

## Remap Numbered Heads Together (Remap-NHT) Influence on Collaboration Skill of Students in Biology Lesson

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**Abstract:** 21st century skills are not only developing individual abilities but need to increase supporting skills, one of which is collaboration skills. This study aims to see the effect of the Remap NHT learning model on collaboration skills of class XI students in Biology subjects. The research design was quasi experiment with the nonequivalent pretest-posttest control group design. The study population was all students of class XI MIPA SMA Negeri 4 Malang and the sample was 3 out of 7 classes selected through the equivalence test. Each of the three classes is taught using the NHT Remap, NHT, and lecture methods, respectively. Collaboration skills are measured using observation sheets and the results are tested with one-way ancova. The results showed the effect of Remap NHT learning on student collaboration skills better than students learned with NHT and lecture methods.

**Key Words:** collaboration skills; Remap NHT; number head together

**Abstrak:** Keterampilan abad 21 bukan hanya mengembangkan kemampuan individu tetapi perlu peningkatan keterampilan penunjang di masyarakat, salah satunya adalah keterampilan berkolaborasi. Penelitian bertujuan melihat pengaruh model pembelajaran *Remap* NHT terhadap keterampilan kolaborasi siswa kelas XI mata pelajaran Biologi. Desain penelitian quasi *experiment* dengan rancangan *non equivalent pretest-posttest control group*. Populasi penelitian adalah seluruh siswa kelas XI MIPA SMA Negeri 4 Malang dan sampelnya adalah tiga kelas dari tujuh kelas yang dipilih melalui uji kesetaraan. Ketiga kelas masing-masing dibelajarkan dengan model *Remap* NHT, NHT, dan metode ceramah. Keterampilan kolaborasi diukur menggunakan lembar observasi dan hasilnya diuji dengan anakova satu jalur. Hasil penelitian menunjukkan adanya pengaruh pembelajaran *Remap* NHT terhadap keterampilan kolaborasi siswa.

**Kata kunci:** keterampilan kolaborasi; *Remap* NHT; *numbered heads together*

### INTRODUCTION

The development occurring in current modern years requires every individual to develop both core individual abilities and other supporting abilities to be able to participate and contribute to the community, one important ability is collaboration skills (Abualrob, 2019). Collaboration skills allow an individual to cooperate to achieve common communal goal (Zubaidah, 2018) with strong commitment (Perault, McClelland, Austin, & Sieppert, 2011). Collaboration skills are highly essential for students since it is classified as innovation capability that supports them in the professional work later (Maniam & Pruekpramool, 2019). In the real life, collaboration skills are prominent to enable individuals to solve communal problems conjointly (Anantyartha & Sari, 2017;

Hesse, Care, Buder, Sassenberg, & Griffi, 2015). Students are required to develop collaboration skills which later it support them to be able to (1) take a role for themselves, take a role for their partners in professional work, and (3) to manage the tasks they attain (Maniam & Pruekpramool, 2019).

As a matter of fact, students' ability in collaborating, in the context of learning process, remains limited, thus, it impacts on the acquisition of lesson contents (Indriwati, Susilo, & Hermawan (2019). The findings discovered by Anantyartha and Sari (2017) confirmed that students' collaboration aspects on the indicator of productive working, compromising, and individual's responsibility was good and obtained 60 percent. Based on the results of interviews conducted with biology teachers of class XI MIPA at SMA

Negeri 4 Malang, it revealed that in the implementation of learning in general there are no activities which provide total opportunities for students to experience learning directly, therefore learning does seem conventional. Conventional learning reflects more on the passive nature of students in learning therefore it does not facilitate students in developing collaborative skills (Hanim, 2007). Accordingly, learning is required that allows learners actively involved in learning process. In addition, the observation indicated that the school implements Independent Learning Activity Unit or commonly referred as UKBM, thus it reflects more on individual's attitude and progress.

Comprehensive learning should involve students completely (Kurniawati, Susanto, & Munir, 2019) and take into account the role of teacher as facilitator to direct student's learning process (Rusniati, 2016). To improve student's collaboration skill during learning process, it requires cooperative learning strategy (Uto-mo, 2011). Before carrying out collaborative activities, each individual needs to have initial knowledge therefore they can support group activities that become information material for the working group. There needs to be a combination of other activities combined with the cooperative learning model.

One learning model that can support student's collaborative skill is Remap Coople developed by Zubaidah and Corebima (2016). The Remap Coople model is a combination of reading activities, making concept maps, and implementing learning with cooperative learning (Mahanal, Zubaidah, Bahri, & Dinnurriya, 2016). In this study, Numbered Head Together (NHT) was applied, thus the learning model can be called the NHT Remap. NHT offers students the opportunity to combine their thoughts (Kagan & Kagan, 2009), because it emphasizes teamwork activities (Darmadi, 2017). This activity supports students in social interaction (Dinnurriya, Zubaidah, & Mahanal, 2015) as the prominent objective of collaboration.

Various cooperative learning models are demonstrated to improve collaboration skills. Research conducted by Halimah, Mawardi, and Wardani (2019) reveals that learning with the Teams Games Tournament (TGT) cooperative learning model improve collaboration skills between cycles I and II with an increase percentage of 15. In addition, based on research conducted by Anggis (2016), it discovers that the Jigsaw cooperative learning model contributes 8.26 percent to collaboration skills and the results of research by Nuzalifa and Sulasmi (2019) indicate that

learning with the Think Pair Share type cooperative learning model (TPS) improve collaboration skills on each indicator. Other findings revealed by Indriwati et al. (2019) indicates that collaboration skills improve the quality of learning. Therefore, this study was conducted using the NHT REMAP model to identify its effect on student collaboration skills.

## METHOD

This research employed quasi-experiment by using non-equivalent pretest-posttest control group design. It involved 234 students of XI Natural Science class in SMAN 4 Malang as the research population. Then, it took three classes as the research sample, specifically XI MIPA 5, XI MIPA 3, and XI MIPA 6. One class served as experimental class and taught by Remap NHT, one class served as positive control class and taught by NHT, one class served as negative control class and taught by conventional method. The class which was taught by Remap NHT employed the following syntax: Reading, Concept Map, Numbering, Questioning and it was facilitated by Group Learning Activity Unit during the discussion activity, Head Together, and Answering. Positive control class was taught by NHT and also facilitated by Group Learning Activity Unit. Meanwhile, negative control class was taught by conventional method and facilitated by Independent Learning Activity Unit. Experimental and positive control classes were given practicum activity three times. Meanwhile, negative control class was only given simple demonstration.

The dependent variable in this research was collaboration skill and it was measured by observation sheet. The variable was measured by three observers. The indicators measured were: (1) contribution, (2) time management, (3) problem solving, (4) cooperation, and (5) observation. Assessment of collaboration skills used an assessment rubric developed by Hermawan et al. (2017) which was modified from (Read Write Think, 2005), with a score of 1 to 4. The description of the scores given was: a) students do not participate (score 1); b) participated only once (score 2); c) participated twice (score 3); d) participated more than twice (score 4).

## RESULTS

The obtained data were first analyzed by employing normality and homogeneity testing. Based on normality testing, it obtained 0.398 for pretest and

**Table 1. One-way ANACOVA Results of Collaboration Skill**

Source	Type III Sum of Square	df	MS	F	Sig.
Corrected Model	10899 ,123 <sup>a</sup>	3	3633 ,041	89 ,799	0 ,000
Intercept	954,061	1	954,061	23,582	0,000
X	2092,907	1	2092 ,907	51 ,731	0 ,000
Threatment	2810 ,539	2	1405 ,270	34 ,734	0 ,000
Error	3883,917	96	40,457		
Total	513784,000	100			
Corrected Total	14783 ,040	99			

**Table 2. Corrected Average Score and LSD Testing Results of Learning Model to Collaboration Skill**

Learning Model	XCollaboration	YCollaboration	Margin	Collaboration Cor	Notation
Remap NHT	60 ,971	81 ,294	20 ,323	77 ,501	a
NHT	55 ,618	71 ,647	16 ,029	71 ,874	b
Conventional	50 ,875	58 ,250	7 ,375	62 ,039	c

0.091 for posttest. Since the values were  $> 0.05$ , thus the data were normally distributed. Based on homogeneity testing, it obtained 0.266 for pretest and 0.205 for posttest. Since the values were  $> 0.05$ , the data were considered homogeneous. Then, the data were hypothetically testing by using one-way ANACOVA. The Results are presented in Table 1 and Table 2 presents LSD testing results.

Table 1 presents that the value of Fcount was 34.734 with the significance degree of 0.000. It further means that Remap NHT affects students' collaboration skill. Based on Table 2, the corrected average of the implementation Remap NHT was 77.50, the average of the implementation of NHT was 71.874, and the average of the implementation of conventional model was 62.039. The implementation of Remap NHT was 5.483 higher than NHT, and was 15.128 higher than conventional model. Thus, Remap NHT implementation improves students' collaboration skill.

## DISCUSSION

Students who were taught in the experimental class using the Remap NHT learning model obtained higher collaboration skills scores when compared to classes taught by NHT or the conventional method. The results of data analysis showed significantly different values between the experimental class which applied the Remap NHT the two control classes. Thus, Remap NHT learning model is able to have a good influence on improving student collaboration skills.

The improvement in the development of student collaboration skills is supported by the syntax in the Remap NHT model which consists of 1) reading; 2) creating a concept map; 3) numbering; 4) questioning; 5) performing heads together; and 6) answering. Reading activities and creating concept maps are connected to each other and are carried out at home so that it becomes the initial provision for students individually before collaborating with groups. A series of NHT activities will be carried out during class learning.

Reading activities are a combination of acquiring knowledge and understanding of various information which are then interpreted by readers (Utevsy & Hervey, 2016). The results of this interpretation become material for students to provide solutions in their study groups, thus they can provide source of discussion material (Indriwati et al., 2019). Students in the same group can carry out group discussions in the form of decision making to achieve common goals. In addition, students also need to collaborate to synchronize various perceptions and ideas obtained from each individual based on reading results. These activities can develop students' collaboration skills. The reading results obtained by students will be poured in the form of a concept map.

The students made a concept map at home after they had done their reading activities. The existence of an assignment in the form of a concept map can make it easier for students to prepare learning material to generate meaningful learning process (Dinnurriya et al., 2015). On average, students satisfied when

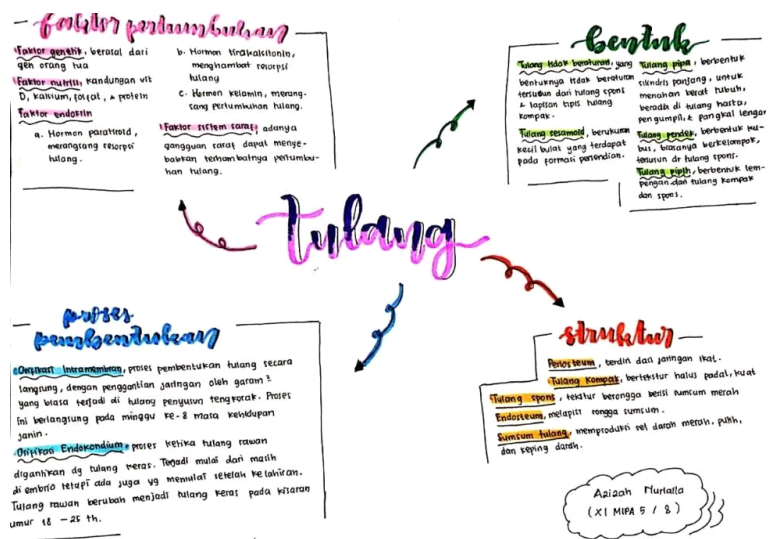


Figure 1. Student's Concept Map of Human Movement System Concept

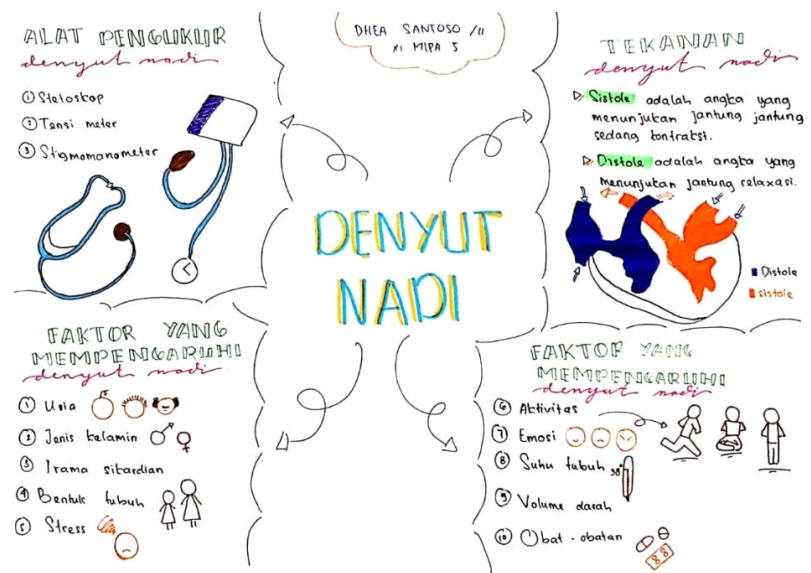


Figure 2. Student's Concept Map of Human Blood Circulation System

making a concept map because it can help understand, integrate, and further clarify the concept (Tendrita, Mahanal, & Zubaidah, 2017). Assignments in the form of concept maps can also be used as supporting material for students in exploration during group activities (De George-Walker & Tyler, 2014).

Some of the students' work can be seen in Figure 1 and Figure 2. Based on Figures 1 and 2, it can be seen that students preferred to make works manually without the help of chart or diagram maker software. The work that the students made was written on A4-sized paper and was made using various types of writing tools including black, colorful pens, and colored markers. However, the works made by the students were more mind map-patterned with the main topic in the middle of the paper and branches

showing the sub-topics. This shows that students are still less able to distinguish between the patterns used to make works including a concept map with a mind map. This is a lack of researchers in the implementation at the learning stage in the classroom. Researchers have provided directions regarding how to make a concept map, but the students' work has not shown the expected results. Apart from the confusion between making a concept map and a mind map, the works made by students are classified as creative and vary with the addition of animated images and various uses of color according to the tastes and creativity of each individual, besides that it can be an initial learning material for each individual who made the work.

The implementation of learning in the classroom was supported by a cooperative learning model. Cooperative learning provides opportunities for students to create their own learning with the teacher as a facilitator in directing students to information sources (Tombak & Altun, 2016). Cooperative learning combined with Remap activities is NHT. NHT model initial stage is numbering. In the numbering stage, the group was divided consisting of 4-5 students and giving the head number to each student in the group. Students in one group were numbered 1-5, as are the other groups. According to Tombak & Altun (2016), grouping students create a sense of interdependence thus each group member helps each other to achieve the target. Giving a different head number for each group member is useful to provide a comprehensive opportunity for students to play an active role evenly, therefore teachers can monitor student involvement in the group (Kagan & Kagan, 2009). Before expressing their opinions, students can discuss things that they do not understand with group friends. The next stage is questioning. The Questioning stage was facilitated by providing Group Learning Activity Unit. The provision of Group Learning Activity Unit encourages students to work together and complete assignments on time and can make it easier for observers to assess collaboration skills. The group of students will involve in Group Learning Activity Unit when they begin the heads together stage.

In the Heads Together stage, students: 1) distribute tasks to save time, 2) discuss to find answers, 3) synchronize perceptions regarding the information they obtain independently through reading and concept maps, and 4) look for additional information from various sources. This stage asks students to unite their thoughts to discuss solving problems given by the teacher (Devi, Wahyudi, & Indarini, 2018). The last stage is answering. At this stage one of the numbers 1-5 will be called by the teacher and the same number will give each other input, questions or suggestions. This can see the collaboration in each group whether they have the same thoughts to the delivery of communication.

The stages in the Remap NHT provide experiences for students to solve problems faced by collaborating with group members. This is in line with the opinion of Sturmer, Bishop, & Lenhart (2016) which states that students have made efforts to collaborate including: 1) compromising with the group; 2) accepting different work habits between individuals; and 3) responsible for the assigned task. According to (Per-

rault et al., 2011) students in the collaborative process will bring up behaviors, specifically: 1) mutual trust to build relationships; 2) distributing tasks for mutual achievement; 3) commitment to the given time; 4) mutually adequate resources; and 5) leadership role in the group. Especially in the answering stage, the teacher points to a random head number to encourage students in groups to help each other and work together to solve problems by discussing (Triana, 2018). In conducting research, it is necessary to pay attention to the factors that can affect the fluctuation of student interest in learning, because it can affect student collaboration within the team, one of which is the motivation to contribute to student cooperation (Apriansyah, Sulaiman, & Mukarromah, 2017).

Based on the results presented, it can be concluded that the application of the Remap NHT model can facilitate the development of student collaboration skills. Previous research that has discussed the Remap Coople learning model has played a major role in improving collaboration skills and other skills including increasing collaboration skills and motivation using Remap Jigsaw (Indriwati et al., 2019), improving critical thinking skills and learning outcomes with REMAP STAD (Pangestuti, 2017), and empowerment of critical and creative thinking skills using STAD Remap (Zubaidah, Mahanal, Ramadhan, Tendrita, & Ismirawati, 2018).

## CONCLUSION

Based on the results and discussion presented above, the implementation of Remap NHT improves the collaboration skill of students of XI graders in SMAN 4 Malang on Biology lesson. The corrected average score obtained of experimental class is classified good compare to the two control classes. In addition, the implementation of Group Learning Activity Unit facilitates students' cooperation compare to the implementation of Independent Learning Activity Unit.

It is important to provide more enrichment for students in the development of concept maps for potential researchers who may want to apply the Remap Coople learning model so that appropriate work can be done. In addition, the presence of internal or external factors that can impact the abilities of student collaboration can be seen as additional variables that can be evaluated and other forms of cooperative learning models that can boost the abilities of student collaboration can also be studied.

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