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## Students' reading interest in biology learning model based on remap CIRC, GI and TGT

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### ABSTRACT

This study aims to determine the differences in students' reading interest in biology learning models based on remap CIRC, GI, and TGT. It is a quasi-experiment implemented in Public High School N of Malang, Indonesia and Public High School S of Malang, Indonesia in the odd semester of 2014/2015. The research population was all students of 10<sup>th</sup> grade of Public High School of Malang, Indonesia. The sampling technique was random sampling. The research sample consisted of 10<sup>th</sup>-grade science 1 of Public High School N of Malang, Indonesia, 10<sup>th</sup>-grade science 2 of Public High School N of Malang Indonesia, and 10<sup>th</sup>-grade science 1 of Public High School S of Malang, Indonesia as an experiment group; and 10<sup>th</sup>-grade science 3 of Public High School N of Malang, Indonesia as a control group. The analysis was carried out in a quantitative. The result showed that the CIRC remapping learning model had the greatest influence on students' reading interest compared to GI and TGT. The students' reading interest scores using remap CIRC, GI, and TGT models were 82.90, 76.23, and 80.49. Remap CIRC, GI, and TGT model should be applied in biology learning because it can empower students' reading interest.

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## INTRODUCTION

Reading is a crucial skill (Ristanto, Zubaidah, Amin, & Rohman, 2018; Wu, 2012) and very important in both the learning process and communication. Today's educational world assumes reading lessons as an important first step in developing students' mental and language abilities (Alshumaimeri, 2011). Related to that, Iftanti (2012) explains that reading is a way to discover new things. Therefore, it is important to master reading skills for academic purposes and lifelong learning. Furthermore, the ability to read is the skill needed by students to comprehend various information being read (Ruslan & Wibayanti, 2019).

Reading has many benefits, not only to get information but also as a means of entertainment. However, some study shows that Indonesian have low interest in reading. The PIRLS study in 2011 placed the reading literacy ability of Indonesian students in the 42<sup>nd</sup> out of 45 PIRLS member countries with a score of 428 (Mullis & Martin, 2016). PISA for Indonesia on the reading indicator is ranked 72 out of 77 countries surveyed (Schleicher, 2019). Indonesian are more likely to fond of oral information than written, so reading activities are still not at the stage of a need (Pangestuti et al., 2015). In connection with this statement, the low interest in reading of Indonesian generally affects the quality of education, namely on students' thinking abilities, which in turn affects student learning outcomes. Reading is very important in learning because most of the knowledge is presented in written form so that students are required to read in order to gain knowledge (Harahap, Ristanto, & Komala, 2020; Zubaidah, 2014).

Based on the results of a narrower scope observations and interviews with students of 10th-grade science 2 of Public High School N of Malang Indonesia on September 22<sup>nd</sup>-29<sup>th</sup> 2014, it showed that the students' reading interest of 10th-grade science 2 of Public High School N of Malang, Indonesia is relatively low. Only 3.7% of students placed reading as hobby, 85% of them prefer to spend their free time playing with gadgets than reading, and only 7.4% of students read the material at home before being discussed in class. Based on these facts, it can be stated that students' interest in reading is classified as low. This also occurs in 10th-grade science 1 of Public High School N of Malang Indonesia and 10th-grade science 1 of Public High School S of Malang, Indonesia. The teachers have not tried to overcome students' low interest in reading for biology learning. It is only in the form of presenting the material in groups by students, being followed by some discussion, and strengthening the teacher's material.

To achieve learning objectives, integration between reading and writing in the classroom, teaching and learning is needed (Mubarok & Sofiana, 2017). Based on the outlined problems, a solution is given in the form of the application of a biology learning model based on reading-concept map-cooperative learning (remap coople), which is expected to increase students' interest in reading. This learning model is a combination of reading activities combined with the preparation of concept mapping and cooperative learning. This learning model requires students to read as an initial stage before face-to-face learning is implemented. In face-to-face learning, the teacher applies cooperative learning; then, students are asked to make a concept map at the end of the material. There were several previous studies related to remap coople; they are remap NHT (Dinnurriya et al., 2015; Mahanal et al., 2016; Purwaningsih et al., 2017), remap CIRC (Hayati et al., 2015a; Hayati et al., 2015b), remap TPS (Tendrita et al., 2017; Setiawan et al., 2020), remap TGT (Pangestuti et al., 2015; Latif et al., 2015), remap STAD (Antika et al., 2015; Ramadhan et al., 2016; Pangestuti, 2017), remap GI (Prasmala et al., 2014; Mistianah et al., 2014; Zubaidah, et al. 2018), remap RT (Sholihah et al., 2016; Zubaidah et al., 2019), remap jigsaw (Zubaidah et al., 2018), remap CS (Kurniawati et al., 2016).

The remap coople learning model chosen in this study is remap CIRC, GI, and TGT. Remap CIRC (Cooperative Integrated Reading and Composition) is a learning model that requires students to do reading text activities, master the main idea, think to find out the main ideas of the text, then retell and respond to each other's content (Djamahar, Ristanto, Sartono, & Darmawan, 2020; Ristanto & Darmawan, 2020). Through these activities, students are expected

to foster an interest in reading. Research has been conducted reveals that there is an effect of learning results by doing remap CIRC on students' reading interest (Hayati et al., 2015b).

The remap GI (Group Investigation) learning model has a philosophy of constructivism that requires students to build their knowledge, and teacher acts as a facilitator. During face-to-face learning through GI, students plan their assignments to be studied, carry out investigations, gather information, report the results of investigations, and provide feedback to each other on topics that have been studied. It is expected to increase students' interest in reading, seeing from gathering various information during the investigation. There is an increase in students' interest in reading by 7% with adopting the remap GI learning model (Prasmala et al., (2014). Furthermore, other findings also explained that students' reading interest with the remap GI learning model was higher than remap jigsaw (Zubaidah et al., 2018).

Remap TGT (Teams Games Tournaments) is unique cooperative learning because it uses educational games. In TGT learning, students must conduct Games and Tournaments after doing Teamwork. Applying TGT is expected to increase students' interest in reading because, with Games and Tournaments activities, students are more motivated to read. Pangestuti et al. (2015) reported the remap TGT application increased students' interest in reading.

Activities on remap CIRC, remap GI, and remap TGT can foster interest in reading, which will affect students' cognitive learning outcomes. Students are asked to read the material before face-to-face learning at the reading stage so that it can increase knowledge and students' interest in reading. Preparation of concept maps can also empower interest in reading, building understanding, and practicing students' thinking skills. This study was conducted to determine differences in students' reading interest in the biology learning model based on remap CIRC, remap GI, and remap TGT. This study is different from previous research related to remap coople model because it compares students' reading interest with three cooperative learning models, namely CIRC, GI, and TGT. This research is important because considering the low reading ability of Indonesian students needs to be improved through learning innovations in the form of remap combined with various cooperative learning models.

## METHODS

### Research Design

This research used a quasi-experiment since not all variables thought to affect research results are controlled (Maksum, 2018) with a descriptive quantitative method that aimed to find out the differences in students' reading interest in biology learning models based on remap CIRC, remap GI and remap TGT. It was conducted in the odd semester academic year 2014/2015 in Public High School N and Public High School S of Malang Indonesia. This research was applied in Basic Competencies about Virus, Archaeobacteria and Eubacteria, and Protist. Table 1 shows the research design used.

**Table 1**

The Research Design of Reading Interest based on Remap Coople

|         |                |                |                |
|---------|----------------|----------------|----------------|
| Group A | O <sub>1</sub> | X <sub>1</sub> | O <sub>2</sub> |
| Group B | O <sub>3</sub> | X <sub>2</sub> | O <sub>4</sub> |

Table 1 shows that group A is the experimental group that is taught by using remap CIRC, GI, and TGT. Group B is the control group taught by using a scientific approach based on the school curriculum applied. O<sub>1</sub> and O<sub>3</sub> are students' questionnaires given at the beginning of the learning process, while O<sub>2</sub> and O<sub>4</sub> are shown at the end of the learning process. X<sub>1</sub> is a biology learning model based on remap CIRC, remap GI, and remap TGT, while X<sub>2</sub> is a biology learning model using a scientific approach.



## Population and Samples

The population used in this research was all students in the 10<sup>th</sup> grade of Public High School of Malang, Indonesia, which consisted of 10 schools. From the research population, an equivalence test was carried out using the Duncan test based on the students' National Exam (UN) scores when entered high school. In principle, this equivalence test is a test of different classes for schools in the research population. The next stage is to determine the research sample using a random sampling technique, where the equivalent classes are then taken randomly to be the research sample. After that, determine the experimental class and control class randomly based on the sample.

The experimental group consisted of 26 students of 10th-grade science 1 of Public High School N of Malang, Indonesia, 25 students of 10th-grade science 2 of Public High School N of Malang Indonesia, and 31 students 10th-grade science 1 of Public High School S of Malang, Indonesia. The control group used was 26 students of 10th-grade science 3 of Public High School of Malang, Indonesia.

## Instrument

The instrument used in this research consisted of treatment and measurement instruments. The treatment includes syllabus, learning implementation plan, students' worksheet, and implementation sheet of learning syntax. Three observers observe the implementation sheet's filling. The measurement instrument was designed in the form of a questionnaire of reading interest, consisted of seven multiple-choice and three essays derived from Gambrell et al. (1996); Maldonado & Gonzalez (2010); Wanjari & Mahakulkar (2011). This measurement instrument has been tested for validity and reliability against 27 non-samples with valid and reliable results.

The questionnaire consisted of questions in the form of multiple choices and essays. The multiple-choice question grid contains: 1) how important reading is based on student perception, 2) kinds of reading text read by a student, 3) how often student reads biology book in a week, 4) how often student reads the non-biology book in a week, 5) the reasons encouraging the student to read biology book, 6) things making student is not interested in reading a book, 7) student's feeling when reading biology book. For the essay questions grid contains: 1) student's activity during break time, the reason they do it, kinds of the book the students usually read during break time and the topic the student most like, 2) a person who makes the student interested in reading, 3) kinds of biology book the student's prefer to read and the reason they like it.

The followings are an example of multiple-choice questions.

1. I read my biology book in one week...
  - a. never
  - b. one time
  - c. two times
  - d. more than two times
2. I read other reading materials besides biology books in one week...
  - a. never
  - b. one time
  - c. two times
  - d. more than two times
3. The reason I read the biology book is...
  - a. to spend my free time
  - b. because there will be a test
  - c. to complete the assignment given by the teacher
  - d. because accustomed to reading books and to increase knowledge

The followings are an example of essay questions.

1. What do you do when you have free time?
  - a. playing
  - b. watching television or listening to the radio
  - c. reading the book
  - d. playing gadget
  - e. other (please mention it):

.....  
Why do you like these activities?  
.....

2. What reading material do you read more often?
  - a. newspaper
  - b. novel or comic
  - c. internet articles
  - d. textbooks
  - e. other (please mention it):

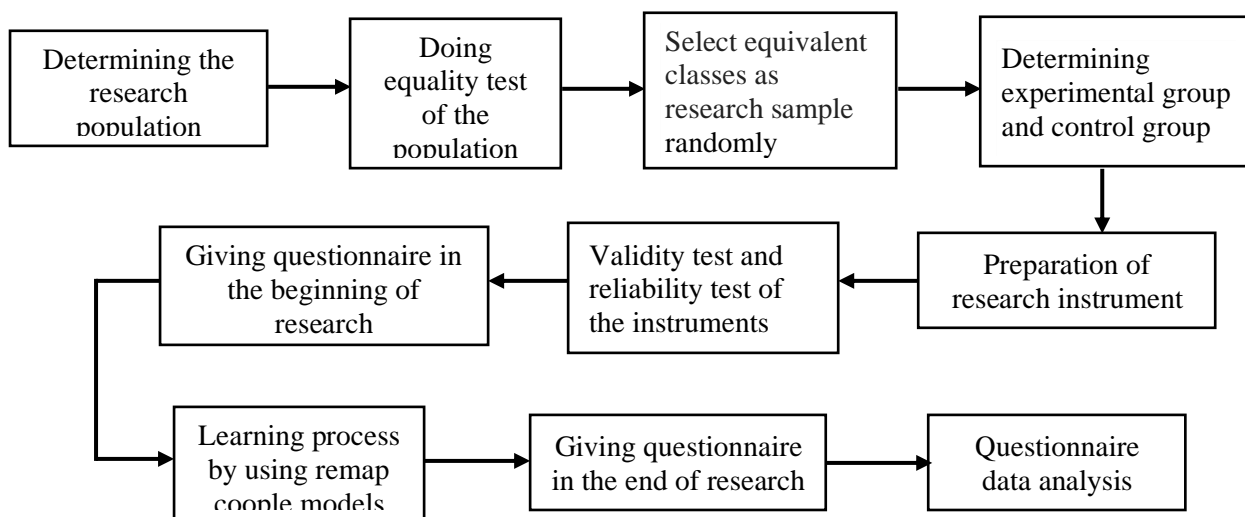
.....  
From these reading sources, what topic or title do you prefer?  
.....

### Procedure

The procedure process in doing the research consists of two stages. Thus are preparation and implementation stages. In the preparation stage includes: 1) determining the research population, 2) doing equality test of the population, 3) determining research sample randomly from equivalent classes based on the results of the equivalence test, 4) determining experimental group and control group based on the sample that has been selected, 5) doing observation and interview to the biology teacher in Public High School N of Malang Indonesia and Public High School S of Malang Indonesia, 6) build the research instrument, and 7) doing validity test and reliability test of the instruments on 27 students non-samples. As for implementation stages are: 1) giving questionnaire in the form of multiple-choice and essay questions to the students at the beginning of the research, 2) applying biology learning model based on remap CIRC, remap GI, and remap TGT, 3) giving questionnaire at the end of learning process to determine students' reading interest after applying remap coople.

Remap CIRC was applied in 10th-grade science 2 of Public High School N of Malang Indonesia; remap GI was applied in 10th-grade science 1 of Public High School N of Malang Indonesia; remap TGT was applied in 10th-grade science 1 of Public High School S of Malang Indonesia. The learning process was carried out based on the Learning Implementation Plan which refers to the syllabus. The last activity was given by providing the final reading interest questionnaire, which aimed to determine students' interest in reading after applying the remap coople learning model. Reading interest data were then analyzed to answer the research objectives. As for the research, the procedure is concluded in [Figure 1](#).

Remap coople learning models include reading activities (reading the text), concept maps (preparation), and cooperative learning (application of cooperative learning models). First of all, the students were given the task to read the material to be studied at home. The next day, the teacher face-to-face gave number of questions to ensure students have read the material at home. Then, the application of remap coople in the class. The last stage, the students compiled concept maps related to the material they have learned. For further clarification, [Table 2](#) presents remap coople syntax.



**Figure 1.** Research Procedure

**Table 2**

Remap Coople Syntax

| Remap Coople Syntax  |                   | Explanation                   |
|----------------------|-------------------|-------------------------------|
| Reading              |                   | Conducted at home by students |
| Concept map          |                   | Conducted at home by students |
| Cooperative learning | CIRC<br>GI<br>TGT | Conducted in the class        |

### Data Analysis Techniques

The data of this research were in the form of reading interest data, which were analyzed quantitatively by using analysis of covariance (ANCOVA) with a significance level of 0.05 ( $P < 0.05$ ). Before the covariance analysis was performed, a prerequisite test in the form of a normality test uses the Kolmogorov-Smirnov One-Sample test and a variant homogeneity test in the form of the Levene's Test of Equality of Error Variances was done. The summary of normality data test result of reading interest can be seen in [Table 3](#).

**Table 3**

The Summary of Normality Data Test Result of Reading Interest

|                          |                | Previous Reading Interest | Final Reading Interest |
|--------------------------|----------------|---------------------------|------------------------|
| N                        |                | 108                       | 108                    |
| Normal Parameters (a,b)  | Mean           | 73.4185                   | 78.2019                |
|                          | Std. Deviation | 7.84631                   | 9.50827                |
| Most Extreme Differences | Absolute       | 0.111                     | 0.161                  |
|                          | Positive       | 0.111                     | 0.127                  |
|                          | Negative       | -0.111                    | -0.161                 |
| Kolmogorov-Smirnov Z     |                | 1.152                     | 1.472                  |
| Asymp. Sig. (2-tailed)   |                | 0.141                     | 0.052                  |

Based on the normality data test result in [Table 3](#), it is known that the significance score of previous reading interest is 0.141 and the final reading interest is 0.052. It shows that the data is more than 0.05, so the data is categorized as normal. Then, the result homogeneity data test result of reading interest is shown in [Table 4](#).

**Table 4**

The Summary of Homogeneity Data Test Result of Reading Interest

|                           | F     | df1 | df2 | Sig.  |
|---------------------------|-------|-----|-----|-------|
| Previous Reading Interest | 2.224 | 3   | 104 | 0.090 |
| Final Reading Interest    | 3.611 | 3   | 104 | 0.051 |

Based on [Table 4](#), it is known that the significance score of previous reading interest is 0.090 and the final reading interest is 0.051. It shows that previous and final reading interest data is more than 0.05, so it is distributed homogeny.

## RESULTS AND DISCUSSION

[Table 5](#) shows the average data increase of reading interest score in the control and experiment group through the biology learning model based on remap CIRC, remap GI, and remap TGT.

**Table 5**

The Data Average Increase of Reading Interest Score in Control and Experimental Group through Biology Learning Model based on Remap CIRC, Remap GI, and Remap TGT.

| Group      | Increase of Reading Interest (%) |
|------------|----------------------------------|
| Control    | -0.66                            |
| Remap CIRC | 15.87                            |
| Remap GI   | 3.47                             |
| Remap TGT  | 7.83                             |

Based on [Table 5](#), there is a decrease in the average score of reading interest in the control class by 0.66% at the end of the study. Meanwhile, there is an increase in the average score of reading interest in the class taught by the remap CIRC model, which is 15.87%. The average score of reading interest in the class taught by the remap GI model also increases by 3.47%. Lastly, the average score of reading interest in the class taught by the remap TGT model also increase by 7.83% at the end of the study. In summary, it is known that the biggest increase in reading interest score is in the class taught using the remap CIRC model.

The covariance analysis results to determine the effect of the biology learning model based on remap CIRC, GI, and TGT toward students' reading interest, as explained in [Table 6](#).

**Table 6**

The Summary of Anacova Data Test Result of Reading Interest

| Source          | Type III Sum of Squares | df  | Mean Square | F      | Sig.  |
|-----------------|-------------------------|-----|-------------|--------|-------|
| Corrected Model | 2679.507(a)             | 4   | 669.877     | 9.865  | 0.000 |
| Intercept       | 2301.786                | 1   | 2301.786    | 33.898 | 0.000 |
| XBACA           | 1273.439                | 1   | 1273.439    | 18.754 | 0.000 |
| KELAS           | 1529.788                | 3   | 509.929     | 7.510  | 0.000 |
| Error           | 6994.063                | 103 | 67.904      |        |       |
| Total           | 670152.334              | 108 |             |        |       |
| Corrected Total | 9673.570                | 107 |             |        |       |

a R Squared = 0.277 (Adjusted R Squared = 0.249)

It is known in [Table 6](#) that F score of 7.510 with a significance value of 0.000 is smaller than 0.05, so there is an effect on the biology learning model based on remap CIRC, remap GI,

and remap TGT toward students' reading interest. Next, each learning model's effect difference toward students' reading interest is explained in [Table 7](#).

**Table 7**

The Effect Differences of Learning Model by using Remap CIRC, Remap GI, and Remap TGT toward Students' Reading Interest based on Anacova Test Result

| Group      | Xreading | Yreading | Difference | Readingcor | Notation LSD |
|------------|----------|----------|------------|------------|--------------|
| Control    | 73.40    | 72.92    | -0.48      | 72.93      | a            |
| Remap GI   | 73.88    | 76.44    | 2.57       | 76.23      | b            |
| Remap TGT  | 75.54    | 81.45    | 5.91       | 80.49      | b c          |
| Remap CIRC | 70.33    | 81.50    | 11.17      | 82.90      | c            |

Based on [Table 7](#), it is known that the biology learning model based on remap CIRC, GI, and TGT have a significant influence on students' reading interest and are significantly different from the control class. The remap CIRC learning model has the most influence on students' reading interest compared to the remap GI and remap TGT, which is indicated by a corrected reading interest score of 82.90. The effect is also significantly different from the remap GI model, but not significantly different from the remap TGT model. The remap TGT learning model influences students' reading interest with a corrected reading interest score of 80.49, which is not significantly different from the remap GI model. The remap GI learning model had the least effect on students' reading interest compared to the remap CIRC and remap TGT models, as indicated by the corrected reading interest score of 76.23.

In this study, the biology learning model based on remap CIRC had the greatest influence on students' reading interest compared to the remap GI and remap TGT models because the remap CIRC syntax supported it. In the remap CIRC learning model, students conduct reading activities at the reading stage and at the time of CIRC implementation. At the reading stage, students are forced to read at the beginning of learning so as to foster a student's fondness for reading. reading stage provides opportunities for students to read biology material from various sources, so that not only it can increase students' understanding of subject matter but also students' interest in reading

During CIRC learning, the teacher presents the material using a reading text; then, students are directed to read it. Next, students work together to read out the main ideas of the text. The CIRC learning model allows students to read aloud while forcing them to read the text to easily find out the main idea. Citing an explanation from the WWC Intervention Report (2012) that CIRC in daily learning provides students with opportunities to practice understanding and reading skills in pairs and small groups. Students in teams read each other, predict the conclusion, summarize the content, and write responses to questions raised by the teacher, decoding, and vocabulary (Ristanto et al., 2018; Harahap et al., 2020). In small groups, students are asked to understand the text's main ideas and rewrite the contents. As such, CIRC has the potential to enhance reading comprehension for beginner readers positively. It was also stated in another source that CIRC was considered an effective and efficient strategy in teaching reading activities compared to conventional teaching (Karafkan & Aghazadeh, 2015; Gupta & Ahuja, 2014; Zarei, 2012).

The reading activity in the Student Worksheet during remap CIRC learning can train students to read more, further encouraging students' interest in reading. There is new information in the text of the student worksheet, which is not included in the textbooks. The information contained aims to develop the material to be understood, so students can add their reading material and enrich their knowledge of the concept. Still, they can also encourage interest in reading. Research by Yonatin (2014) reinforces this study's results that the CIRC method can create a more lively learning atmosphere and make students more interested in

reading.

The biology learning model based on remap GI has the least influence on students' reading interest compared to the remap CIRC and TGT models because the syntax of the GI learning model is more directed towards empowering students' thinking abilities. The remap GI model can empower students' reading interest during an investigation, where students are required to gather information from various sources. It emphasizes student self-direction through group-centered decision making. Remap GI makes students focused more on finding and overcoming problems that encourage them to think critically.

Students are forced to read at the beginning of learning to foster a student's hobby for reading at the reading stage. This stage provides an opportunity for students to read biology material from various sources, so that remap GI can increase students' understanding of the subject matter and students' interest in reading. The explanation was also strengthened by Prasmala et al. (2014) which is stated that the application of the remap GI model can increase students' interest in reading because it is a learning that forces students to do reading activities at the reading stage at the beginning of learning that can foster students' fondness for reading. Furthermore, Setiani & Razak (2019) revealed that reading is an activity that can increase students' knowledge. If students have more knowledge, it will be easier to identify and choose information in developing a conceptual framework.

Another factor influencing the low interest in reading among students in this study during the remap GI learning model was students interest on reading other types of reading than biology books. Also, students often did not have time to read due to many schoolwork assignments that must be finished or too preoccupied with school extracurricular activities. Romainah (2018) explained that other factors also influence students' reading comprehension, including reading motivation and reading habits. It is suspected that students as the subject of this study are not accustomed to reading, especially concerning the subject matter. Furthermore, Alshumaimeri (2011) also stated that reading skills are obtained more through practice, not from educational backgrounds or teaching methods. Interest in reading can also be influenced by internal and external factors, especially social-psychological factors (Shehu, 2015).

The remap TGT learning model's influence in this study is supported by the remap TGT model's syntax, which is at the reading stage, Games, and Tournaments. Students are asked to do a reading activity related to subject matter that can empower students' interest in reading at the reading stage. The Games and Tournaments stage can motivate students to read more subject matter so that with more reading, students can win every Games and Tournaments they participate. Students in the remap TGT class can interact well, decrease disruptive behavior in the class, and spend more time working on assignments together. These activities can optimize the emergence of various ideas from reading activities (Latif et al., 2015).

The results of this study are supported by Pangestuti et al. (2015) research, which shows that the application of biology learning models based on remap TGT can increase students' reading interest. In the application of remap TGT, a student can be a winner in the Games and Tournaments stage if they have more knowledge than their opponents, so students are more motivated to read more. By reading a lot at the "reading" stage, students will gain more knowledge. Students will have more motivation to increase the amount of reading that increases student reading interest through Games and Tournaments.

Students were directed to read material about Viruses, Archaeobacteria and Eubacteria, and Protists in this study. Students are given the task of reading at home about the subject matter to be studied. Students are also required to read again during the remap CIRC application, remap GI and remap TGT models in the class. In biology learning, students are required to read a lot to understand the material. Learning biology is not a form of memorization, but the most important thing is understanding the concept of biology. Students

who read the material well will be able to master the concepts of biology. The concepts that have been obtained are then poured into a concept map.

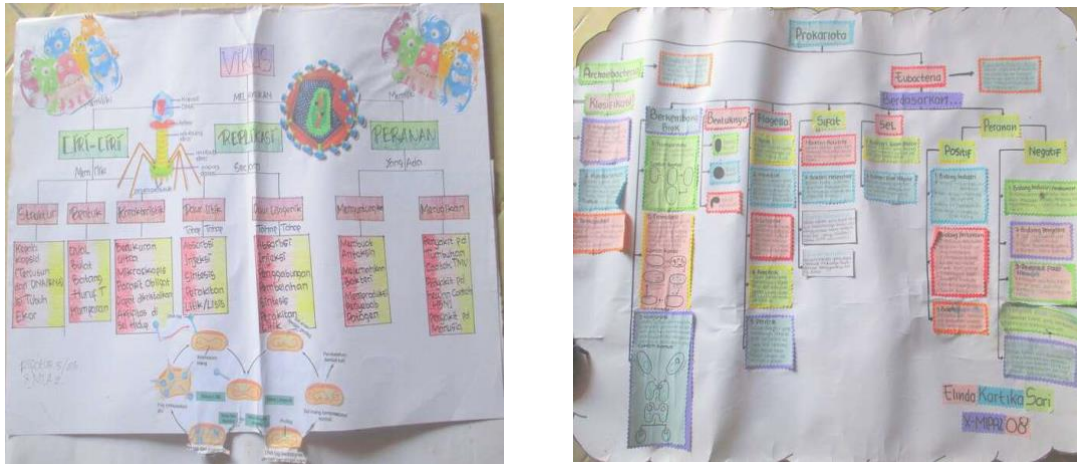


Figure 2. The example of students' concept map in remap CIRC model



Figure 3. The example of students' concept map in remap GI model

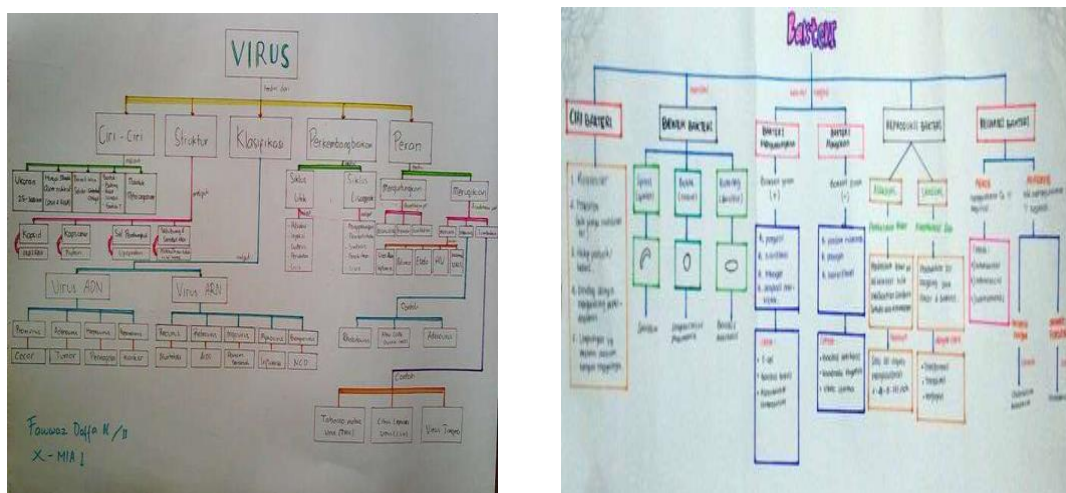


Figure 4. The example of students' concept map in remap TGT model

The final activity of the remap couple learning model is the preparation of concept maps. At the end of the learning material, students are given the task of making a concept map. Students are given the freedom to produce concept maps according to their respective

creativity during making concept maps. The researcher only directs about the type of paper used to make the concept map. Based on the concept map that has been made, it can be seen that there are differences in concepts that students understand. Some students have been able to write the concept of the material in detail. Some are accompanied by related pictures and illustrations, as well as various colors to make the concept map look attractive. For the example of virus material, some students could write concepts in virus history, virus characteristics, virus structure, virus reproduction, the role of viruses, and virus classification. However, some students only wrote concepts about the characteristics of viruses, virus reproduction, and viruses' role in their concept maps. After students have collected the concept map, an assessment of the concept map is carried out. This assessment aims to determine how well the concept map has been produced so that the level of student understanding of the subject matter that has been read can be determined.

Making a concept map has an important role in increasing students' reading interest based on the depth of the concepts contained in the concept map. Concept maps are prepared individually by students at the end of each learning material that can be used to find out how many concepts have been understood by students. Novak & Canas (2008) stated that concept maps are tools or ways that can be used to organize and acknowledge what students have already known. In the activity of preparing concept maps, reading has a very important role. In order to compile a good concept map, a student must understand the subject matter. A student will understand the subject matter if he has read the material. The reading stage of remap and reading stage of the text in CIRC facilitates student reading activities. Reading a lot can help students understand and remember new information related to the material. Figures 2, 3, and 4 are an example of a concept map made by students.

Reading interest and reading habits need to be developed because it will impact thinking ability, which in turn affects student academic achievement. Restuningsih et al. (2017) revealed that there are thinking activities that affect critical thinking skills in critical reading. Several studies also explained a significant and positive relationship between reading habits and student academic achievement (Lawrence, 2014; Jafari et al., 2019).

In this study, reading activities were carried out at home by students. Researchers provide a checklist to record data on students who have read the subject matter at home. However, the obstacle faced was the difficulty in measuring whether students were doing reading activities. At school since students' reading activities are limited by time only during biology lessons. Thus, the effort to foster students' reading interest and reading habits and instilling biological concepts is not easy, and it takes a long time. Besides, the application of cooperative learning models in the classroom often spends a lot of time conditioning students to develop reading interest, and biological concepts are not optimal.

## CONCLUSION

There was a significant difference in the science students' reading interest of the 10<sup>th</sup> grade of Public High School of Malang Indonesia in the learning model of remap CIRC, GI, and TGT. The score of students' reading interest with the remap CIRC model was 82.90; the score of students' reading interest with the remap GI model was 76.23, and students' reading interest with the remap TGT model was 80.49. Therefore, remap CIRC learning model has the best effect on students' reading interest compared to remap GI and remap TGT. So that, remap CIRC, remap GI, and remap TGT model should be applied in biology learning because it can empower students' reading interest. During the implementation in the classroom, the cooperative learning model's steps must be considered to lead students to enjoy reading activities and instill the concept of biology. A special instrument is needed that can measure whether students do reading activities at home. The efforts to foster reading interest are not easy. Research that aims



to increase reading interest should be carried out for a longer time in order to provide a better increase in reading interest.

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