

THE MODEL OF LEARNING ANALOGY AND ITS EFFECT ON THE MASTERY OF THE CONCEPT IMMUNITY SYSTEM

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ABSTRACT

This research means to determine the effect of the analogy learning model on the ability to mastery the biological concepts of class XI students at the Islamic Boarding School MA As'adiyah Dapoko Bantaeng. This research is the type of quasi-experimental (Quasi-Experimental Research) with a Non-Equivalent Control Group Design. The population in this study were all students of class XI. The sampling in this study used a purposive technique so that XI MIA 1 was selected as the control group and XI MIA 2 as the experimental group. Each class has 20 students. The instrument used to collect data research is a concept mastery test consisting of a pretest and posttest, then the data is analyzed by descriptive and inferential through independent-sample t-test. The results show that the average posttest value of students in the experimental group was 67.30. In contrast, the control group was 54.20. then the sig. (2-Tailed) 0.000 < 0.05 so that means there was an effect of the analogy learning model on the mastery of the concept immunity system of class XI students at the Pondok Pesantren MA As'adiyah Dapoko Bantaeng.

Keywords: Analogy Learning Model, Concept Mastery

1) INTRODUCTION

Education is the process of transferring knowledge, changing values and the process of character formation to obtain maturity and perfection in the development of individuals in society (Nurkholis, 2013). The success of educational activities in schools is largely determined by the performance of teachers as facilitators and organizers of learning in the classroom so that in this case a teacher's not only deliver teaching materials but also play a role to create a good learning ecosystem (Nurhaidah & Musa, 2016; Kirom, 2017). Therefore, teachers are required to be able to master pedagogical competencies including the ability to plan, manage, and conduct learning evaluations (Hamdayama, 2017). In managing classroom learning, the teachers can apply the models of learning. The learning model is an educator's guideline in carrying out a series of learning activities to achieve the planned learning goals (Muizaddin & Santoso, 2016).

Teachers can choose the different types of learning models that exist to apply when in the classroom (Afandi, Chamalah, & Wardani, 2013), the application of learning models

appropriately and adapted to the characteristics of teaching materials will facilitate participants. The learners in receiving lessons (Abdullah, 2017). The application of learning models should be able to facilitate learners in associating previous knowledge with new knowledge to be learned. As in the theory of constructivism learning which states that understanding is derived from the cognitive processes of learners themselves by compiling and creating knowledge based on previous experience (Supardan, 2016).

Biology is a branch of science that studies the intricacies of living things and their lives so that these subjects are so close to the daily lives of learners, but even so, some learners still tend to be passive when learning because they consider biology as a subject that many memorizing, then it is so difficult to learn. To understand abstract materials and concepts, you do have not to observe microscopic cells and very complex issues. (Fitratin, Fajarningtyas, & Wati, 2018; Irhami, 2019). Therefore, in teaching Biology instead of appropriate and effective learning models to simplify the delivery of materials (Raida, 2018). In addition, the learning model that is applied should make it easier for learners to be able to master the concept, namely, learners can understand the understanding and function of a material, able to give the interpretation, and able to apply their knowledge (Astuti, 2017).

Based on the results of an interview conducted with one of the biology teacher's at Pondok Pesantren MA As'adiyah Dapoko Bantaeng on February 27, 2020, it was obtained that the subject matter that was considered the most difficult to deliver was body defense system material in class XI, some learners also admitted that they still often forget and it is difficult to master the material even though it has been repeatedly explained. This happens because of the characteristics of abstract material that make it difficult for learners when imagine the material/concepts in it. Therefore, it is necessary to various learning models that are more effective and provide a strong understanding of the concepts in the mind of learners, then in terms of researchers apply analogy learning model.

Analogies in the learning model can be used to simplify the delivery of biology teaching materials by liking concepts that are still abstract with other familiar concepts (Harrison & Coll, 2013). Perhaps in analogies can explain the similarities of characteristics between two different concepts or ideas (Hasan, Nusantari, Latjompoh, & Nurrijal, 2017), for example, human body defense systems can be analogous to border forts, patrol police, defense soldiers, or intelligence agencies that can recognize intruders. Such analogies can make learning more rational and memorable; this is because learners are invited to associate their daily life knowledge with concepts newly taught by educators (Yuningsih & Susilo, 2018).

This analogy learning model was developed by, Glynn. As for the learning stages, namely, 1) introducing the concept to be aligned, 2) giving an example of analogy, 3) identifying the characteristics of both, 4) mapping the equation, and 4) identifying the difference between the concept with the analogy used, 5) then conclude (Nufida, Muntari, & Purwoko, 2013). The existence of this syntax or stage will facilitate educators in carrying out learning models effectively and systematically. Based on the description above, this research is carried out to find out the influence of the analogy learning model in the mastery of learners' biological concepts.

2) METHODS

This research included a kind of *Quasy Experimental*, with the use *Non-Equivalent Control Group Design*. The location of research this Exactly Implemented in the Boarding MA As'adiyah Dapoko, Kec. Eremerasa, the regency of Bantaeng. The Population at research Includes entire Participants educate at class XI. To determine of Sample research use *Purposive sampling* that Selected class XI MIA 1 as group control that will Apply type defenders Conventional

Form Lectures and ask the answer, then class XI MIA 2 as group experiment that will Apply type Learning analogy. Each group has Participants who educate more than 20 people.

Research data is collected through the concept mastery test instrument of 30 questions in the form of multiple-choice objective tests that have previously been validated. Each group will get the test twice, namely through *pretest* and *posttest*. The difference in the results of both is an indication of the influence of the learning model applied (Sundayana, 2014), so to find out then the research data that has been obtained will be processed descriptively and inferentially through the bed test an *independent-sample t-test*.

3) RESULTS

Based on the results of descriptive statistical analysis conducted, *pretest* and *posttest* results were obtained in the experimental group and control group as follows:

Table 1. Results of concept mastery test analysis

Parameters	Experiment		Control	
	Pretest	Posttest	Pretest	Posttest
Number of Samples	20	20	20	20
Hughes Score	50	86	56	80
Lowest Score	16	53	16	36
Average	31.10	67,30	31.20	54.20
Standard Deviation	8.92	8,57	9.51	12.51
Variance	79.57	73.48	90.38	155.59

After the results test in both research groups has been collected, then the level of mastery of the concept of learners can be determined based on categorization as follows:

Table 2. Categorization of concept mastery test results

Score	Experiment		Control		Categorization
	Pretest	Posttest	Pretest	Posttest	
81-100	0	1	0	0	Very Good
61-80	0	16	0	4	Good
41-60	2	3	1	14	Moderate
21-40	15	0	17	2	Low
-20	3	0	2	0	Very Low

Based on Table 2 categorization data, a striking difference was obtained in the results of the *student's post-test* after being given different treatments. In the experimental group that applied the learning model analogy, there was 1 student who managed to achieve excellent categorization, then 16 learners were in the good chassis category, the rest are 3 learners are in the moderate category. While in the control group that applies the conventional learning model, there are only 4learners only in good categorization, then 14 people are insufficient categorization. the rest are 2 learners are still in the low categorizationn. The average comparison of the two groups can be seen as follows:

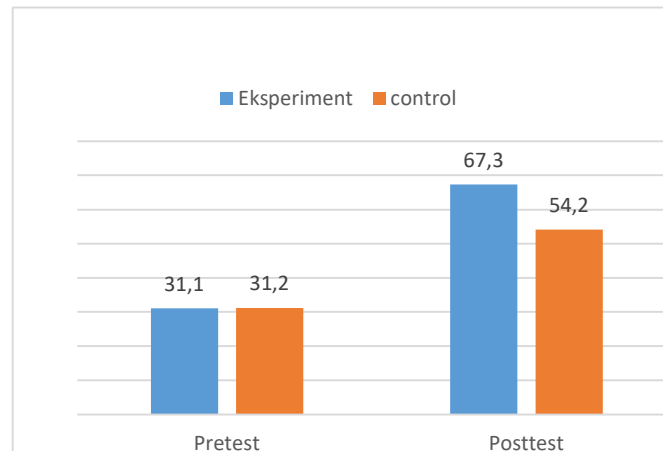


Figure 1. Comparison Diagram of Concept Mastery Test Results

Based on the diagram, it appears that the average *posttest* results of the experimental group experienced a higher increase than the control group, but based on the N-Gain test conducted to find out the percentage increase in average *pretest* and *posttest*, it is known that the average acquisition of test results in each group is in the moderate category. Comparison of N-Gain test results of each group can be seen as follows:

Table 3. The comparison of average results of concept mastery tests

Kelas	Pretest	Posttest	N-Gain	Category
XI MIA 2	31,10	67,30	0,53	Moderate
XI MIA 1	31,20	54,20	0,34	Moderate

Furthermore, to correct the difference in influence between learning models used against the ability of learners in mastering biological material concepts, hypothesis tests are carried out through Inferential statistical analysis. The hypothesis test in this study is processed with a statistical formula of independent different tests *sample t-test* with a significance level of $\alpha = 0.05$. But before that normal and homogeneous distributed research data is a prerequisite test that must be fulfilled before testing this hypothesis. Hasil normality test uses *Shapiro-Wilk* analysis as follows:

Table 4. Normality Test Results

Class	Experiment		
	Statistic	Df	Sig
XI MIA 2	0.965	20	0.653
XI MIA 1	0.921	20	0.104

Based on the analysis, it shows that the signification of value that obtained > 0.05 . It means that all data test results mastery of biological concepts in both research groups are distributed normally. Then the homogeneity test results from data by using *statistics* as follows:

Table 5. Homogeneity Test Results

Levene Statistic	df1	df2	Sig.
2.957	1	38	0.094

Based on the analysis, the significance value is obtained which is $0.094 > 0.005$. So it means that the both of research groups have homogeneous variance. After all prerequisite tests are met, the hypothesis test is then carried out using an independent test *and t-test*:

Table 6. Hypothesis Test Results

	Levene Test for Equality of Variance		t-test for Equality of Means		
	F	Sig.	T	Df	Sig. (2- tailed)
Equal variance assumed	2.957	0.094	3.862	38	0
Equal variance is not assumed			3.862	33.614	0

Based on data through independent *tests -sample t-test*, the results of calculated (3,862) $> t_{tables}$ (1,686) with a level of significance value (2-tailed) = 0.000. $> \alpha$ (0.05). Therefore, it can be interpreted that the application of analogy learning model has an influence on the ability of learners in mastering the concept of Biology.

4) DISCUSSION

Differences in the level of mastery of concepts in these two research groups can be influenced by several things, including by the level of material difficulty and learning models applied (Pangestika, Ramli, Nurmiyati, & Sapartiwi, 2017).

According to Raida (2018), the immunity system material is considered one of the most difficult biological materials to master, this is because of its abstract material characteristics making it so difficult to imagine the concepts of materials. Therefore, to be able to master the material concept of the immunity system is not enough if only by memorization, but learners must be directed to learn. Active in seeking, discovering, and building an understanding of the concepts being learned. (Harahap, Indriyanti, & Marianti, 2017).

In this research control group, the learners are taught about the material concepts of the immunity system by applying the learning model in the form of lectures and questions and answers, in addition to making it easier to explain teacher materials using the help of power *points*. At the beginning of learning, learners seem serious and pay close attention to their teacher's explanation, but over time learners it seems to start saturated and passive. The result is they ask questions and pays less attention to the teacher while explaining. Saturation during the learning process in the classroom can be caused by the ineffectiveness of the learning model used (Kasmawati, Jamilah, & Taufiq, 2021).

Based on this case, in the control group, it is considered not good enough in facilitating learners in learning the material of the body's defense system. This is because the learning atmosphere that is awakened becomes *teacher-centered* where communication that occurs only one way, so the situation is vulnerable to making learners passive and saturated with learning (Ali, 2013).

Different of the groups of experiments that apply the syntax of the learning model analogy, first the learners will be taught about the concepts in the material of the body defense system in general after which the teacher gives some examples of analogies that have previously been prepared by the teacher. through direct explanation and visualization into the form of media *power points* and audiovisual *videos*. After that, learners will be organized into several study groups to discuss and make their analogies into group worksheets shared by teachers. Finally, each group will be asked to explain the results of their discussions, which include similarities and differences between the concepts of the body's defense system and the analogies they use.

When comparing its learning syntax, the analogy learning model looks more adequate compared to conventional learning models. According to Mustami (2007) that the general application of learning analogy makes the learning process active because learners will try to find and think about parables that are appropriate to describe and explain concepts in the material he is studying.

We can see the average difference in the increase in lame test results in both research groups. In the control group that implemented the conventional learning model, the increase that occurred only by 0.34 although it still belonged to the moderate category but this acquisition was close to the low category threshold, in addition, the gain was still far less if compared to the average increase in the results of the experimental group concept mastery test that applied thea nalogi learning model, which is 0.53.

Referring to its form, the study uses more direct *analogies*, to simply compare the equations between two different ideas/concepts (Khatena,2016), in this case, that is. Concepts on the material of the body's defense system abstract with real events that are easier to understand, such as the concept of the skin as a physical barrier that *protects* the body from external exposure (Restuati, 2021) can be analogous to a wall or outermost defense fortress that protects from enemy attacks, or the working concept of white blood cells working like a policeman who is working. Patrols (Andriyanto, 2011) or even more complicated such as the working concept of lymphocytes (T Cells and B Cells) as specific defense components (Syarifuddin, 2019) can be analogous to soldiers and intelligence agencies being able to locate and recognize intruders entering the body. Such analogies can lead to communication between teachers and learners in explaining abstract concepts (Suryanda,2020). Through analogy learning models, learners will be invited to imagine these abstract concepts with something more tangible (Murat, 2013; Sujito,2019), so that the

learner done becomes more rational, effective, and imprinted in the memory of learners (Yuningsih, & Susilo,2018).

In addition, the series of activities on the learning model analogy can also encourage learners to actively participate in learning, including in the third and fourth learning syntax, namely learners will be directed to independently and group makes analogies based on interpretation and their understanding, thus learners can freely think and make analogies that they can understand themselves (Ritter & Mostert, 2017; Utomo, 2021). This is in line with the theory of learning the construction of sticks, that knowledge cannot be simply transferred from the teacher's mind to the teacher's mind, but rather the learners themselves who must construct their knowledge based on their experience and understanding. (Ahdelia, Rapi, & Ismail, 2020).

Group activities to arrange and identify similarities and differences between the teaching materials of the body's defense system with the analogies used can make learning take place better. As according to Hasanah (2017), that the use of discussion groups in the application of analogy model can make the learning climate positive. Mustami (2009) and Ramos (2011) explained that, the activity of discussing these analogies can be a stimulus for learners to be more active in constructing their knowledge, so that by discussing these analogies, they can be a stimulus for learners to be more active in constructing their knowledge, so that by Thus can build a better atmosphere of learning and understanding of the material in each learner.

Demam	
Konsep	Analogi
<p>Demam menandakan adanya penyakit atau kondisi lain di dalam tubuh. Demam merupakan reaksi sistem imun dalam melawan zat asing (antigen) yang kuat. Saat demam, antigen akan melemah sedangkan sel imun akan lebih aktif bekerja.</p>	<p>Demam bekerja seperti sebuah "Alarm Rumah Anti Maling" yang akan berbunyi apabila ada orang asing (pencuri) yang memasuki rumah. Sehingga pemilik rumah menjadi lebih waspada serta bisa segera meminta tolong (polisi).</p>
Perbedaan	
<p>Demam adalah gejala normal yang dapat dialami oleh semua orang, sebagai tanda bahwa sistem imun kita mendeteksi dan melawan zat asing (penyebab penyakit). Sedangkan alarm anti maling tidak semua rumah memilikinya.</p>	

As for the advantages of this an learner model, in its application there are still often encountered some obstacles, including learners are not familiar with the model of learning analogy in as structured manner so that it takes more time to explain and run this learning model. The analogies that will be conveyed by the teacher should be prepared carefully by paying attention to the relationship of equations and differences in analogies so as not to cause misconceptions in the teacher. learners (Samara,2016).

5) CONCLUSION

The average result of the learner's concept mastery test after applying then analogy learning model is 67.30. While the results of the mastery test of the concept of learners after applying the learning model konvensional there is 54.20. Through the results of the hypothesis test

obtained that the value of significance. (2-tailed) = 0.000. > 0.05. It can then be concluded that there is an effect of analogy learning model in the mastery of the concept immunity system of class XI learners at Pondok Pesantren MA As'adiyah Dapoko Bantaeng.

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