

Numbered Heads Together Cooperative Learning in Learning Collaboration and Communication Skills Based on Lesson Study Activities

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Abstract:

Education directly continues to experience a process of change from time to time. In 21st-century learning, there are important skills for students, namely collaboration and communication skills. This research aims to discover how students' collaboration and communication skills apply the NHT learning model to excretory system material. This lesson study activity consists of 2 meetings; the implementation stages are plan, do, and see. The planning stage is on May 14, 2023, for the first and second meetings; the do stage is on May 23, 2023, for the first meeting and May 25, for the second meeting. View stage: May 23, First meeting, and May 26, second meeting. The subjects in this research were 17 class VIII students at Sunan Giri Middle School, Malang. The instruments used are observation sheets, reflection notes, and documentation. The results show student collaboration and communication skills change during the first and second meetings. Meanwhile, N-Gain's overall score for collaboration skills is 0.43 in the medium category, and communication skills is 0.40 in the medium category. In this research, collaboration skills are more prominent than communication skills. NHT is quite relevant for increasing student collaboration and also student competition between groups.

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Introduction

Education is a critical need to support the nation's progress. If education is good, it will produce good human resources, too. Education directly continues to experience a process of change from time to time. This change is also felt in the 21st century, where education in the 21st century is not only limited to how much knowledge is gained in class, but students must have other supporting skills (Alimah & Utami, 2019; Rahmawati et al., 2023; Sunassee et al., 2021). 21st-century learning is defined as where students must have the 4C skills. According to Zubaidah (2020) 4C skills consist of: (1) Critical thinking abilities; (2) creative (creative); (3) collaboration and (4) communication.

Based on the results of observations in January 2023, the learning process in class VIII SMP Sunan Giri Malang shows that students still do not participate enough in learning activities, so they seem passive or inactive in learning activities, students do not dare to express ideas or opinions, most students do not participate in presenting the results of group discussions, as well as many students in learning who are indifferent. In discussion activities, students need to cooperate more and not compromise with each other in groups to solve problems; students still need mutual respect in learning activities, and many students need to be more careful about completing assignments in groups.

Collaboration skills, as defined by Sari et al., (2017) , are the capacity to participate in any activity to develop relationships with others, value relationships, and work as a team to achieve common goals. Collaborative learning can be done by forming small groups and discussing the material. Student collaboration in groups can also trigger the initiation of critical thinking stages. According to Mardhiyatirrahmah & Abdussakir (2021); Sormunen et al. (2023); Stehle & Peters-Burton (2019), the results of implementing problem-based learning (PBL) with several stages of defragmentation or problem-solving have succeeded in triggering students' critical thinking processes. The group discussion process occurs through reinforcement between members and appreciation between friends, and a discussion process prioritizes politeness and behavior (Khalid et al., 2016).

Thus, collaboration relates to how communication occurs within the group. Communication skills are conveying and understanding messages from one person to another. Communication skills require students to be able to explain information so that others can receive it. Message delivery has various types and purposes. In group collaboration, communication will occur well and be directed. The purpose of communication is not only to seek answers to questions but to convey each individual's ideas regarding a problem presented (Alimah & Utami, 2019; Triana et al., 2020). This research focuses on the variables of student collaboration and communication skills.

Based on the detailed results of the preliminary analysis, several problems were formulated, such as the need for collaboration and communication skills among students. One of the cooperative learning models used by researchers to determine students' collaboration and communication skills is the Numbered Heads Together (NHT) learning model. According to Faraqanita et al. (2020) , the NHT learning model is a group learning model where all group members are responsible for their group assignments so that there is no separation between one student and another. The NHT

learning model is more student-centered learning where students are divided into small groups of 4-5 people, and each group gets questions answered within the group so that all group members have shared responsibility (Prasetyo & Mitasari, 2016).

For this research, lesson study activities were also developed, namely collaboration between researchers as prospective teachers and subject teachers at the school. This effort is a form of collaboration that can make it easier for researchers to plan learning according to school needs. The Numbered Heads Together learning model can be used to determine students' communication and collaboration skills through lesson study activities. A lesson study is a learning assessment effort carried out collaboratively and continuously by a group of teachers to improve the quality of learning. Lesson study is carried out, including planning, implementation, and reflection stages. Implementation of lesson study generally consists of 3 stages: planning, implementation, and reflection (Lathifah et al., 2021; Nurmatin & Rustaman, 2016; Widjaja et al., 2015).

The choice of material in this research was excretory system material, whereas, in the interview process with science subject teachers, the excretory system material was complex material for students because the excretory system material could not just be imagined. However, many terms were found, and learning strategies were carried out to facilitate understanding, which focuses on actual practice, for example, through several experiments. Through experimental activities, it is hoped that students will know the analogies of the body's physiological processes in a more concrete and easy-to-remember way. Several previous studies (Ekaputra & Widarwati, 2023; Faraqanita et al., 2020) stated that through practical activities, students gain more meaningful and authentic experiences that attract more attention to learning and are remembered for longer.

Research Method

This research is qualitative. This research was carried out on 14–31 May 2023 at Sunan Giri Middle School, Malang, with the research subjects being 17 students in class VIII of Sunan Giri Middle School, Malang. This research examines students' collaboration and communication skills through the Numbered Heads Together (NHT) learning model based on lesson study activities. This research procedure is through lesson study activities consisting of three stages: planning, implementation (do), and reflection (see). Data collection uses observation methods, documentation, and supporting notes. The research instruments used were Observation sheets for student collaboration and communication skills, implementation sheets for the NHT learning model, and monitoring sheets for implementing lesson study activities. Next, the data obtained was analyzed qualitatively.

Result and Discussion

The implementation of lesson study activities in this research from meetings 1 and 2 is shown in Table 1.

Table 1. Recapitulation of the Percentage of Implementation of Lesson Study Activities

Meeting	Implementation Percentage (%)			Interpretation		
	Plan	Do	See	Plan	Do	See
1	81,23	73,68	81,25	Very Good	Good	Very Good
2	81,23	89,47	93,75	Very Good	Very Good	Very Good

Based on Table 1, the implementation of lesson study activities has increased from the first and second meetings. The lesson study activities in the do and see stages have increased from the first and second meetings. Meanwhile, the planning stage stayed the same because the plans for meetings 1 and 2 were carried out simultaneously. At the first meeting, the planning stage's implementation percentage was 81.23%, with the implementation category being outstanding. At the second meeting, the percentage of plan implementation was 81.23%. The planning stage at the first and second meetings stayed the same because the planning stage was carried out simultaneously from February - to April 2023.

The stage at the first meeting had a percentage of implementation of 73.68%, with the implementation category being good; this was because, at the first meeting, several indicators had not been implemented, and there was still no evaluation at first. In the meeting, the use of time in learning differed from what had been done. As planned in the lesson plan at the second meeting, the percentage of implementation of activities was 89.47%, with the implementation category being outstanding and experiencing an increase from the implementation stage of the first meeting. The increase occurred because the reflection stage at the first meeting discussed what needed to be added at the first meeting and how to improve it. However, several indicators did not appear during the reflection activity. There were changes in several indicators, but several indicators still needed to be implemented at the second meeting; this was also a limitation of the Lesson Study team.

In the see stage at the first meeting, the percentage of implementation was 81.25%, with the implementation category being outstanding; this was because at the first meeting, there were still several indicators that did not appear during the reflection activity, and the percentage of implementation of the seen activity at the second meeting was 93.75% with the implementation category The changes at the second meeting were very good because the previous indicators that had not appeared at the second meeting had appeared. In contrast, in the reflection activity, all the indicators for the reflection activity appeared except for one indicator that did not.

The NHT learning model implementation results are summarized in the percentage of implementation table, as shown in Table 2. This table provides a comprehensive view of the NHT learning model's progress.

Table 2. Recapitulation of Learning Model Implementation Percentage

Meeting	Implementation Percentage (%)	Interpretation
1	94,11	Very Good
2	100	Very Good

Based on Table 2 above, it can be seen that the percentage of implementation of the Numbered Heads Together learning model reached 94.11% for the first meeting and

experienced an increase in the second meeting, namely 100%. Based on the results of observations, the implementation of the NHT learning model from the first and second meetings has increased and is in the outstanding category for implementation. This means that the learning process using the NHT model is running well and by the stages that must be carried out.

The results of measuring student collaboration skills in the learning process show varying results in each aspect of the indicators. The value for each indicator shows that the learning activities carried out have demonstrated the characteristics expected of each student. The learning activities carried out using the NHT learning model through lesson study activities in the human excretory system subject show the ability to collaborate in the learning process. The N-gain Score for student collaboration skills can be seen in the Table 3.

Table 3. Score of Gain Collaboration Skills

No	Colaboration Aspects	N-Gain Score	Category
1	Contributing actively	0,5	Medium
2	Working productively	0,25	Low
3	Responsibility	0,37	Medium
4	Showing flexibility	0,48	Low
5	Respecting for others	0,61	Medium
Average		0,43	Medium

Table 3 shows that the gain score for collaboration skills is still in the medium and low categories. The lowest gain score is an indicator of flexibility, while the highest gain score is an indicator of respect for other people. Meanwhile, the overall average N-Gain score is 0.41 in the medium category.

The results of measuring students' communication skills in the learning process show varying results in each aspect of the indicators. The value for each indicator shows that the learning activities carried out have demonstrated the characteristics expected of each student. Based on the results of data analysis, the overall score on the communication skills of class VIII students at SMP Sunan Giri Malang is known based on the average percentage of scores during learning. The learning activities that have been carried out using the NHT learning model through lesson study activities in the human excretory system subject determine the presence of communication skills in the learning process. The N-gain Score for student collaboration skills can be seen in the Table 4.

Table 4. Score of Gain Communication Skills

No	Communication Aspects	N-Gain Score	Category
1	Oral Communication	0,48	Medium
2	Receptive Communication	0,28	Low
3	Using Communication Strategies	0,425	Medium
4	Communicate clearly for a single purpose	0,428	Medium
5	Presentation Skills	0,5	Medium
Average		0,40	Medium

Table 4 shows that the gain score for communication skills is still in the medium and low categories. The lowest gain score is the receptive communication indicator, with a gain score of 0.28. Meanwhile, the gain score with the highest value is percentage skills, with a gain score of 0.5 in the medium category. Meanwhile, the overall average N-Gain Score is 0.40 in the medium category.

The research results used the NHT learning model to teach collaboration and communication skills to class VIII students at Sunan Giri Middle School, Malang, through lesson study activities. The implementation of the lesson study activities in this research has been carried out well. The results of the data analysis showed that the percentage of implementation of lesson study activities at the first and second meetings had increased. The improvement occurred because, at every meeting, the LS team always carried out learning planning activities for the next meeting or redesigned them. According to [Saito \(2022\)](#) and [Saito et al. \(2006\)](#) a *Lesson Study* is a learning assessment effort carried out collaboratively and continuously by a group of teachers to improve the quality of learning. Lesson Study activities consist of three stages, namely implementation planning and reflection. The main thing to do at the planning stage in this research is to prepare learning tools such as materials, Learning Implementation Plan, worksheet, Lesson Design, and Chapter Design. The result of planning is the composition of the Learning Implementation Plan, which includes detailed and operational scenarios or learning steps ([Faraqanita et al., 2020](#)). The do stage is an implementation activity of the plan prepared by the LS team at the plan stage. This is in line with the opinion of [Istikomayanti, et al. \(2019\)](#), [Nurmatin & Rustaman \(2016\)](#) that the implementation stage (Do) is intended to implement the learning design that was formulated in the previous stage. In the reflection activity, the observer conveys the findings in the learning process and provides solutions so that improvements can be made in the next LS. The activities carried out by researchers at this reflection stage are in line with the opinion of [Muhfahroyin & Oka \(2017\)](#); [Mynott \(2018\)](#) that in the reflection forum, observers present data from observations, then interpret why this happened, what is the way out so that the learning process can be effective and efficient, and what was learned from the incident.

The research was conducted using the NHT model over two meetings. The data from the analysis shows that the Numbered Heads Together model is implemented. Implementing the learning model at meetings 1 and 2 went very well. The NHT learning model was implemented very well at meetings 1 and 2 and made students collaborate and communicate more in small groups divided heterogeneously with fixed numbers in the head. There are several stages in implementing the NHT learning model that must be carried out in this research, according to [Faraqanita et al. \(2020\)](#): preliminary stage, information presentation stage, numbering stage, question-asking stage, joint thinking stage, answer-giving stage, evaluation and appreciation stage and closing stage. At the first meeting, the implementation stage of the NHT learning model was 98.45% with the outstanding implementation category, and at the second meeting, it reached 100% with the excellent implementation category. At the first meeting, there were still many students doing their activities because the teacher needed to pay more attention to the students. The students looked noisy when the numbers were distributed in their heads at the first meeting.

However, there was a change at the second meeting because the teacher had coordinated the students well, so the situation was quiet when the numbers were distributed in the heads. Based on the analysis of the implementation of the learning model that has been used, it shows that the NHT learning model is effectively used to develop collaboration and communication skills for class VIII students at SMP Sunan Giri Malang on the subject of the human excretory system. The results of this research align with the results of research in line with [Faraqanita et al. \(2020\)](#) who found that applying the NHT model was able to train students' communication skills. The research results of [Idris et al., \(2020\)](#); [Sari et al. \(2017\)](#) and [Triana et al. \(2020\)](#) concluded that using the NHT learning model not only provides a different learning experience than usual but also indirectly stimulates students to develop collaboration skills. Collaboration with colleagues or guidance from friends is also carried out through peer teaching collaboration from research ([Nuriyani & Winarso 2021](#)).

Looking at the facilitation process by the teacher from the previous description, which developed from reflection activities with the research team, shows that facilitating student collaboration and communication can be challenging. Lesson study activities help prospective teachers quickly improve by sharing ideas and thoughts on learning strategies or tactics ([Campbell et al., 1993](#); [Dam & Teo, 2018](#); [Gilissen et al., 2021](#); [Tan, 2003](#)). Collaboration and communication skills are two critical skills in the complete aspect of 21st-century skills. According to [Zubaidah \(2020\)](#) requires differentiation efforts in facilitating learning according to the needs of each learner. In this research, a collaborative process is presented that can change from one meeting to the next with the intervention of the teacher as a director and policy maker in the classroom. In this stage, prospective teachers also learn to see and evaluate. Not acting sporadically is very important as a precaution, and through reflection efforts with the lesson study group, various suggestions were obtained.

The collaboration skills of class VIII students at SMP Sunan Giri Malang from the first and second meetings have improved. Student collaboration skills at the second meeting of each indicator increased. The changes at the first and second meetings did not change much, so the overall average N-Gain was 0.41, which is in the medium category. This is because the learning process at the first and second meetings was similar, and there needed to be more exciting things in the process. The communication skills of class VIII students at SMP Sunan Giri Malang from the first and second meetings have increased. Students' communication skills at the second meeting of each indicator increased.

The changes at the first and second meetings did not change much, so the overall average N-Gain was 0.40, which is in the medium category. This is because the learning process at the first and second meetings was similar, and there needed to be more exciting things. Indicators of collaboration and communication skills all appear in this learning activity, but some still could be more optimal. In this study, indicators of collaboration skills are more prominent than communication skills. This proves that students collaborate more in learning.

The implications of this research can lead to the need for evaluation efforts of each strategy implemented by teachers. Practically, it is essential to constantly hone sharpness in respecting the student learning process. According to [Brew & Saunders \(2020\)](#); [Tan \(2003\)](#), teachers need to map strategies and determine appropriate and

agile strategic decisions in learning. Of course, this is not easy for prospective teachers with little teaching experience. With collaboration within the research/lesson study team, it can be shortened with the help of several people in the form of suggestions and thoughts, which, of course, could be more promising but do not rule out the possibility of opening new alternative strategies.

The student collaboration process requires learning stages that must be presented in a planned or dynamic way in the classroom. For example [Aimah & Purwanto \(2018\)](#), [Stehle & Peters-Burton \(2019\)](#), [Tan \(2003\)](#) stated that collaboration can occur with the initial form of independence for students to learn. Furthermore, the existence of specific problems or phenomena can be used as a trigger for groups of students to interact with each other and try to solve problems. One of them is with NHT; students will voluntarily appoint themselves as the selected number and contribute actively without hesitation or embarrassment with friends who are not their collaborators. This shows that the NHT strategy is relevant for increasing student collaboration and group competition.

Conclusion

Based on N-Gain, collaboration skills, the indicator of respect for others, they had the highest change, 0.61 in the medium category. Meanwhile, the N-Gain communication skills indicator score has the most significant change in percentage skills with a value of 0.5, which is in the medium category – lesson study activities in science learning. Material on the human excretory system at Sunan Giri Middle School, Malang, was carried out in 2 meetings through 3 stages. Namely, plan, do, and see. The total number of LS team members was five students, two lecturers, and one subject teacher, so the lesson study activities were well conducted. The implementation of Lesson Study activities at the first meeting of plan activities was 81.23%, with a perfect percentage of implementation. At the second meeting, it was 81.23%, with a perfect percentage of implementation. Activities at the first meeting were 76.68%, with a good percentage of implementation, while the second meeting was 89.97%, with a percentage of. The implementation was perfect, and the activity seen at the first meeting was 81.25%, which is a perfect percentage of implementation. In contrast, at the second meeting, it was 93.75%, with a perfect percentage of implementation. The research results show that the NHT strategy is relevant for increasing student collaboration and student competition between groups.

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