

Influence of team quiz model on students' retention in biology in the eighth grade of SMP Negeri 11 Samarinda in the 2013/2014 academic year

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Abstract. The aim of this research is to know the influence of Team Quiz model on students' retention in biology in the eighth grade of SMP Negeri 11 Samarinda in academic year 2013/2014. This research is a quasi-experiment research using posttest only control group design. This research used purposive sampling technique in which the samples were selected with certain consideration. The samples of this research were VIII-D class using Team Quiz cooperative learning model and VIII-F class using conventional learning model. The technique of data analysis technique in this research was t test (t-test). The result of this research showed that the students' average score in the experimental class was 82.38; while in the control class was 77.26. The t-test shows that $t_{\text{count}} = (3.11) > t_{\text{table}} = (1.66)$ in the level of significance 5%, there was a significant difference in students' learning outcomes in the control class (VIII-F) and the experimental class (VIII-D). The students' retention score in the experimental class was 74, while in the control class was 69, that is, 70% in the experimental class and 50% in the control class. Thus, it could be concluded that the model of Team Quiz influenced students' retention in Biology in the eighth grade of SMP Negeri 11 Samarinda in academic year 2013/2014.

Keywords: Team quiz cooperative learning, students' learning outcomes, retention.

INTRODUCTION

Education is universal and continues over generations across the world. Education is not acquired in a short time, but requires a learning processing order to create the outcomes that is suitable with the process that has been passed. Education plays an important role towards the development of people and society of a country. In Indonesia, education is expected to develop skill, character, and civilization in order to improve the life of the nation and students' potentials to become faithful person to God Almighty, noble, healthy, educated, skilled, creative, independent, democratic, and responsible (Act no. 20 paragraph 3, 2003). Therefore, Indonesian government should improve the quality of education although still not sufficient.

According to Sagala (2003), education is a conscious

effort to prepare students through guidance, teaching and training both formal and non-formal. The purpose of education is mainly about an overview of the values of good, noble, worthy, right, and beautiful for living. The purpose of education has two functions namely give guidance to all educational activities and the goal of educational activities.

The school is purposely designed to carry out education, which is the educational environment that helps students to interact with their surrounding environment (physical, social and cultural), the main variety of educational resources, in order to achieve the optimal educational purposes; namely to develop ability as well as to improve the quality of living and human dignity in order to achieve national goals. The national

goals may be achieved through national development in the field of education that seeks to educate people and nation and to improve the quality of Indonesian people to advance, equal, prosperous and enable to empower themselves both in physical and spiritual based on Pancasila and the 1945 Constitution (Act of Republic Indonesia, no. 20 paragraph 1, 2003).

Humans are individuals who have different characteristics. To respond to these differences and in order to improve students' achievement, the teachers should be able to choose and decide the learning strategies in order to make the teaching and learning process tedious; and by implementing fun strategies. It is expected to give a positive influence to students' learning outcomes, one of them is by applying a character method which consists of active learning, innovative, creative, effective, fun, happy and valuable.

Teachers play a very important role in deciding the quantity and the quality of teaching and learning process. Students' learning outcomes in a certain subject is one of the indicators of the quality of education. Therefore, teachers should think carefully and make plans to improve students' motivation and interest in learning, and also improve the quality of teaching in the classroom. To meet these, teachers should be able to make changes in classroom organization, the use of teaching methods, and teaching learning strategies. The teachers should also consider the students not only as individuals with their own characteristics, but also as social beings which have different characteristics.

As the person who is responsible for their students, teachers have done a lot of efforts beginning with applying variations and styles in delivering learning materials and also variations of teaching and learning model to give a positive impact to students' learning outcomes. Students are divided into several groups, and each group is given the appropriate material according to the syllabus, when a group made a presentation, the other groups function as the discussion groups and give comments. This learning model was less successful. The groups are always unable to understand the materials or did not remember the materials that should be presented and the discussion groups also unable to respond properly. It can be seen from the teaching and learning process which is less enthusiastic, students' low retention, and most of the students paid no attention and only few students participate actively in the discussion. The activity during teaching and learning process is still low. The materials that have been delivered are only remembered for a short time, and after a few days the students did not remember the materials that have been delivered and discussed. When the teacher asked questions or quizzes, most of the students cannot answer the questions correctly. One of the reasons is maybe the learning strategy did not support the students' learning activities then makes them uninterested in attending the class. As the result students' retention is still low. According to Hill (2011), retention is one of the basic

components in learning where the materials may be remembered for a long time.

Based on the problems above, the researcher applied one of the learning models namely Team Quiz. The Team Quiz is one of the models of cooperative learning that developed by Silberman (1996) where consists of several learning strategies to improve students' responsibility for effective learning activities.

Team Quiz is a model of learning by dividing the students into groups where the learning materials are divided according to the groups, thus the groups will have an opportunity to ask and answer questions. According to Sidik (2008), Team Quiz is a model of active learning where the participants are divided into three groups. Each group responsible to prepare questions and short answer, and the other groups use their time to check the notes.

An academic competition means an activity undertaken in the classroom in order to make the students interested in following the teaching and learning process. After the academic competition, there will be evaluation where the group with the highest score will receive an award from the teacher. The award is in the form of additional score for the group, strengthening, or a gift. These activities aim to improve students' motivation in order to be responsible and active in teaching and learning process. With a sense of responsibility, the students will try to remember the material that has been delivered by the teacher in order to get an award both for individually and group, as well as achieve the goal of teaching and learning process. The teaching and learning process will run smoothly if the students have a good retention. But if the students have a low retention then there will be problems because the teaching and learning process will run slowly and will not achieve the targets (Rahman, 2010).

One of the factors that can improve students' retention is by using the model of cooperative learning where the students can empower their potential in discussion. Team Quiz is one of the models of cooperative learning where in the implementation will be divided into groups that should cooperate and responsible for completing the task.

Based on the background above, Team Quiz is one of the models of cooperative learning that can improve students' retention. To prove that statement, the researcher conducted a research under the title "The influence of Team Quiz Model towards Students' Retention in Biology Subject at the Eighth Grade of SMP Negeri 11 Samarinda in Academic Year 2013/2014".

METHODOLOGY

In line with the problems mentioned above, then the type of this research is quasi-experimental research. According to Sugiyono (2012), the quasi-experiment research method is used to find out the influence of a particular treatment towards the other under controlled

Table 1. Nonequivalent Research Design

Score (%)	Prediction	Treatment(Independent Variable)	Post-test (Dependent Variable)
VIII-D	O ₁	X	O ₂
VIII-F	O ₃	-	O ₄

Source: Sugiyono (2011)

condition.

Research Variable and Operational Definition

Research variable is an attribute or trait of people or object that has certain variations that determined by the researcher to be observed and then draw the conclusion (Sugiyono, 2011).

Research variable

The variables in this research were:

- a) Independent variable: the model of Team Quiz.
- b) Dependent variable: students' retention in Biology subject with the model of Team Quiz at the eighth grade of SMP Negeri 11 Samarinda.

Operational definition

Operational definition is a definition that is given to a variable by giving a meaning or definition that used to measure the variable.

The limitation of the variables in this research had been discussed theoretically and to simplify and clarify the definition of the limitation, it is necessary to provide the operational definitions. The operational definitions based on the theoretical review in this research were as follows:

1. The model of Team Quiz is a model of active learning developed by Silberman which consist of several learning strategies to improve students' responsibility, cooperation, interest and motivation to achieve the effective learning conditions.
2. Retention is the ability to remember a concept after a certain period of time. During two weeks, the students received a lot of new information in other subjects. According to Winkel (2005), interference or retroactive inhibition is a fact that led to disruption of the new information to the previous information. The retention score is calculated by comparing the retention test result of posttest 2 with posttest 1 multiple by 100%. Students' retention in this research may be seen through objective test conducted two weeks after posttest 1.

Population and sample

The population of this research was level VIII that consisted of eight classes. From this population, there were research samples; while the sampling technique was purposive sampling technique where the sample was based on the report of students' learning outcomes. Below are the population and samples of this research:

1. The population of this research was students at the eighth grade of SMP Negeri 11 Samarinda that consisted of 247 students in eight classes.
2. The samples of this research were VIII-D class as experimental class which consisted of 37 students and VIII-F class as control class which consisted of 34 students.

Research Design

This research was designed by using quasi-experiment model of non-equivalent pretest-posttest design (Table 1). The experimental and control groups were not chosen randomly (Sugiyono, 2010).

Description:

1. Group VIII-D and VIII-F are given pre-test
2. Group VIII-D is given treatment by using Team Quiz model
3. Group VIII-F is given treatment by using direct instruction
4. Group VIII-D and VIII-F are given post-test to know students' learning outcomes in Biology subject.

Research Procedure

The procedures of this research are as follow:

1. Observing the research setting/ location.
2. Writing letter of permission to faculty, local education office, and school.
3. Performing pretest to know students basic knowledge.
4. Conducting teaching and learning process based on the lesson plan.

5. Evaluating the learning materials to collect the data about students' retention.
6. Analyzing the data to prove the hypothesis of the research.

Data collection technique

The data collection technique in this research was test. The test is in the form of a formative test, distributed to each class with the same type of test, and then the two test results compared and analyzed. In addition, this research also used interview and documentation to add to the accuracy of data needed by the researcher.

1. The letter of permission was one of the requirements to conduct this research for the relevant institutions. In this case, the local education office and SMP Negeri 11 (State Junior High School) in Samarinda (Indonesia) gave the permission to conduct this research.
2. Documentation, collecting general data, was carried out, which involves using the report of students' learning outcomes in Biology subject to know the homogeneity of students' ability in VIII-D and VIII-F at SMP Negeri 11 Samarinda.
3. Pretest as an initial test was used to know students' ability before the treatment.
4. Posttest as an evaluative test to each class at the last meeting was used to collect data about students' learning outcomes.

Technique of data analysis

Analysis of students' learning outcomes

To know the influence of Team Quiz model towards students' retention in Biology subject at the eighth grade of SMP Negeri 11 Samarinda in academic year 2013/2014, the data was analyzed by using a set of statistic test namely t-test.

The result of this research was the score of objective test. The formulation of hypothesis to analyze the influence of Team Quiz model towards students' retention in Biology subject, were as follows:

H₀: There was no influence of Team Quiz model towards students' retention in Biology subject at the eighth grade of SMP Negeri 11 Samarinda in academic year 2013/2014.

H_a: There was an influence of Team Quiz model towards students' retention in Biology subject at the eighth grade of SMP Negeri 11 Samarinda in academic year 2013/2014.

The t-test was divided into two types namely t-test with homogeneous variance and t-test with heterogeneous variance. The homogeneous or heterogeneous variance

was calculated by using the F formula as follows:

F test formula:

$$F_{\text{Count}} = \frac{S_1^2}{S_2^2} \text{ where } S_1^2 > S_2^2$$

If $F_{\text{count}} < F_{\text{table}}$ then the sample was homogeneous

If $F_{\text{count}} > F_{\text{table}}$ then the sample was heterogeneous

The level of significance: $\alpha = 0.05 \%$ and independent degree (dk) = $n - 1$

1. If the sample was homogeneous, then the formula is:

$$t_{\text{count}} = \frac{X_1 - X_2}{S \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}, \text{ where } S = \sqrt{\frac{(n_1 - 1)S_1^2 + (n_2 - 1)S_2^2}{n_1 + n_2 - 2}}$$

2. If the sample was heterogeneous, then the formula was:

$$t_{\text{count}} = \frac{X_1 - X_2}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}}$$

Description:

X_1 : The average score in Group 1

X_2 : The average score in Group 2

S : The combination of standard deviation

S_1 : The standard deviation in VIII U (experimental class)

S_2 : The standard deviation in VIII N (control class)

n_1 : Number of sample in Group 1

n_2 : Number of sample in Group 2

To find out if there was any significant difference or not, the hypothesis test was done by consulting the t count with the list of t table score in the level of trust 95% for the level of significance 5%. From the comparison between the T_{table} and t_{count} , it could be concluded that:

a) If $F_{\text{count}} > F_{\text{table}}$, then H_0 was rejected and H_a was accepted, which meant there was an influence of Team Quiz model toward students' retention in Biology subject at the eighth grade of SMP Negeri 11 Samarinda in academic year 2013/2014.

b) If $F_{\text{count}} < F_{\text{table}}$, then H_0 was accepted and H_a was rejected, which meant there was no influence of Team Quiz model toward students' retention in Biology subject at the eighth grade of SMP Negeri 11 Samarinda in academic year 2013/2014.

Retention score by using recognition method

The retention score was measured by using recognition method. According to Sawrey and Telford in Ulfah (2010), the formula of recognition method was used to obtain the

Table 2. Categories of retention score.

Score (%)	Prediction
≥ 80	Very good
70 – 79	Good
60 – 69	Fair
50 – 59	Poor
≥ 50	Very poor

retention percentage. It was by comparing the data of posttest 2 and posttest 1 multiplied by 100%.

$$\% \text{ Retention} = \frac{\text{Posttest 2}}{\text{Posttest 1}} \times 100\%$$

According to Syah and Ulfah, (2010), the retention score was then classified into the following categories as shown in Table 2.

DISCUSSION

This research began with knowing students basic ability by performing pretest before the treatment using Team Quiz in the experimental class. Pretest was given to the experimental class and the control class. The average score of pretest in experimental class is 46.53 while in the control class is 49.27. In general, the students' average score in pretest have not met the standard criteria for sciences subjects in SMP Negeri 11 Samarinda which is 70, from the result there are only three students in the control class who met the standard score. The pretest score is not optimal because the average score in pretest did not meet the standard criteria. It may be because the students have low basic knowledge of the subject matter and the possibility that the students never learned about that before. In addition the low of students' average score in pretest is because the students have no preparation, such as did not read the material before following the class. It is in line with Thorndike and Sagala (2009) that students' preparation before learning will determine their learning outcomes. Learning will be better if the students' basic knowledge is related to the new knowledge they will receive. The students' score in pretest have met the standard criteria or have a good category if the students have a good basic knowledge. Thus, students will draw relationship between their basic knowledge and the material they will receive. It helps the students to pay better attention in teaching and learning process (Slameto, 2003).

The test will be carried out after the teaching and learning process. The test was carried out to know the students' retention through the cognitive test in form of descriptive questions. The result of post-test in the experimental class and the control class almost achieved

the standard criteria. The average score of posttest 1 in experimental class is 82.38. While the average score of posttest 1 in the control class is 77.26. There are six students in the control class that failed to achieve the standard criteria. The average score in the experimental class is higher than in the control class.

The data of students learning outcomes showed that the experimental class has the highest score with the category very good, while the control class has the highest score with the category good. It can be concluded that the students learning outcome in the experimental class is higher than in the control class. In general, there is an improvement in students' learning outcomes. The students who have not met the standard criteria or low in cognitive learning outcomes, it may be because they paid no attention and are not ready to learn, as stated by Slameto (2003) one of the teacher' concerns is to prepare students to be ready in following the teaching and learning process so they will achieve a better learning outcomes. Students who have low learning outcomes are in the control class in which learning by using conventional model.

The result of students' average score in the control class and the experimental class showed that the students score in the experimental class is higher than in the control class with the average score in the experimental class is 82.38 and in the control class is 77.26. It indicates that the cooperative learning Team Quiz influence students' learning outcomes.

The students' learning outcomes in the experimental class achieved the standard criteria due to the fact that the Team Quiz has several advantages: (1) It makes the students able to develop and implement their basic concept because they can share opinions and ideas with friends in group to answer the questions; (2) the teaching and learning process is not only teacher centered but also students centered; in this model the students are stimulated through the active learning process; (3) the students in their group are motivated to answer the questions because there will be an academic competition in the last meeting. The group that has the highest score will be awarded in form of reinforcement.

The teaching and learning process in the control class was in the form of direct instruction where the teacher dominated the process, while the students only received information, they were not asked to find and combine the concept. The questions given by the teacher was only inviting chorus answers and many students only follow without thinking whether the answers are suitable or not. It can be concluded that the teaching and learning process with cooperative learning Team Quiz have higher students activities compared with the direct instruction, as the result the students who taught by using the Team Quiz model have higher cognitive learning outcomes than by using the direct instruction. It can be concluded that the learning condition with cooperative learning model of Team Quiz can improve students' cognitive learning outcomes.

Retention or memory is an important factor in teaching

and learning. Without retention, the learning process will never be come true, and vice versa (Ariyanti and Zein, 2010).

In this research, the retention score is in the form of percentage by comparing the result of posttest 1 and post-test 2 multiplied by 100%. In this case, there is a possibility that students' retention is high but has not achieved the standard criteria. The implementation of posttest has an aim to find out the students' retention ability two weeks after the treatment without repeating the learning process.

The students' retention in the control class is lower than in the experimental class. The difference between students' retention in the experimental class and the control class is not because of the level of retention, but because of the level of intelligence, the attention to the material, the ability to memorizing, and the students' interest.

In general, the result of posttest decreased, and it may be because most students were unable to recall the previous information as they cannot remember it well. As stated by Winkel (2005), people cannot remember something well may be because they paid lack of attention in the concentration phase and intervention in the form of retroactive inhibition. This intervention means there are a lot of materials that have to be remembered.

The students' retention category in the experimental class is very good which is better than in the control class. In general the percentage of retention score in the experimental class is 70.27% which is better than the control class about 50%.

The control class has lower retention score than the experimental class which suggests that there is a problem in concentration phase which is lack of attention. The brain will give attention and concentration to the new information; the more important the new information, the higher the tension and concentration given to the new information (Gunawan in Zain, 2010). Then the retention will be better. The tendency of students being bored and tired of the material is one of the factors causing the students to not concentrate well.

Within two weeks students' retention will be influenced both in the experimental class and the control class. In two weeks, the students will receive more new information and other materials. According to Winkel (2005) the intervention of retroactive inhibition is one of the facts that led to the intervention of the new information to the old information. There are several tips to improve memory as stated by Winkel (2005), namely:

(1) improve motivation and interest in learning, (2) direct the students' attention to the main topic, (3) help the students to understand the materials and describe it in the form of verbal, scheme or chart, (4) update the information by recall it from the memory, repeat it and save it in mind, (5) give structured questions in order to make the students recall the information from their memory.

Retention is a very important thing in teaching and learning process in order to achieve the expected learning outcomes. Students' retention will influence their achievement in learning. The better the students retention, the higher opportunity to achieve good learning outcomes, while the lower students retention, the lower their learning outcomes.

CONCLUSION

Based on the result and discussion, it can be concluded that

1. Cooperative learning Team Quiz model has an influence on students' retention in Biology subject at the eighth grade of SMP Negeri 11 Samarinda.
2. The level of students' retention at the eighth grade of SMP Negeri 7 Samarinda after the treatment is included in the good category with the percentage of 70.27% in the experimental class and 50% in the control class.

SUGGESTIONS

Based on the result and the conclusion of this research, the researcher proposed the following suggestions:

1. The model of Team Quiz is expected to improve the teaching and learning process, as well as students' active learning, cooperation, responsibility and retention in the teaching and learning process.
2. This research is expected to be implemented in Biology subject or other subjects, because the model of cooperative learning Team Quiz is good in improving students' learning outcomes and retention, because it forces students to learn actively and independently.
3. To implement the cooperative learning Team Quiz, the teacher should have experience in teaching. One of them is experience in individual approach, because every student has a different learning style.

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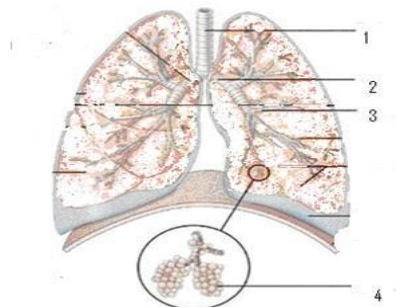
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a. Pre-test and Post-test

Sub Topic: Human Respiratory (Breathing) System

Answer the following questions correctly!

1. What is the meaning of breathing?
2. Pay attention to the picture of breathing system below!
Tell the part which is indicated by each arrow:



3. Explain the inspiration mechanism of stomach breathing!
4. Explain the expiration mechanism of chest breathing!
5. Write down in sequence the breathing apparatus!
6. What are the functions of hair and mucus membrane inside the nose?
7. What are the difference between vital lung capacity and total lung capacity?
8. What is the name of instrument which uses measuring gas in the lungs?
9. Where is the place which gas exchange occurs in the lungs?
10. Describe 5 types of disturbance likely to happen in human respiratory system?

b. Assessment Rubric

1. What is the meaning of breathing? (10 points)

Scoring criteria	Score
There is no answer	0
The answer is incorrect, but language is good and well-written	1
The answer is not complete, the language is right and well-written	2
The answer is correct, poor language	3
The answer is complete, the language is right and well-written	4
Key answer: Breathing is the process of inhaling O ₂ from outside body into the body, and blow CO ₂ gas out of the body.	4

Source: Sudijono, 2012

2. Pay attention to the picture of respiratory system below! (10 points)

Scoring criteria	Score
There is no answer	0
The answer is incorrect, but language is good and well-written	1
The answer is not complete, the language is right and well-written	2
The answer is correct, poor language	3
The answer is complete, the language is right and well-written	4
Key answer: 1. Trachea 2. Bronchus 3. Bronchilus 4. Lungs	4

Source: Sudijono, 2012

3. Explain the inspiration mechanism of stomach breathing! (10 points)

Scoring criteria	Score
There is no answer	0
The answer is incorrect, but language is good and well-written	1
The answer is not complete, the language is right and well-written	2
The answer is correct, poor language	3
The answer is complete, the language is right and well-written	4
Key answer: Diaphragm muscles were contracted so as its pulled diaphragm into stomach breathing space. The diaphragm turns flat so that the chest to escalate. Therefore, the pressure in chest space is reduced and pulled the outside air into lungs.	4

Source: Sudijono, 2012

4. Explain the expiration mechanism of chest breathing! (10 points)

Scoring criteria	Score
There is no answer	0
The answer is incorrect, but language is good and well-written	1
The answer is not complete, the language is right and well-written	2
The answer is correct, poor language	3
The answer is complete, the language is right and well-written	4
Key answer: A relaxation of muscles occur among rib bones so that those bones firmed back into their position and the chest hollow flattened. Therefore, air from inside lung will pushed out.	4

Source: Sudijono, 2012

5. Write down in sequence the breathing apparatus! (10 points)

Scoring criteria	Score
There is no answer	0
The answer is incorrect, but language is good and well-written	1
The answer is not complete, the language is right and well-written	2
The answer is correct, poor language	3
The answer is complete, the language is right and well-written	4
Key answer: Nose → Throat → Larynges → Trachea → Bronchus → Lung → Alveolus	4

Source: Sudijono, 2012

6. What are the functions of hair and mucus membrane inside the nose? (10 points)

Scoring criteria	Score
There is no answer	0
The answer is incorrect, but language is good and well-written	1
The answer is not complete, the language is right and well-written	2
The answer is correct, poor language	3
The answer is complete, the language is right and well-written	4
Key answer: The function of nose hair is to filter the incoming air, and the role of mucus membrane function to adapt the incoming air temperature.	4

Source: Sudijono, 2012

7. What are the difference between vital lung capacity and total lung capacity? (10 points)

Scoring criteria	Score
There is no answer	0
The answer is incorrect, but language is good and well-written	1
The answer is not complete, the language is right and well-written	2
The answer is correct, poor language	3
The answer is complete, the language is right and well-written	4
Key answer: Lung's vital capacity is the amount of gas volume that can be blown out by the strongest expression meanwhile the total lung capacity is the vital capacity plus the residual volume.	4

Source: Sudijono, 2012

8. What is the name of instrument which uses measuring gas in the lungs? (10 points)

Scoring criteria	Score
There is no answer	0
The answer is incorrect, but language is good and well-written	1
The answer is not complete, the language is right and well-written	2
The answer is correct, poor language	3
The answer is complete, the language is right and well-written	4
Key answer: The instrument which use to measure gas volume and vital lung capacity is spirometer.	4

Source: Sudijono, 2012

9. Where is the place which gas exchange occurs in the lungs? (10 points)

Scoring criteria	Score
There is no answer	0
The answer is incorrect, but language is good and well-written	1
The answer is not complete, the language is right and well-written	2
The answer is correct, poor language	3
The answer is complete, the language is right and well-written	4
Key answer: Place where the gas exchange occurs is called alveolus	4

Source: Sudijono, 2012

10. Describe 5 types of disturbance likely to happen in human respiratory system? (10 points)

Scoring criteria	Score
There is no answer	0
The answer is incorrect, but language is good and well-written	1
The answer is not complete, the language is right and well-written	2
The answer is correct, poor language	3
The answer is complete, the language is right and well-written	4
Key answer: Asthma, Influenza, Bronchitis, Lung cancer, and Tuberculosis (TBC).	4

Source: Sudijono, 2012