

Research Article

Analysis of Student Communication in the Discovery Learning Model Using Transcript-based Lesson Analysis

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Asep Irvan Irvani: <https://orcid.org/0000-0002-7421-3741>**Abstract.**

This study aimed to analyze student and teacher communication in discovery learning through transcript-based lesson analysis (TBLA). The research was conducted in one of the junior high schools in Garut Regency on science subjects. The learning material studied in this research was about Coulomb's Law. The learning video was taken from one of the open class activities from a series of lesson study activities. As many as 16 students of grade 9 were included in the study. Through descriptive research methods, researchers revealed learning trajectories and student communication methods while learning through the transcripts made. Learning activities are divided into three main parts, namely introduction, core activities, and closing. There are five stages in the core activity, namely literacy activities, critical thinking, collaboration, communication, and creativity. The results of the analysis show that in the preliminary activity, communication is dominated by the teacher. The dialogue that appears is just a minimalistic dialogue. In core activities, student communication had started to dominate, especially at the collaboration and communication stages. The use of interactive simulation media at the collaboration stage improved the communication between students. The creativity stage was mostly dominated by the teacher, until the closing activity, and less by student communication. The lag time between teacher questions and student answers is the key to student responses. When the pause is given too quickly, there was no communication from students at almost all stages.

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1. INTRODUCTION

Analyzing a learning activity is one of the efforts to improve the quality of learning itself. A teacher needs to evaluate and reflect on the learning that has been done so that he can make improvements from the results of the evaluation and reflection. This reflection activity can help teachers improve the quality of their learning [1]. Of course, teachers need data in evaluating and reflecting. One of the data that can be used is learning observation data.

Learning observation can be done independently by the teacher or assisted by the observer. In practice, it is difficult for teachers to obtain comprehensive data when

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observing learning independently. The presence of an observer who helps the teacher to reflect will provide complete data compared to the results of independent observations made by the teacher when carrying out learning.

One of the activities carried out with the aim of studying learning is Lesson Study (LS). Through LS, we can re-examine the process of reflection from the learning being studied [2]. The reflection is obtained from observation activities. So that observation is an important part in the process of studying a lesson. Through LS also, teachers can be assisted by observers to obtain more observational data.

Although observation is very important to do, in fact, observations made by humans are indeed limited by the existing senses. Observations made by both the teacher and the observer during the learning process did not show the full learning process of the students. There needs to be a sharpening of the observation lens so that more information can be found, especially from the dialogues carried out by students, both between students and students and between students and teachers.

Why do we need to observe student dialogue? Because through student dialogue, we can analyze their way of communication and learning. By analyzing the way of communication and learning, we will find the learning trajectory or student learning patterns. This is a hidden finding in the learning process. Of course, the findings that are dug deeper will provide a more in-depth analysis.

Through camera technology, teachers can obtain more detailed observation data because they can repeat the recording. By repeating learning video recordings or doing slow motion in certain parts, we will minimize the loss of moments from the learning process carried out by students. From video recordings, learning findings can be explored in more detail. This video recording can be transformed into a transcript. This method is known as "Transcript Based Learning Analysis" (TBLA).

TBLA is one of the methods used in LS to analyze more deeply the situation in the learning process [3]. Through TBLA, the situation in a lesson can be presented in quantitative data so that more things can be said from the lesson. TBLA can also identify the success of a Lesson Design [4]. One of the things that can be observed is the flow of student communication in studying learning content, including physics material. In learning science, especially in learning physics, it is very important to analyze the way students learn and think so that teachers can design appropriate lessons to carry out effective and meaningful learning. Based on this background, the author wants to analyze student communication in learning with the Discovery Learning model using Transcript Based Learning Analysis.

2. RESEARCH METHOD

This research uses a qualitative approach, with the type of descriptive analysis research. Where in the data analysis using the results of learning transcripts obtained from video recordings of learning. The explanation of the data analysis is supported based on the analysis of literature studies relevant to the topic in this study [5].

The subjects of this study were grade 9 students in one of the junior high schools in Garut district. There were 16 students sampled in this study using purposive sampling technique. These students have been involved in Open Class activities in a series of LS activities three times.

The primary data in this study were transcripts of science learning in the sample class on the topic of Coulomb's Law. This learning transcript is presented in the form of a student and teacher dialogue table. Sentences spoken by both the teacher and students are entered into the transcript table and then indexed for each second as shown in Figure 1.

Time	Speaker	Indeks	Greetings	Num of Letters	Num of Letters from Teacher/Setudents	
Minute	Second	T/S				
0	3	T	1	Assalamualaikum warahmatullahi wabarakatuh	42	42
0	8	SS	2	Waalikumsalam warahmatullahi wabarakatuh	41	-41
0	9	T	3	Apa kabar semua?	16	16
0	11	SS	4	Baik	4	-4
0	25	T	5	Alhamdulillah pada hari ini bertemu lagi dengan pembelajaran IPA. Sebelum dimulai pembelajaran, mari kita berdoa dulu. April sialkan pimpin doa!	145	145
0	32	S1	6	Sebelum belajar, alangkah baiknya kita berdoa di dalam hati masing-masing.	88	-88
0	41	S1	7	Berdoa mulai.	7	-7
1	4	T	8	Pada pertemuan minggu lalu kita sudah belajar tentang muatan listrik dan interaksinya. Nah untuk mengingatkan itu, mari kita lihat dulu video yang waktu itu sempat kita lihat.	175	175
1	27	SS	9	(siswa mengamati video)	0	0
1	28	T	10	Nah perhatikan	14	14
1	57	SS	11	(siswa mengamati video)	0	0
1	57	T	12	Nah gitu ya, balon dengan rambut digosok-gosok, begitu mau dijauhkan seperti	147	147

Figure 1: Screenshot of transcript.

To facilitate the analysis of the transcript, the number of letters in each teacher and student utterance is then presented in the form. The number of letters in the teacher's speech is multiplied by (+1) and the number of letters in the student's speech is multiplied by (-1) so that the graph will show the orientation of the words of students and teachers. Every word of students and teachers from beginning to end is given an index to make it easier to discuss.

3. RESULTS AND DISCUSSION

The purpose of a Results section is to present the key results of your research. This section should include your research findings, comparison with prior studies, limitation of your work, casual arguments, speculations, and deductive arguments. Please present your scientific data in a clear and concise fashion. This is only an example of how your text adjusted to our template. Several sentences and contents are written here to guide you follow the instruction. The following sentence provide you an example of how to put your research result in this section and to express it using figure and table. The figures, tables, and equations must be inserted in the text and may not be grouped at the end of the paper. Important: A miscount of figures, tables, or equations may result from revisions. Please double check the numbering of these elements before you submit your paper to your proceeding's editor.

1. Plan, at this stage, the model teacher and members of the learning community who will be observers make lesson designs. A model teacher is a teacher who will open a class and share their learning with the learning community. While the learning community is an association of teachers, lecturers, and students who carry out lesson study activities.

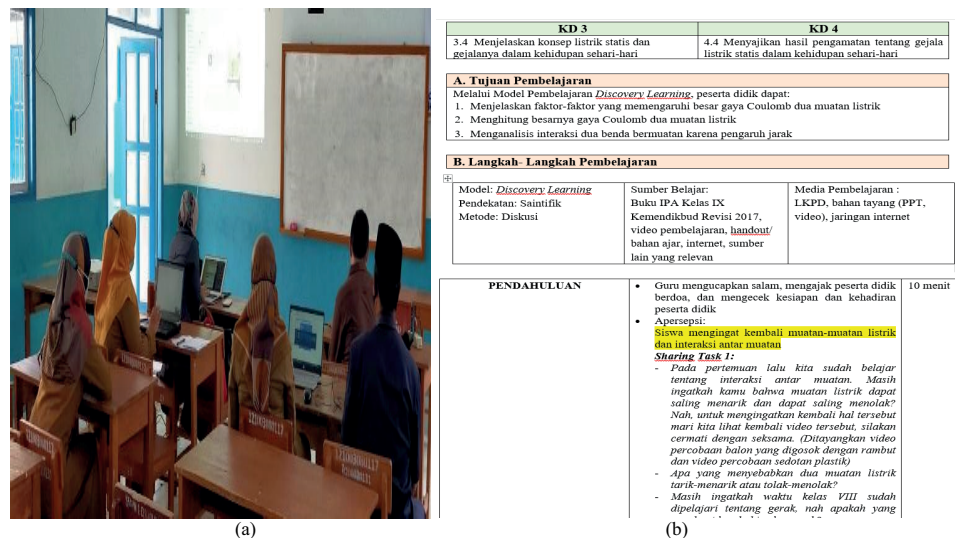


Figure 2: (a) Documentation when making lesson designs, (b) Screenshot of lesson designs.

Lesson design is made in a tabular format as shown in Figure 2 (b). In the lesson design there are school identities, basic competencies, learning objectives, and learning steps designed in a didactic situation format, predicting student responses, and teacher assistance.

1. Do, at this stage, learning is carried out with a model teacher as a learning leader. While the observer is tasked with observing and recording all learning activities carried out by students. In the learning process students are immediately placed in groups of seats as shown in Figure 3. Each group consists of four students who have been randomized before starting the lesson.



Figure 3: Documentation during learning.

Learning is done using the Discovery Learning model. In the investigation stage, students in groups conducted experiments with the help of a virtual laboratory from PhET. Students discuss after taking data.



Figure 4: Documentation during group discussions.

1. See, at this stage the model teacher and the observers conduct discussions to reflect on the learning that has been done. Each observer expressed his

observations, provided input, and planned improvement efforts. The model teacher is also given the opportunity to confirm and also ask questions regarding the input that has been given.



Figure 5: Documentation when learning reflection takes place.

3.1. TBLA Result

Based on the results of the transcript as shown in Figure 1, the data is then presented in graphic form to facilitate the analysis of students' communication tendencies in learning. The TBLA graph for the entire learning transcript is shown in Figure 6.

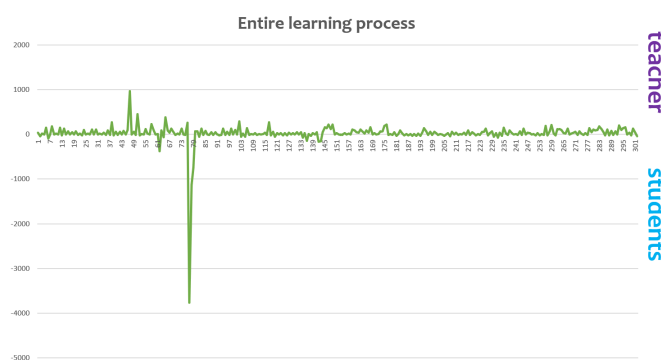


Figure 6: Analysis of transcripts based on the number of letters.

Based on the graph in Figure 6, it can be seen that the students' communication tendencies are almost the same throughout the lesson except at the beginning and in one section of index 73. This index section is the core activity section. So that it will be clearer when the graph is broken down into several parts according to the learning

section. This learning section includes preliminary activities, core activities, and closing activities. The transcript of the preliminary activities can be seen in Figure 7.

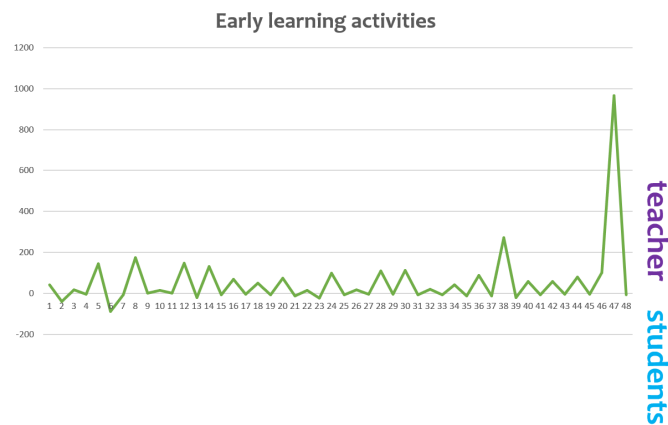


Figure 7: Graph of the transcript of the preliminary activity by number of letters.

Based on the graph in Figure 7, it can be seen that in the preliminary activity the graph was more upwards. This indicates that communication is very much dominated by the teacher. Very few utterances were issued by students. Students answer with short answers and do it together. From the graph it can be seen that the bottom tends to be straight, so the dynamics are not yet visible. Transcript graphs like this can show the dynamics of communication and learning interactions [6, 7].

In the core activities, the dynamics of communication began to appear. These dynamics can be seen from the graph of the transcript of the core activities in Figure 8.

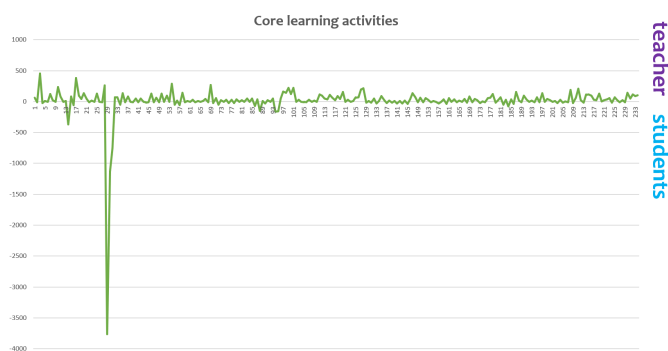


Figure 8: Graph of transcripts of core activities by number of letters.

Based on the graph in Figure 8, it can be seen that the dynamics of communication are starting to emerge. However, it only appears on index 29-33. In this section, students are conducting an investigation and group discussion. So that during the discussion students can say more sentences related to the learning material. The discussion was getting more intense considering that it was the first-time students were using a virtual laboratory. There were several dialogues regarding the technical use of the virtual

laboratory during group discussion activities. The first type of dialog deals with how to change the magnitude of the payload and determine which ones are fixed and which ones are changing. The next dialogue, students discuss to make sure the instructions in the worksheet are in accordance with the practicum carried out. Dialogue occurs in two directions between students and students when reading the numbers listed in the PhET simulation.

Student communication only improved during group discussions. Meanwhile, during other activities, the dominance of the teacher is still more. Likewise at the closing activity. As shown in Figure 9, the sentences spoken by students are still very minimal.

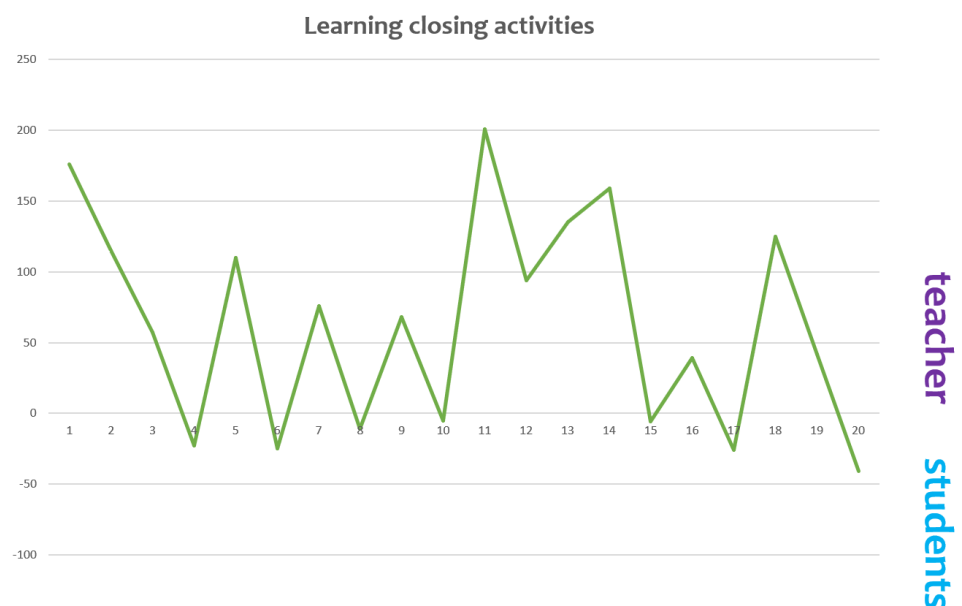


Figure 9: Graph of the transcript of the closing activity by number of letters.

From the analysis of the learning transcripts in each section, it shows that the learning process that occurs is not in accordance with the expected lesson design. In the learning design, it is planned that for every question and instruction the teacher gives an active response from the students. Assuming that students' responses are in the form of spoken sentences, the number of words spoken by students on the transcript can show students' responses quantitatively. Based on these assumptions, learning is still dominated by teachers.

4. CONCLUSION

Based on the results of the analysis of the transcript data plus the analysis of the results of learning reflections, it can be concluded that student communication throughout the learning process shows a minimalist dialogue. The teacher still dominates the

dialogue, especially in classical discussions. In core activities, student communication has started to dominate, especially at the collaboration and communication stages. The use of interactive simulation media at the collaboration stage improves communication between students. In the creativity stage, student communication returns to obey and is dominated by the teacher until the closing activity. The lag time between teacher questions and student answers is the key to student responses. When the pause is given too quickly, there is no communication from students at almost all stages.

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