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The Effect of Learning Model Survey, Question, Read, Recite Review (SQ3R) and Critical Thingking Ability to Senior High School Students' Learning Result

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ABSTRACT

Developing study in 21 century, the students must have a good skill which can support in developing era. One of the skills is critical thinking. The students must have the competence which can solve the problem faced it for instance environment pollution problem. The problem is one of parts from Biology with collaboration study model of SQ3R that has superior for cooperation between inactive and active students , the hope can give big contribute for the students can solve the problem. The Quasi experiment uses Anava two direction (2x2) Factorial. The research is done at SMAN 1 N Tambun Utara on September-October 2017. Data of the result research shows normal point and homogeny (P> 0,05) with sample 140.. The result of research uses the Anava experiment two direction can be gotten P = 0,000 ,it means P < 0,05 (reject Ho). So the summary (1) There can be the effect of the study model of SQ3R to The result of study. (2) There can be the effect of critical thinking to the result of study. (3) There can be interaction between SQ3R and critical thinking to the result of study.

Keywords: Critical thinking, the result of study of environment pollution, SQ3R

INTRODUCTION

Indonesia as one of the developing countries felt it was necessary to improve human resources quality to be able to compete with other countries. In an effort to improve the quality of human resources closely related to the quality of education in Indonesia, because education is one of the vehicles seen in improving the quality of human resources. One of the goals of education in Indonesia nowadays is to build 21st century skills, including critical thinking, problem solving skill, effective communication skill, and collaborate skill. According Chaeruman (2013) skills are a hallmark of today's global society, the knowledge society.

In an effort to improve the quality of human resources, closely related to the quality of education in Indonesia. Based on results of several studies, students' awareness of environment in school are low, the amount of garbage scattered around the cafeteria, classrooms and desk drawers indicates students ability to think critically about cleaning sorrounding environment are low, moreover this low critical thinking ability will make learning output is not maximal. The problem might appears because during this time the teacher provides biology learning with conventional learning model. Learning model that causes learners only understand the material by memorizing, besides learning model that train students' critical thinking that will help them to apply their knowledge in life and get satisfying result.

Solution of problems described above, requires a learning model involving learners to be active in constructing science. Biology learning involving learners to be active, can train their ability to think critically and get good learning outcomes. The learning can be done by using Survey, Question, Read, Recite and

Review (SQ3R) learning models (Shaffa, 2009; Surijono, 2009). According to Trianto (2009), SQ3R learning model will provide benefits for teachers and learners that is easier to master the class, more involving learners directly and actively in the learning process and will strengthen the memory of learners. Besides Hanafiah (2009) explains by applying SQ3R learning model, learning outcomes will be greater, because learners become active readers and directed directly on the main content in the text.

According to Shah (1995), SQ3R learning model developed by Francis P. Robinson is specifically designed to understand the text content contained in books, scientific articles, and research reports. This SQ3R learning model is a strategy of studying the text actively and leads directly to the essence or key content implicitly and expressly in the text of a material. According to psychologists, the SQ3R learning model is an efficient way to help learners understand a concept or writing that is being read. Because, in the learning model SQ3R contained vocabulary mastery, organizing reading materials, and linking facts to one another and can improve students' critical thinking skills.

One place that can equip every individual with critical thinking is school. According to Zhou, et al. (2013) critical thinking is an inseparable part of education and critical thinking is a very important cognitive ability, so school continues to improve it. Meanwhile, according to Chukyuwenum (2013) learners who are able to think critically will be able to solve problems effectively.

Critical thinking according to Ennis (2011) is the ability to do reasoning and reflective thinking that is directed to decide what thing to do. Rustaman (2011) argues critical thinking is important to master because it is one of the high-order thinking (Higher Order Thinking) that must be developed, and it is one alternative to build the character of learners in science education. In addition, the emphasis of learning is the result of learning itself. Student learning outcomes are oriented as a reflection to know the mastery of learners' learning towards a material. Learning outcomes of learners are influenced by the model of learning used by teachers. Choosing the right strategy will improve the learning process and outcomes. According to Pamitkatsih (2016) to overcome this the teachers are required to use learning models that can stimulate learners to have critical thinking ability and get good learning outcomes.

Related to the SQ3R learning model, Sumarno (2003) states that SQ3R learning model is an active, dynamic, and generative reading skill. Toharudin, et al. (2011) says that reading ability ability to think critically. When a learner has good reading skills, automatically he will also has good critical thinking skills, and expected to have good learning results as well. Based on observations in SMA Negeri 1 Tambun Utara and observations in the learning process, shows that learning process and evaluation questions that is given is not oriented to develop the critical thinking ability of learners. It makes low critical thinking ability of students.

The use of SQ3R learning model is expected to improve critical thinking ability and learning outcomes of learners. Based on the above explanation, it is assumed that learning with SQ3R model can be one way to improve critical thinking ability and learners' learning outcomes compared to conventional model (STAD) that has been used by teachers.

METHOD

The method used in this research is quasi experiment method with posttest-control design experimental design used (Creswell, 2014). In this design, experimental and control class are both

doing post-test, only the experimental class is given treatment (treatment).

RESULTS AND DISCUSSION

Student Learning Outcomes Data on Environmental Pollution Material with SQ3R Learning Model and High Critical Thinking Level (A1B1)

Student learning outcomes on Environmental Pollution materials, that learn to apply the SQ3R Learning Model with High Critical Thinking level can be described as follows:

Range of score 5 with the lowest score of 95 and with the highest score 100; Average Calculation Result 97.72; with standard deviation of 1,046. Frequency distribution of learning outcomes of learners using SQ3R Learning Model with High Critical Thinking Level can be presented in the following histogram chart:

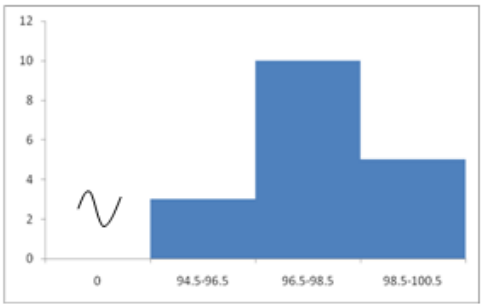

Figure 1. Histogram Score of Environmental Pollution Learning Results on Learners Using SQ3R and High Critical Learning Model (A1B1)

In the Histogram, it shows that the range of values starts from 95 to 100. In the histogram data groups are divided into 4 groups of data and class length of 0.2. In range 95 to 97 has a frequency 3. In range 97 to 99 has a frequency of 13. In range 99 to 100 has a frequency 2.

Data of Learning Environmental Pollution on Learners with Learning Model SQ3R and Low Critical Thinking (A1B2)

Result of Environmental Pollution Study material to learners using Learning Model S3QR with low critical thinking level, minimum score 60; highest score 85; average 79.22; standard deviation of 6.025. Frequency distribution of learning outcomes of learners given SQ3R Learning Model with Critical Thinking can be presented in the following figure, in the form of a histogram graph.

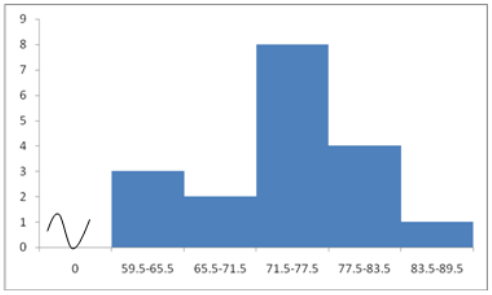

Figure 2. Histogram Score of Learning Result of Environmental Pollution on Learners With Learning Model SQ3R and Low Critical Thinking Low (A1B2)

In the Histogram, it shows that the range of values starts from 60 to 85. In the histogram data groups are divided into 5 groups of data and class length of 5. In range 60 to 65 the freqency is 2. In range 66 to 70 the freqency is 3. In range 71 to 75 the freqency is 7. In range 76 to 80 the freqency is 4. In range 81 to 85 the freqency is 2.

Data on Learning Environmental Pollution on Learners With STAD Learning Model and High Critical Thinking (A2B1)

Environmental Pollution learning results in high critical thinking learners are described as follows: score range 13; minimum score 85; highest score 98; average 92.44; standard deviation 4.301. Frequency distribution of learning outcomes of learners:

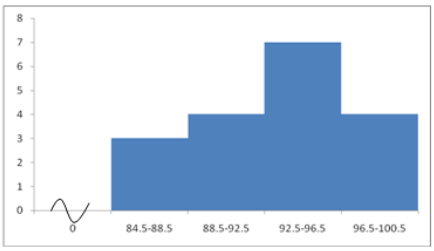

Figure 3. Histogram Score of Learning Result of Environmental Pollution on Learners with STAD Learning Model and High Critical Thinking (A2B1)

In the Histogram, it that that the range of values starts from 85-98. In the histogram data group is divided into 3 groups of data and class length of 5. In range 85-90, the frequency is 5. In range 91-95, the frequency is 9. In range 96-100, the frequency is 9. In range 8.5-9, the frequency is 4.

Data of Environmental Pollution Learning on Learners with STAD Learning Model and Critical Thinking Low (A2B2)

The result of Environmental Pollution study on low critical thinking students using STAD Learning Model is described as follows: score range 35; minimum score 33; highest score 68; average 54.67 ;. Frequency distribution of learning outcomes of learners:

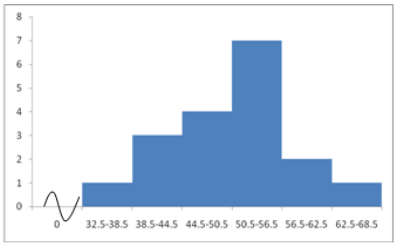

Figure 4. Histogram Score of Environmental Pollution Learning Results on Learners with STAD Learning Model and High Critical Thinking (A2B1)

In the histogram it is seen that the range of values starts from 33 to 58. In the histogram data group is divided into 5 groups of data and class length of 5. In range 33-38, the frequency is3. In range 39-43, the frequency is5. In range 44 to 48, the frequency is 6. In range 49 to 53, the frequency is 2. In range 54 to 58, the frequency is 1.

Test Prerequisite Analysis

Testing requirements performed is a test of normality and homogeneity of data. The explanation of the prerequisite sample test data research results as follows:

1. Normality Test

In this research, there are 2 data: data of critical thinking ability and result data of study material of Environmental Pollution. The two data are divided into 4 groups of data.

The learning outcomes of IPA class X students in SMA Negeri 1 Tambun Utara, both control classes (using STAD Learning Model) and experiments (using SQ3R Learning Model) with each postest score of 140 data. In this study using Kolmogorov Smirnov test can be seen that the test value of 0.082, where this value is greater than the value of alpha 0.05. This result indicates that H_0 is accepted meaning that the data is normally distributed. The results can be seen in the following table 1.

Table 1. Test of Normality in Four Data Groups

Data	Mean	N	Sig
A1B1	97.72	18	.64952
A1B2	79.22	18	.44683
A2B1	92.44	18	.59658
A2B2	54.67	18	.41667
Total	86.97	72	.87455

From the calculation it can be measured that the A1B1 data group has normal data (p> 0.05), the normal A1B2 data group (p> 0.05), the normal A2B1 data group (p> 0.05), and the normal A2B2 data group (p> 0.05).

2. Homogeneity Test

To test the homogeneity of learning outcomes in students of XA IPA class in SMA Negeri 1 Tambun Utara, both control class (using STAD Learning Model) and experiment (using Learning Model SQ3R) with each post-test value.

Homogeneity test results showed that p value = 0.051, where this value is greater

than alpha value 0.05 (p> 0.05). This result shows that Ho is accepted. It is concluded that the four groups of data tested were derived from samples with homogeneous data variance

The results can be seen in the following table 2.

Table 2. Homogeneity Test in Four Groups of Learning Result Data of Environmental Pollution

Data	Mean	N	Sig
A1B1	97.72	18	.5789
A1B2	79.22	18	.4344
A2B1	92.44	18	.6754
A2B2	54.67	18	.3271
Total	86.97	72	.5674

From the calculation, it can be measured that the A1B1 data group has homogeneous data (p> 0.05), the A1B2 data group has homogeneous data (p> 0.05), the A2B1 data group has homogeneous data (p> 0.05), and the data group A2B2 has data which is homogeneous (p> 0.05).

Hypothesis test of learning result data by using Model SQ3R and STAD Model and critical thinking done with 2 way anava test (using SPSS) can be seen in table 3.

Table 3. Table Hypothesis Test of Anova 2 Direction

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	19929.819*	3	6643.273	163.369	.000
Intercept	472554.014	1	471554.014	11620.881	.000
Model	4005.125	1	4005.125	98.493	.000
Berpikir Model*	14252.347	1	14252.347	350.489	.000
Berpikir	1672.347	1	1672.347	41.126	.000
Error	2765.167	68	40.664		
Total	495249.000	72			
Corrected Total	22694.986	71			

Based on the data analysis, the results of hypothesis testing is mentioned as follows:

1) There is influence of SQ3R learning model to learners' learning result on Environmental Pollution material. It is shown from calculation result that p value for learning result using STAD and SQ3R model is p = 0.000, where the value of p <0.05 means reject H0, which means that there are differences in learning outcomes between learners using STAD model with SQ3R model.

2) There is influence of critical thinking ability to learners' learning result on Environmental Pollution material. It is shown from the calculation result that the value of p for learning result in learners with high critical thinking ability and low critical thinking ability is p = 0.000. Where the value of p <0.05 means reject H0 which indicates that there are differences in learning outcomes between learners with high critical thinking skills with learners who have low critical thinking ability.

3) There is an interaction of SQ3R learning model and critical thinking ability to learners' learning result on Environmental Pollution material. It is shown from calculation result that p value for interaction value between learning model with critical thinking ability is 0.000, p value <0.05 means reject H0 indicating that there is interaction between learning model with critical thinking ability.

Learning process with SQ3R model is a learning model through the activity stage that is reviewing, asking, reading, telling, and repeating. This model can help learners to be able to react critically-creatively and think critically.

The data obtained are suitable with those proposed by Halpen (2013) that critical thinking can be developed following some of the following characteristics: (1) willingness to engage and endure complex problems, (2) habitual use of plans and suppression of impulsive activity, (3)) flexibility or open-mindedness, (4) a willingness to abandon productive strategies in an attempt to self-

correct, and (5) an awareness of the social reality that needs to be overcome so that the mind can become action.

Implementation of learning activities in accordance with the syntax allows the formation of a good understanding that will impact on student learning outcomes. A good understanding will reduce forget, because the material will be embedded in the long-term memory of learners (Anderson, 2001). Similarly, Kwantlen (2010) opinion in his research that by using SQ3R model learners will be more understanding about the material taught because learners are actively involved in reading so as to get high learning results.

The results of this study are also supported by several previous studies namely: Model SQ3R is an excellent reading model to understand the content of reading that uses the steps systematically in the implementation, (Dalman, H, 2013). Robinson in Hanafiah (2010) states that Effective Study, through reading activities with SQ3R model, namely: 1) Survey, ie investigate in advance to get a glimpse of the content / subject to be studied. 2) Question, which is to ask the question of the main idea or the contents of the book read in passing. 3) Read, which is to actively read to give answers to the questions made. 4) Recite, ie recite the answer given to the question by not looking at the book / look at the small notes that outline. 5) Review, ie repeat what he read by checking his notes.

In SQ3R model learning activity, learners are also encouraged to be active in learning activities in groups. It can also be seen based on the results of learning observation that learners follow the learning activities in an orderly and vibrant manner (Appendix 5). Such learning activities make it possible to improve the learning outcomes of learners. This is also stated by Robinson in Syah (2016) the application of SQ3R model can improve learning outcomes because this model has the following advantages: 1) SQ3R model has clear steps to enable learners to understand the material texts; 2) SQ3R learning model requires learners to be active learners and directed directly at the essence contained in the subject matter; 3) SQ3R model enables learners to understand and remember the material for a longer period of time; 4) SQ3R model can improve the liveliness and involvement of learners during the learning activities take place.

One of the advantages of this SQ3R learning model, is that it can increase the liveliness and involvement of learners during the learning activities, so that it can improve the critical thinking skills of learners. With the increased ability to think critically, it can also improve learning outcomes (Appendix 13). According to Rustina (2014) in his research states that the ability of critical thinking in the group of learners who get SQ3R learning has improved better, so there is a significant correlation between the ability to think critically and the learning outcomes.

Based on these conclusions that the ability to think critically is directly proportional to the value of the learners' learning outcomes, this is in accordance with the opinion expressed by Facione (2011) that critical thinking ability consists of several aspects, including: interpretation, analysis inference, evaluation, explanation, and self regulation. Aspects of interpretation of learners are able to classify the problems received so that it has a meaning and a clear meaning. Aspect Analysis learners are able to test ideas and recognize the reasons and statements. Inferior aspect of learners can make a conclusion in solving the problem. Aspects of evaluation of learners are able to assess the statement or opinion received from both yourself and others. Aspect Explanation learners are able to explain the statement as well as opinions that have been disclosed to be a strong opinion. Self-regulation Aspects learners can manage their existence in the

face of problem solving. As stated by Arief (2013) critical thinking is to empower the skills or cognitive strategy in determining the purpose and ability to solve the problem.

After hypothesis testing, a follow-up test was conducted using Tukey test. Based on the Tukey test results obtained data showing that data groups that apply SQ3R model with high critical thinking ability better than the group using SQ3R model with low critical thinking ability. And SQ3R model with high critical thinking ability better than STAD model with high critical thinking ability. This means that the SQ3R model is better than the STAD model. SQ3R model with learners who have high critical thinking ability can show much better learning outcomes than students who have low critical thinking ability.

Learning is not only a model, but also about the critical thinking skills that learners have in learning. Learners with high critical thinking skills will show good results compared to learners with low critical thinking skills. Critical thinking ability is directly proportional to the value of learners' learning outcomes.

Research results that show high learning outcomes of learners in groups learning with SQ3R learning model and high critical thinking skills, indicate the importance of teachers to be able to design active and interesting learning for learners. In addition, for learners who still have low learning outcomes, it can be supported by teacher in order to improve the value of learning outcomes in various ways, both the support of self-learners (improve the ability to think critically) and learning environment (learning process in the classroom). The existence of interaction between the good learning design of the teacher and the ability to think critically will help learners achieve optimal learning outcomes. If the critical thinking skills of learners have been good, then the learning outcomes of students will be good.

Based on the results of research conducted by Facione (2011) mentions that critical thinking is a process of thinking in a broad and deep in building knowledge. Learners who have good critical thinking skills will be able to discuss a problem with a broad and deep, can examine a problem from various points of view (Facione, 2011).

From other studies, it shows that learners who have good critical thinking skills will be able to improve learning outcomes or can build knowledge very well. The combination of using technology with critical thinking skills of learners will show better learning outcomes (Patarnaporn and Wannapiroon, 2015).

Other studies have shown that critical thinking skills are an important ability that learners must possess in today's era. A teacher must have the skills in critical thinking skills in order to form learners who are able to think critically too. The current curriculum should be able to build the critical thinking ability of learners (Nilson et al, 2013).

In science learning such as Biology, critical thinking ability is very important. In studying this nature requires a critical thinking ability. With the ability to think critically learners can examine natural events well and can discuss broadly and deeply about a problem or phenomenon related to nature (Bailin, 2002).

Based on the research conducted by Ayu (2013) critical thinking ability is the ability to think that should be developed and controlled learners in the context of learning. Meanwhile, according to Hidayanti (2016) learning should be able to invite learners to practice and learn to think critically so that after graduating students are equipped with the ability to think critically. Thinking is a personal human activity that leads to a discovery directed to a goal (Purwanto, 2007).

According Jhonsons (2013) if learners are given the opportunity to use critical thinking skills in every class level, students

will eventually get used to sorting out information with logical arguments in accordance with facts. Meanwhile, according to Hidayanti (2016) learning should be able to invite learners to practice and learn to think critically so that after graduating students are equipped with the ability to think critically. Meanwhile, according to Ennis (2011) critical thinking is a logical and reasonable thinking that is focused on making decisions about what is believed and done.

The interaction between the use of the SQ3R learning model and the critical thinking ability of the learning outcomes is shown through two straight lines with different slopes. Both points on each line indicate that the two lines can be extended according to the number of data. Both lines on the image do not intersect but both look closer together.

This shows the interaction between the two. This is supported by the statement of Laratu, Darsikin and Wahyono (2016) that although not intersecting, the two lines on the two-lane anava graph approach each other indicate the interaction between the two research variables. The cause does not intersect these two lines is the existence of other factors that influence the interaction is not examined in this study. Therefore, it is expected in the next research to know the factors that affect the interaction of both. However, this opinion is different with Santoso (2010) which states that if the pattern of lines on the two-lane anava graph does not intersect each other, then it shows that there is no interaction. The same thing was also stated by Feldt (2009) which explains that the absence of line intersection in the two-lane anova graph shows no interaction between the two variables.

CONCLUSION

Based on hypothesis test, there is influence of SQ3R learning model to learners' learning result on Environmental Pollution material. It is shown from calculation result that p value for learning result using STAD and SQ3R model is p = 0.000. Where the value of p <0.05 means reject H0 which means that there are differences in learning outcomes between learners using STAD model with SQ3R model.

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