

# THE EFFECT OF RQA-COMBINED TPS ON THE BIOLOGY DEPARTMENT STUDENTS' RETENTION IN GENETICS SUBJECT AT UNIVERSITY OF MUHAMMADIYAH JEMBER

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## THE EFFECT OF RQA-COMBINED TPS ON THE BIOLOGY DEPARTMENT STUDENTS' RETENTION IN GENETICS SUBJECT AT UNIVERSITY OF MUHAMMADIYAH JEMBER

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### Abstract

The teaching and learning strategies applied in Biology Department at University of Muhammadiyah Jember are mostly lecturing.. This method, said to be one of the conventional methods, is also applied in Genetics course. This method has not been proven to be effective in optimizing the abilities of the students to have good thinking skill as one of the life skills should be acquired yet. As a proposed solution, a more students-centered approach, constructivists, is offered to invite more participation of the students during teaching and learning activities. Applying active learning strategies and constructivist causes students actively involved in learning. Material learned can be meaningful and retention of students increased. The strategy offered is the Combination of Reading, Questioning and Answering (RQA) and Think Pair and Share (TPS). The combination of these two is to train students to read, formulate questions, and provide answers, and discuss with their peers or groups on the material being taught. The problem of the study is to find out how significant is the effect of Reading, Questioning and Answering (RQA) and Think Pair and Share (TPS) toward students' retention on Genetics course. The research design applied in the study is quasi-experimental design. It is aimed at giving the real description on the effects of students' retention. The population of the study are the two classes of fifth (5th) semester students of Biology Department of University of Muhammadiyah Jember. One class is treated as the controlled group which applied think, pair, and share strategy, and another one is of the experiment group which applied the combination of reading, questioning and answering strategy and think pair and share strategies. The results of the study show that the average retention of the students of the experiment group is higher than those of the controlled group. The average corrected score on learning strategies combined TPS and RQA are 9.6% higher compared to learning the TPS.

**Keywords:** RQA, TPS, retention

### I. Introduction

Education is directed to overcome the nation problems this whole time, so it is necessary have an education product which is appropriate not only in quantity, but also in quality. Quantitatively, we can say that the education in Indonesia has experienced an improvement (the ability of reading and writing of the society reached 67,24%), but from qualitative side Indonesia were still low (Mulyani, 1999). Meanwhile, education quality is determined by the quality of graduates from one educational institution. The quality of graduates is determined by how broad is the knowledge and creativity that is acquired from educational institution which is useful for them to face life and win the competition in globalisation era (Sumampouw, 2011).

The quality of educational institution graduates is in accordance with the vision, mission, and purpose of an educational institution. While the purpose of Biology department in the University of Muhammadiyah Jember is to create a competent graduates in the field of biology education and have Islamic characteristic. It is hoped that biology education department can produce teacher candidates which reach the standard competence of teacher i.e. Ministry of Education Decree number 16 year 2007. Standard competence of teacher consists of pedagogy competence, personality competence, professional competence, and social competence.

According to the observation result in genetics course learning in the year of 2011/2012, students only reached cognitive C1 (remember) and C2 (understand). The conclusion is students only remember, memorize, recognize, and explain facts. This is because learning strategy that is used is conventional strategy. Conventional strategy used in genetics course is the material given by lecturer, and students only receive material and simply discuss it. Thus, one of the solutions to improve teacher candidates competence from biology education at University of Muhammadiyah Jember is by changing learning style in Genetics subject.

The alteration that can be done in genetics is by implementing learning strategy which uses constructivist approach. It is a strategy which centred at students, so that students are able to construct their own knowledge. According to Marzano (1992), constructivist approach in learning should be arranged and managed well in order to encourage students to organize their own experiences to be a new knowledge which is meaningful. The use of innovative learning strategy can develop students' potential i.e. cognitive learning, critical thinking ability, meta-cognitive skill, and retention (Setiawan, 2008). There are some strategies which based on constructivist approach. Those are RQA, Cooperative (Jigsaw, Group Investigation, and TPS), PBL, inquiry, and PjBL. RQA learning strategy is considered as a strategy which based on constructivist approach.

RQA learning strategy is a relatively new strategy. This learning strategy is developed based on reality that virtually all students that is told to read course material related to the upcoming class always do not do it. The result is that the learning strategy designed is not implemented and eventually, the understanding towards course material becomes low. Implementation of RQA learning strategy is proven to be able to force students to read course material given and make a statement, so that learning strategy which has been planned can be implemented and the understanding about the course

material has improved at almost 100% (Corebima, 2009). In this RQA strategy, learners are given the chance to be able to work by them through individual task fulfilment i.e. constructing questions. By making individual works, learners compete fairly to earn a valid award. At the same time, learning activity is also needed to provide chance for learners to learn work together, either in small or in large group (class). In this type of learning strategy, it can be seen when the students present the list of questions and answers in front of the class, and then the other students respond them. From this activity, learners can build a new knowledge together in a large group. Corebima (2010) mentioned that RQA potential in preserving meta-cognitive ability of students will be bigger if the implementation of syntactical learning is in a group model. This activity is possible to grow the spirit of working together which encourages the growth of solidarity, sympathy, and empathy towards other people. Thus, by using RQA learning strategy, learning activity at campus can be held from two poles: learning independently, and learning together. By learning independently, students can have longer retention.

Learning strategy TPS (Think, Pair, and Share) in cooperative learning was first introduced by Frank Lymn (1985). Generally, the steps in this learning are think (think individually), pair (pair with friends), and share (share the answers to the other pairs or the whole class). Cooperative learning is a learning which harnesses the grouping of students to work together in learning process, so that the maximum result is earned. Because by this grouping, it is hoped that students can help each other in their academic tasks. Besides, cooperative is also force the students to be active and participative in learning (Isjoni, 2007). Learning with this model can be a remarkable and meaningful learning so that it results a strong learning retention (Saleh, 2012).

RQA and TPS strategies are combined and focused on students (Student-centred). This trains students to be self-regulated learners, and to be responsible towards their learning improvement and adapt their learning strategy to reach the task demand.

The combination of RQA strategy and TPS can influence students' retention. The syntactical combination requires students to construct their own minds so that they can have meaningful learning, impressive, and easy-to-remember learning. By the existence of retention test, students are in the final

process of learning i.e. retrieval or the process of finding back the saved information inside the memory if in case needed or recalled back.

## **II. Method**

This research used a quasi-experimental design in which a treatment was given to free-variable to determine its influence to controlled variable, but the influenced variables could not be controlled strictly (Campbel and Stanley, 1963). The purpose of this design was to know the equality level among groups and pre-test score as covariate to control statistically. The design used in this research was Pre-Test Post-Test Non-Equivalent Control Group Design (Ary, et.al., 1982; Tuckman, 1999; Sugiyono, 2003). The population in this research was the whole students in biology education program of University of Muhammadiyah Jember who joined genetics course at odd semester in the 2012/2013 academic year. Classes used were two classes in biology education program i.e. A class and B class. A class was a control-class (TPS) and B class was a treatment-class (RQA combined with TPS). The data of the research result which related to the effect of RQA strategy combined with TPS towards retention were collected two weeks later after the final exam. The data collected were described by using descriptive statistics and hypothetical test which analyzed by covariate (Ancova). Pre-test scores were used as covariate. Before doing analysis, prerequisite test would be done first which covers: normality test, homogeneity test of the varians.

## **III. The Result and Discussion**

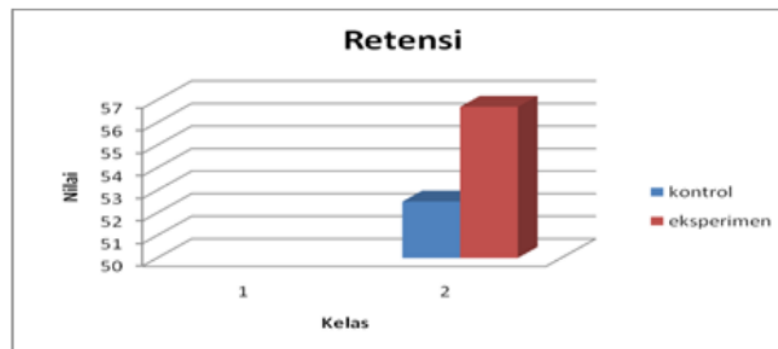
### ***Retention Students***

Retention data of students refered to essay test that has been done two weeks after post-test. Retention questions consist of: remember (C1), understand (C2), implement (C3), analyze (C4), evaluate (C5) and create (C6). According to the descriptive analysis result (table 4.3) shows that: 1) the average score for control-class is 53 (less), with the highest at 63 (adequate), and the lowest score at 43 (very less); 2) the average score in experimental class was 62 (adequate), with the highest at 74 (adequate) and the lowest score at 45 (very less).

Table 1.1 Students' Retention Score

Class	Criteria	Score	Category
Control	Low	43	Very Less
	High	63	Adequate
	Fair	53	Less
Experiment	Low	50	Less
	High	74	Good
	Fair	62	Adequate

Retention score in students for control and experiment group can be seen on Picture 1.1



Picture 1.1 the Comparison of Mean Retention Score of Students between Control-Class and Experiment-Class

#### ***Hypothetical Test of Learning Strategy Effect towards Students' Retention***

The data of the research should be tested by using normality test and homogeneity test before analyzing it by using Anakova. Normality test used Kolmogrov-Smirnov formula in retention results that all the data are normal and can be continued to be tested by using Anakova test. Retention data is also done by homogeneity test by using Levene results that all data are homogeny and can be continued to Anakova test.

According to the summary of hypothetical test by using anakova in meta-cognitive skill <sup>2</sup> can be seen in table 1.2.

Table 1.2 The Summary of Anakova in Retention Students

Sources	Quadratic	Free Degree	Mean Quadratic	F	Sig.
Corrected Model	2643.383(a)	2	1172.457	159.093	.000
Intercept	20.988	1	744.793	101.062	.000
X-meta-cog	1355.316	1	1328.097	180.212	.000
Treatment	350.362	1	280.142	38.013	.000
Error	914.017	57	7.370		
Total	199182.000	60			
Corrected Total	3557.400	59			

Based on Anakova statistics test, the effect of treatment towards retention can be interpreted. In learning strategy source can be seen  $p$ -level smaller than alpha 0.05 ( $p < 0.05$ ) with sig. 0.000. This means that  $H_0$  “there is no effect of learning strategy toward retention” is not accepted and research hypothesis which stated that “there is an effect of learning strategy towards retention” is accepted. Thus, there is a significant effect from learning strategy towards students’ retention. In other words, the use of strategy has different influence toward retention of the University of Muhammadiyah Jember in Biology Education Program in genetics course.

According to mean score, it shows that experiment class has 9.6% retention better than control-class. RQA strategy combined with TPS can improve retention compared to TPS learning strategy.

#### IV. Conclusion

Based on the research result, it shows that learning strategy has a significant influence and different toward students’ retention. Learning retention is the ability of students to recall the material that has been learnt after certain period of time. Cognitive learning biology retention in the research that has been conducted is acquired from the test result that comes after two weeks; it is when the students are not being told earlier if there is a test implementation. The measurement of this learning retention is to know how big the material defence that has been learnt by

the students. The categorized value of cognitive learning retention of biology follows the categorized that has been done in cognitive biology learning.

The model of cooperative learning STAD type basically gives chance to students to learn from their friends as a principal that sometimes students are easier to learn with their friends because they have easier thinking and communication ability. Learning by using this model can be an impressive and meaningful learning so that it can result a strong learning retention (Saleh, 2012). One of the excellences from TPS according to Fogarty and Robin (in Anita Lie, 2004) is to improve the ability of saving long-term learning material.

RQA Strategy is one of the strategies which based on constructivist philosophy, which is developed with following principals: students' self-establishment knowledge, either personally or socially. The changing of concept to the more detailed direction, complete, and scientific happen if the construction process is continuously moving, individual knowledge is saved in its cognitive structure, it is received from process of construction physically and mentally in physical and social environment. By constructing their own knowledge, students have meaningful, impressive, and easy-to-remember learning.

According to Thomborg and Chaumam (1979, in Ardiansyah 2011), several principals have to be considered in learning retention i.e. 1) meaningful, impressive, and easy-to-remember learning, 2) abstract use of media, 3) contextual learning which have associative power, 4) recitation, 5) clear material concept, and 6) repetition practice, mainly in motor skills. Besides, several factors can influence learning retention i.e. what is learnt in the first (original learning), over learning, and spaced review.

Learning process is really influenced by three processes which happen inside i.e. encoding, storage, and retrieval. Encoding process is the process of putting information inside the memory. Storage process is the process of saving information inside the memory in which there is some alterations in the structure of information itself. Last process is retrieval or finding back the saved information inside the memory if it is immediately needed or recall back.

The combination of RQA strategy and TPS can influence students' retention. The syntactical combination requires students to construct their own



minds so that they can have meaningful learning, impressive, and easy-to-remember learning. By the existence of retention test, students are in the final process of learning i.e. retrieval or the process of finding back the saved information inside the memory if in case needed or recalled back.

According to Hitipeuw (2009), retention is the implication of the encouragement of meta-cognitive skill. Meta-cognitive skill is positioned as the watcher and give decision to determine how big the care and perception needed in the implementation of learning strategy as well. It includes the effort of inserting that information to a long term memory. Meta-cognitive skill in processing information strategy is really influential towards the cognition processes which cover attention, perception, rehearsal, retrieval of long term information, and the process of representing information to the long term memory.

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