

## **Improving Students' Communication Skills Using Student Worksheets on Nervous System Concepts**

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### **Abstract**

This study aimed to improve students' communication skills by applying student worksheets. This research is class action research. The research was conducted at a high school in Bandung, Indonesia. The research subjects were class XI Math and Science students consisting of 13 male and 13 female students. The research was conducted for two cycles. Each research cycle involves planning, action, observation, and reflection. The research data includes students' written communication skills and the implementation of the syntax of teaching and learning activities taking place. Data analysis techniques were carried out using descriptive comparative and critical analysis. Research procedures include planning, action, observation, and reflection. The results showed an increase from Cycle I, and Cycle II resulted in an average increase in communication skills (Cycle I/Cycle II) of (62.7%/ 81.9%). Based on the research results, student worksheets can improve communication skills by 19.2%.

Keywords: Communication Skills, Nervous System Concept, Student Worksheets

### **INTRODUCTION**

Communication skills are very important skills for students to have. This skill is one of the 21st-century skills that must be possessed and must be continuously developed. Communication skills build self-concept, allowing a person to understand situations and various adaptive strategies to deal with the situations they face (Supratman, 2016). Communication process skills must receive more attention from teachers because with these skills, students can dig up as much information as possible and can convey information to the public orally and in writing (Rustaman et al., 2005; Mursidah, et.al, 2019). In addition, students will find it easier to carry out discussions, and seek, and obtain information (Noviyanti, 2011). In addition, communication in learning acts as a means of disseminating knowledge (Hariyanto, 2009).

Based on the results of observations on biology lessons carried out by researchers in class XI mathematics and science at a high school in Bandung, Indonesia, it was found that students' written communication skills were still in the low category. The low students' communication skills can be seen from the following symptoms: 1) Only 26.92% of students are able to share thoughts,

information, and discoveries with others, 2) Only 30.76% of students are able to explain the results of image analysis/ table, 3) Only 8 or 30.76% of students were able to discuss the results of activities regarding a problem or an event. And 4) Only 38.46% of students could explain the parts of the designated picture.

The cause of the low mastery of concepts and students' communication skills in Biology learning, among others, is suspected that students are only used to working on questions from the student handbook. Student worksheets, which are usually presented, are not varied, so students' communication skills in interpreting and analyzing various forms of information are not optimal. Student worksheets is a learning resource containing a series of activities and exercises students must carry out. Student worksheets can help accelerate learning, encourage learning, and direct students' work (Septantiningtyas, 2021). However, it is still rare for student worksheets to support students in building knowledge (Wahyuni, 2017). In addition, it is suspected that all the concepts presented by the teacher to students are still in the form of verbal presentations, even though for some abstract concepts, a different way of presentation is needed, such as presenting them in the form of symbols. The teacher's lack of attention to student activity in communicating among and between group members can affect symptoms of low student communication skills.

Several solutions can be taken to overcome this problem, including teachers can choose pictures, charts, graphs, and tables to start activities that can develop communication skills and ask them to answer the questions included with them. In other words, the teacher should prepare questions that ask students to "read" data in pictures or tables and restate them. Besides that, the teacher can also give assignments to students to present the observed data in tables or graphs (Rustaman, 2003).

Student worksheets can help students find concepts, especially in exact subjects like biology (Ambarita & Restanti, 2020). The student worksheets that is applied should be interesting, pictorial, and exciting because students will more easily understand the lesson with a media or other parable. Using media in the classroom can optimize the learning process (Karo and Rohani, 2018). Student worksheets are very well used to increase students' involvement and communication skills in the learning process.

Learning success is also inseparable from selecting learning strategies (Cardozo, 2020; Khursid, 2020; Daines, 2019). In this study, the Think Pair Square (TPSq) model was chosen because TPSq is a learning strategy that develops communication skills (Anita, 2010).

Communication skills will be honed when students share their work in groups. According to Lie (2002) students will feel more comfortable asking questions or discussing with others.

Based on the background this study aims to improve students' communication skills by applying student worksheets.

## **METHOD**

This research used a classroom action research to improve communication skills in biology learning. This research model adopts the action research model from Kemmis & Taggart in Arikunto (2012), which divides the research procedure into four stages in each cycle: planning, acting, observing, and reflecting. This research was conducted in two cycles, each consisting of one meeting.

The subjects of this study were 26 students of class XI mathematics and science at a high school in Bandung, Indonesia, consisting of 13 boys and 13 girls. The research data is data on students' communication skills obtained through assessing answers in student worksheets on the nervous system concept. Supporting data is the implementation of learning syntax based on the TPSq (Think Pair Square) model and assessing student learning outcomes.

## **RESULTS AND DISCUSSION**

### **Cycle I**

#### *Planning*

In cycle 1, one meeting and one assessment were carried out. Before carrying out this research, the writer prepared all the research needs, such as Learning Implementation Plans (RPP) according to the learning model, Student Worksheets, and research instruments in communication skills indicator sheet instruments (Rustaman 2003).

#### *Implementation*

The implementation of the action was carried out in cycle I, consisting of one meeting with an allocation of 2 hours of lessons (2 x 40 minutes). The first meeting was held on Tuesday 9 May 2023. The learning process began at 12.40 WIB. The pre-activity lasted 10 minutes. The core activity begins with grouping 26 students of class XI MIPA into six groups, each consisting of 4-5 students. The next stage is the teacher using the cooperative learning model of think pair square learning.

#### *Observation*

Researchers carried out the observation stage during the learning process using observation sheets. Observations were made to observe every process in student and teacher activities. The

results of observations of teacher activities in cycle I were: 1) Students still needed clarification about the TPSq learning model, which they felt was new. In addition, teachers must still be conducive to managing each stage of TPSq. The stages in the TPSq learning model are not very clear because students and teachers still seem confused, 2) When the group has to present the results of the discussion, many of them lack confidence when reading the results of the discussion in front of the class, 3) A lot of time is consumed at the beginning at the time of group division so that the activities concluded were not optimal, and 4) In the implementation of learning cycle I using student worksheets in the subject of Biology material for the nervous system class XI mathematics and science at a school in Bandung, Indonesia obtained data from the results of the student worksheets assessment.

Based on research conducted on measuring the written communication skills of class XI mathematics and science students for the 2022/2023 Academic Year in cycle 1, the results are shown in Table 1.

Table 1. Mean of Student Communication Skills in Cycle 1

No	Qualification	Number of students	Mean (%)
1	Very good	13	50%
2	Good	4	15.4%
3	Enough	9	34.6%
4	Not enough	-	-
5	Very less	-	-
6	Less Once	-	-

Based on the study's results, 50% of the students were in the very good category, 15.4% were in the good category, and 34.6% were in the moderate category. This study's results show that the average student's communication skills are in good qualification. In addition, the average of students' communication skills analyzed per indicator was also obtained in sufficient qualifications, which can be seen in Table 2.

Table 2. Percentage of Students' Communication Skills Indicator Score in Cycle I

Communication Skills Indicator	Percentage (%)	Qualification
Changing the form of presentation of images/charts/descriptions/tables into other forms	45.7%	Not enough
Explain the results of data analysis (images/tables/graphs)	71.6%	Good
Show and explain the parts contained in the picture	70.7%	Good
Average	62.7%	Enough

### Reflection

The data will be analyzed and reflected as an evaluation tool to improve the next cycle. The findings obtained are then used as a learning formula to be carried out in the next activity. The data obtained can be described as: 1). The conditioning of the students in the class is not optimal, the teacher's performance is still unclear, and 2) The Explanation of the image media section is unclear. So that many group members cannot be active in participating in discussions, 3) Class conditioning that is not conducive to the application of learning media, and 4) Questions in student worksheets on indicators of changing data presentation need to be adjusted so that students' communication skills improve. Students have difficulty describing quite a lot of structures.

Based on the results of the reflection discussion, the steps to be taken to improve learning in cycle I are as:

- a. Teachers are more enthusiastic and motivate students so that the conditioning of students in class can be maximized. In giving apperception, the teacher must associate the material with everyday life so that students understand it more easily. In delivering material, the teacher must be able to raise his voice and master the lesson plan so that the teacher does not see it repeatedly and can focus more on students.
- b. Explanation of the learning model is suggested to be delivered before class begins.
- c. Making a group must make some anticipatory reserves if students are present.
- d. In each sub-material delivery, the teacher must provide questions so students can remember what has been conveyed.
- e. The teacher must be maximal in giving explanations using student worksheets. Thus, research will be carried out in the next cycle (cycle II).

## **Cycle II**

Cycle II consists of four stages, namely the planning stage, the implementation stage, the observation, and reflection stage. Cycle II was carried out in one lesson with a time allocation of 2x40 minutes. Here are the four stages.

### *Planning*

At this stage, all activities are planned to support smooth improvement and data collection. Planning is carried out based on reflections on the implementation in cycle I, which researchers have discussed with teachers and collaborator lecturers. The planning phase carried out in cycle II, includes:

- a. Develop student worksheets so that students are more interested and easier to understand nervous system material. In the previous student worksheets, drawing student structures was rather difficult

because they had to draw three types and complete them; on student worksheets 2, students described in the form of a mind map/concept chart, so it was hoped that it would be easier.

- b. Improve each stage of the learning model that is applied according to the reflection results from the first cycle. For apperception, the teacher gives several cases related to students' daily lives regarding the nervous system material. For core activities, apply coherently learning media.
- c. Making observation sheets of teacher and student activities is a sheet to determine the level of student activity and teacher success in the biology learning process using ongoing learning media.
- d. Make an evaluation sheet, namely compiling individual learning outcomes test questions with competency indicators set out in the lesson plan to assess the level of ability to understand nervous system material at home and at school. The form of test is in the form of 20 multiple-choice questions that students must answer.

### *Implementation*

The implementation of cycle I, it was carried out on Wednesday, 10 May 2023. With an allocation of 2 study hours (2 x 40 minutes). The learning process begins at 08.20 WIB. Most students were already seated in their respective seats, and some were engrossed in running around the class and were busy themselves. Thus, the teacher gives instructions so that all students can sit in their respective seats and are ready to follow the learning process.

In the preliminary activities, the teacher starts by greeting them, inviting them to pray, and asking how students are doing in a fairly loud voice. When the teacher gave an apperception, some students responded well. The teacher carries out apperception by linking material learning with everyday life. The apperception was carried out by asking questions, with some students responding well to these questions. The teacher conveys the objectives of learning biology with clear sentences.

The core activity begins with grouping 26 students in class XI into six groups, each consisting of 4-5 students. The division of groups uses the previous group for those who have not attended because the dispensing will be grouped accordingly. The next stage is for the teacher to review and re-affirm that the cooperative learning model of the think pair square type will be used in learning.

In closing activities, students are facilitated by the teacher to conclude the learning that has been carried out, and then students are given a post-test. Furthermore, students are given the opportunity to reflect on learning outcomes by writing study journals (honest, disciplined, responsible, environmentally friendly, and cooperative). Shiva listens to the teacher's directions regarding assignments for the next meeting, namely about the central nervous system and peripheral

nervous system, as well as nervous system disorders. Students end the learning activity by praying and greeting.

*Observation*

Researchers carried out the observation stage during the learning process using observation sheets. Observations were made to observe every process in student and teacher activities. As for the results of observations of teacher activities in cycle II, namely: 1) When students carry out discussions, most students seem to understand the assignments given and see from the implementation of conducive classroom conditions. Each stage of TPSq is effective and is followed by students. 2) When the group has to present the discussion results, those who were shy now dare to show themselves in front of the class to read the results. 3) In the implementation of cycle II learning using student worksheets media in the subject of Biology material for the nervous system class XI mathematics and science at a high school in Bandung, Indonesia, data obtained from the results of the student's worksheet assessment and learning achievement tests were obtained.

Based on research conducted on measuring the communication skills of class XI students at a high school in Bandung, Indonesia, for the 2022/2023 Academic Year in cycle 2, the results can be seen in Table 3.

Table 1. Mean of Student Communication Skills in Cycle II

No	Qualification	Number of Students	Mean (%)
1	Very good	20	77%
2	Good	6	23%
3	Enough	-	-
4	Not enough	-	-
5	Very less	-	-
6	Less Once	-	-

Based on the study's results, 77% of students were in the very good category, and 23% were in the good category. The results of this study show that the average student's communication skills are very good qualifications. In addition, the average results of students' communication skills analyzed per indicator were also obtained in good qualifications, as seen in Table 4.

Table 4. Percentage of Students' Communication Skills Indicator Score in Cycle II

Communication Skills Indicator	Value (%)	Category
Changing the form of presentation of images/charts/descriptions/tables into other forms	77.8	Good
Explain the results of data analysis (images/tables/graphs)	83.3	Very good
Show and explain the parts contained in the picture	84.6	Very good

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Average	81.9	Very good
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Thus, the results obtained in cycle II have reached the expected target, so there is no need for repetition or improvement in the next cycle.

### *Reflection*

At this stage, what has been implemented well and still needs improvement in the teaching process will be examined. The data obtained can be described in several ways as follows:

a. In apperception activities, some students still need to respond to the questions given by the teacher.

This is due to the need for more motivation given by the teacher to students.

b. With student worksheets, the difficulty level was reduced to indicators, changing the presentation of the data by asking students to make mind maps/concept charts to make students understand more about the material on the human nervous system.

c. In group discussions, all members can actively and enthusiastically answer. This is because all students pay attention to media learning explained by the teacher.

d. The results of teacher activities in cycle II increased from the previous cycle, namely cycle I 77.7, which increased to 88.8 in cycle II. While the results of student activity in cycle I, namely 66.6, increased to 86.1 in cycle II.

e. The acquisition of the value of communication skills in cycle II has increased compared to cycle I. In cycle I, after the implementation of learning media using the help of student worksheets, the average value of students' communication skills was 62.7% in the sufficient category. In cycle II, there was an increase in the average value of students, namely 81.9% in the very good category. Thus, the student worksheet in cycle II experienced success and did not need to be continued in the next cycle.

Based on observations on the implementation of learning in cycle I and cycle II, the communication skills of class XI mathematics and science students have increased from before the research was carried out using student worksheets. Before implementing the student worksheets, an average value of less than 50% was obtained. Whereas in the first cycle after implementing the student worksheets, the average student score was 62.7% in the sufficient category. The results in cycle I have yet to reach the performance indicators set, so improvements are made to carry out cycle II. In cycle II, the average value of students' communication skills increased, namely to 81.9% in the very good category.

Based on the results of observations in cycle I, there are deficiencies in applying student worksheets, including the teacher's lack of ability to condition students so that students are not ready

to receive lessons, not maximally giving directions on learning models and using learning media, and not giving questions to students about the material. To make the atmosphere more enthusiastic in one group, each group that can answer in the first place will get a star reward with the number of members in each group. Thus, students are more responsible for their duties and more enthusiastic about discussing. Besides that, preparing more interesting media and arranging a more varied difficulty so that students can understand the human nervous system material well. Image-based student worksheet makes students more active and better understand the human nervous system. This happens because student worksheets are a means to help and facilitate the learning process, forming positive interactions between students to increase student activity in improving learning outcomes (Widjayanti, 2008).

Learning using TPSq can increase student learning activities (Irianti, 2018). Student activities at the Think stage provide opportunities for students to build knowledge through observation with active oral and written communication to receive information and then record it as an effort to receive new knowledge. Students actively and independently work to find the basic principles of a material. Students have intrinsic motivation to explore material independently. In the Pair Stage, students are asked to pair up to share their findings by filling out worksheets. At this stage, it also trains students to write down the results of thoughts in a communicative and effective way. According to Prince & Felder (2006), the best writing is communicative, originates from one's own thoughts, and follows the correct writing rules. Stage Square requires students to draft a presentation to be explained in front of the class. This stage trains students to combine group members' thoughts and compile them as communicable and systematic reports. This is supported by the opinion of Sudarman (2007), who states that having discussions will give students more confidence to write answers to questions. Writing and analyzing activities in the three stages of Think Pair Square trigger students' communication skills. Using the right learning model will support the smooth achievement of communication goals.

## **CONCLUSION**

Based on the discussion and analysis of the data above, there was an increase in the communication skills of class XI mathematics and science students at a high school in Bandung, Indonesia, in the biology learning process by applying student worksheets. This can be seen from an average increase in communication skills (Cycle I/Cycle II) of (62.7%/ 81.9%). Based on the study's results, student worksheets can improve communication skills by 19.2%.

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