Number of Students (N)	36	36
Average	47.22	65.28
Standard Deviation	11.859	11.081
Median	45.00	62.50
Maximum Value	80	90
Minimum Value	25	45
Test of Normality (Shapiro-Willk)	0.104	0.077
Paired Sample T-Test Sig. (2-tailed)		0.00

Based on the results of the paired sample T-Test obtained from the pretest and posttest of  $0.00 < 0.05$ , it can be concluded that there is a difference in the average value of the pretest and posttest learning strategy Think Talk Write on mastery of concepts in cell material. This is because Think Talk Write is a cooperative learning strategy so it is very important to train thinking skills in building knowledge through observation or experience and motivate students to be actively involved in the learning process, train students to learn to express opinions, ideas and concepts that have been constructed in discussion and presentation activities in class (Listiana, 2013). According to Hamdayana (2014) using the Think Talk Write can help students construct their own knowledge so that students' understanding of concepts becomes better. Students can discuss their thoughts with their friends so that they exchange ideas.

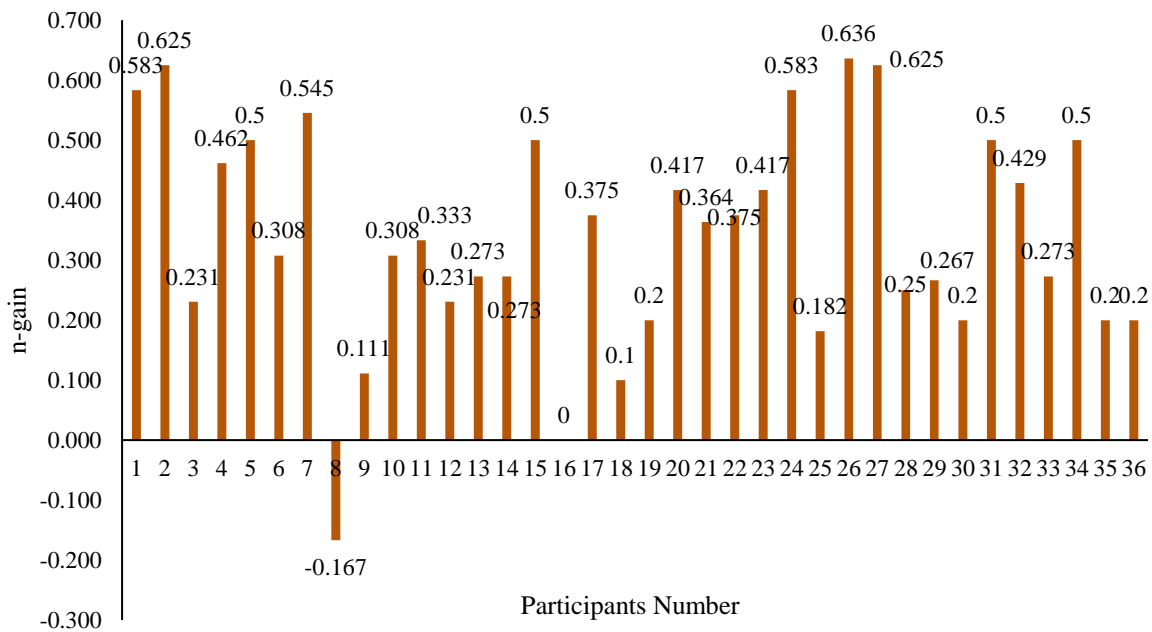


Figure 1. N-gain score of all participants

Figure 1. shows a comparison of the N-Gain values for each student. It can be seen that the smallest N-Gain value is found in student code number 8 (-0.167) while the largest N-Gain value is found in student code number 26 (0.636). The normalized gain score aims to determine the effectiveness of using certain methods or treatments in a one group pretest posttest design study. According to research conducted by Gunawan, Harjono, & Imran (2016) that students' learning styles can affect mastery of concepts, while research conducted by Gusniwati (2015), shows that emotional intelligence and student interest in learning can affect mastery of concepts.

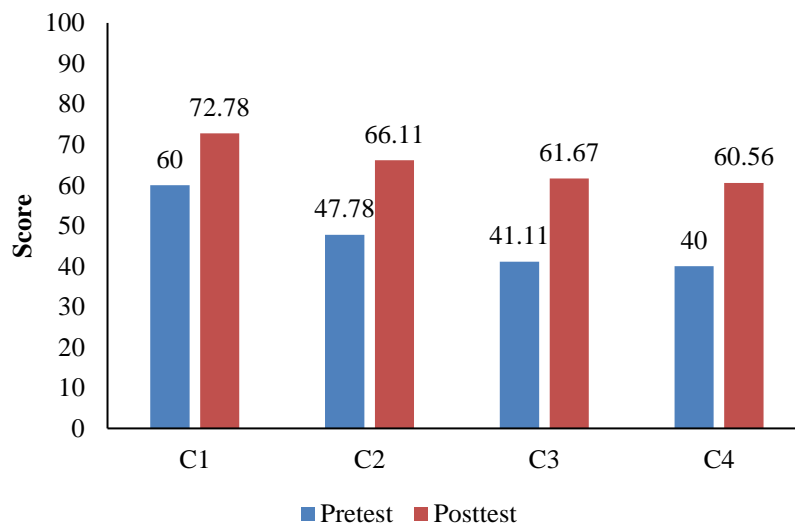
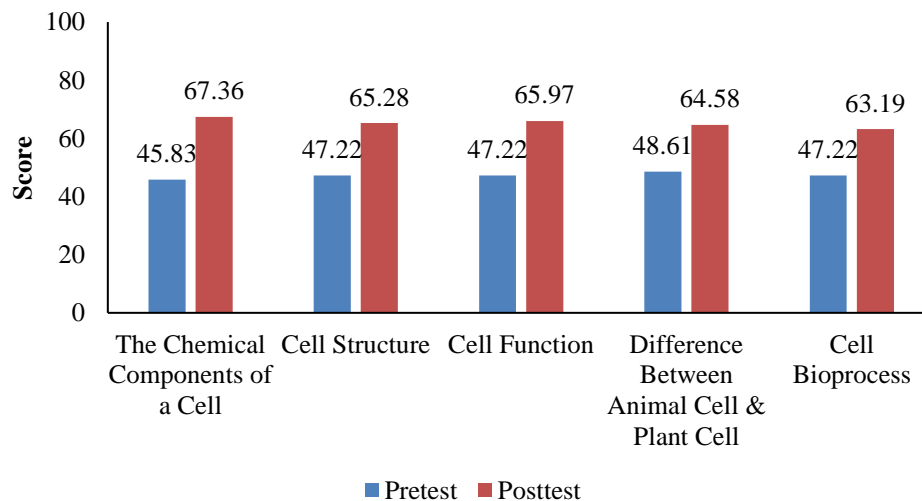


Figure 2. Pretest and posttest scores of concept mastery based on cognitive dimensions

Figure 1 shows a comparison of the pretest and posttest based on the cognitive dimension using the N-Gain on the C1 dimension (memorization) producing an N-Gain of 0.32 (moderate), C2 (comprehension) producing an N-Gain of 0, 35 (medium), C3 (implementation) produces an N-Gain of 0.35 (medium), C4 (analysis) produces an N-Gain of 0.34 (moderate). The highest increase occurred in the cognitive dimensions C2 and C4, in the cognitive dimension C2 students were required to understand and be able to construct the meaning of the learning process both in speech, writing, and pictures (Anderson & Krathwohl, 2014). In learning Think Talk Write , students are demanded to be active and creative so they can improve the quality of learning (Lukman, 2017). This can be seen from the increase in students' understanding skills because they are actively involved in discussing in groups and writing in their own language so that students will more easily understand concepts. While the cognitive dimension in the C4 dimension students are required to have the ability to detail knowledge and understand the relationship between one part and another (Anderson & Krathwohl, 2014).learning Think Talk Write there are thinking activities that can stimulate students to think about a text problem contained in the student worksheet, then the student makes answers/notes in their own language. This activity increased students' analytical skills on cell material. For C1 dimension, students are required to recall material that has been learned, such as knowledge of terms, special facts and classifications (Anderson & Krathwohl, 2014). Think Talk Write strategy there are questions that stimulate students to mention the functions of cell organelles so that these questions require students to remember. Whereas in the C3 dimension students are required to use principles, theories, laws and methods in order to solve problems. By using Think Talk Write students are required to search or investigate and prove for themselves the correctness of a concept in biology that is needed to solve a problem. This is evidenced by research conducted by Bustami, Riyati, & Julung (2019) using Think Talk Write that can improve students' thinking skills on digestive system material.



**Figure 3.** Pretest and posttest score of concept mastery based on cell topics

Figure 3 showed differences in topics related to the cell concept and n-gain score showed that the topic of chemical components making up cells of 0.40 (moderate), cell structure 0.34 (moderate), cell function 0.36 (moderate), the difference between animal cells & plant cells 0.31 (moderate), bio-processing cells 0.30 (moderate). According to Astuti (2017) in biology material there are many concepts that must be understood by students, so mastery of concepts is very important to have. The characteristics of the cell material are the complexity of the scope, the nature of the deep concept and the nature of the cellular structure that cannot be seen by the human eye. This makes students experience difficulties in conceptualizing the cell concept (Sesli & Kara, 2012). The topic of bio-processes is a difficult topic for students to master because this topic is related to complex life processes in cells which include cell membrane transport, cell division, and protein synthesis so that students need more time to understand the topic. According to Angreani, Supriatno, & Anggraeni (2020) activities that use student worksheets circulating on the internet show results in not achieving basic competencies and are less meaningful for students. This can lead to a lack of mastery of concepts for students. By using student worksheets based on the Think Talk Write students are able to connect between concepts, provide examples of concepts, and present situations in various ways and know the differences.

#### ▪ CONCLUSION

Based on the research that has been done, it can be concluded that the using of e-module electrolyte and nonelectrolyte solution based on guided discovery learning has an effect on the learning outcomes of grade X students of SMA Negeri 1 Padangpanjang. The effect is an increase in student learning outcomes in the experimental class using e-module electrolyte and nonelectrolyte solution based on guided discovery learning which is significantly higher than the control class.

The weakness in this study is that students do not understand the guided discovery learning model so that it must be explained first before starting learning, students must have a android or laptop to access e-modules and the time allocation used during learning is not as usual during the Covid19 pandemic. Therefore, the existence of an e-module based on guided discovery learning has a positive impact in the field of education, namely it can help students understand and find concepts independently.

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