Analysis of Communication in Problem-Based Mathematics Learning through Transcript Based Lesson Analysis (TBLA)

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Abstract

This study aims to describe communication in problem-based mathematics learning through TBLA and the learning tendencies based on the results of the analysis of Transcript Based Lesson Analysis (TBLA). This type of research is descriptive exploratory research with a qualitative approach. The subjects of this study were all students of class VIII-D UPT SMP Negeri 1 Gresik which consisted of 32 students. The supporting instruments in this study consisted of documentation using an audio-visual recording device and sheets for lesson analysis the TBLA model. From the results of the TBLA analysis, both based on the number of letters and categorization, it can be seen that problem-based mathematics learning tends to be dominated by students. In the results of the TBLA analysis based on the number of letters, it can be seen that students are active in communicating with other students or group members, only occasionally asking the teacher about things that need explanation. Likewise, the results of the TBLA analysis based on categorization show that the initiation of students in communicating is greater as shown in PM1 and PM2 around 80% compared to teacher initiation shown in PG1 to PG7 of around 20%. This shows that the interaction communication between teachers and students in problem-based mathematics learning in the classroom is more dominated by students. So that problem-based mathematics learning tends to be student centered learning.

Keywords: communication, learning tendencies, transcript based lesson analysis (TBLA).

A. Introduction

21st century learning emphasizes the ability of students to formulate problems, seek information from various sources, think analytically, communicate and work together in solving problems. So that students are required to have skills, one of which is communication skills. Communication comes from the Latin "communis" which means the same, the same in the sense of meaning or understanding. So that two or more people are said to be involved in communication if there is a similarity of meaning or understanding between the communicator with the communicant about what is being communicated. According to Majid (2006), communication is a process that involves two or more people, who in which there is an exchange of information in order to achieve certain goals. Meanwhile, according to Beni (2012), communication is a person's skill in conveying and understanding messages from one person to another. Communication skills is needed by everyone to be able to communicate well with others. With good communication skills it will achieve the goals or objectives regarding what is communicated. Good communication skills can reduce misunderstandings, errors, frustrations, and conflicts on a regular basis. Through communication, our ideas and interests are transmitted to other people; thus, the way we communicate serves as the foundation on which people from their opinions about us (Butler & Stevens, 1997).

In the world of education, communication takes place through the teaching and learning process. Pal et al. (2019) States that communication skills are very important to master, especially in the learning process between teachers and students where there will be a process of exchanging information in the form of learning materials between teachers and students. Communication in learning can be said to be effective, if students can understand the learning material well. If the communication between teachers and students is effective, the learning materials will be easily understood by students (Heliawati et al., 2020). Communication skills also play a key role in facing the changing paradigm of life in the 21st century in addition to collaboration, critical thinking, and creative skills. Communication skills are useful for students to identify sources of accurate information, filter information as new knowledge, and make information as additional knowledge in self-development (Rahman et al., 2019). Therefore, communication skills really need to be mastered in order to achieve the goals in every lesson, including in mathematics learning.

For knowing the communication interactions between teachers and students in the classroom with using transcript-based lesson analysis, the researchers used Flanders (1970) communication categorization which consisted of 10 categories, namely: (1) Accepts feeling, (2) Praise or Encourages, (3) Accepts or use ideas of pupils, (4) Asks questions, (5) Lecturing, (6) Giving directions, (7) Criticizing or justifying authority, (8) Pupil talk-Response, (9) Pupil talk-Initiation, (10) Silence or Confusion. Categorization of communication owned by Flanders is commonly referred to as FIAC (Flanders Interaction Analysis Categories). Analysis Flanders communication interaction is a coding of interaction analysis categories to know the communication interactions between teachers and students in the classroom. Flanders interaction analysis category system records what teachers and students say during the teaching and learning process. Of the 10 categories, they are detailed as follows, seven are used when the teacher is talking, two are used when the students are talking and the latter is used to indicate silence. According to Tichapondwa (2000), Flanders' interaction analysis category system helps researchers to identifying, classifying, and observing communication interactions between teachers and students in class.

Mathematics learning is a teaching and learning process built by teachers to develop students' thinking creativity which can improve students' thinking skills, and can increase good reinforcement of mathematical material (Susanto, 2013). According to Fitri (2014) mathematics learning is a process in which students actively construct mathematical knowledge. Students' mathematical knowledge will be better if students are able to construct their previous knowledge with the new knowledge they get. Therefore, the involvement of students in learning greatly affects the success of mathematics learning. Mathematics itself is one of the basic sciences that has an important role, both in everyday life and in the development of science and technology. According to Ernest (2015), mathematics is a fundamental part of human knowledge and a core component of the current technological revolution. Many of the problems of everyday life that use mathematical models as a method of solving them. Therefore, Mathematics learning is very important for students to be able to develop skills math problem solving.

However, in reality, teachers use the lecture method more often in the learning process, so that it can lead to low mathematical problem solving abilities of students. According to Slameto

(2010) teachers' teaching methods that are not good will affect the learning of students who are not good as well. This can lead to a learning process that is teacher centered learning, where learning is more dominated by the teacher. One of the learning methods that can involve students in solving a problem through the stages of the scientific method is problem based learning. Problem based learning is a student-centered learning method, because students are actively involved in problem solving activities. In addition, problem based can be used for student learning by utilizing real problems (Hali, 2016). Based on the results of research from Ilmiyatni et al., (2019) that the model problem based learning has an effect on increasing collaboration skills and increasing students' higher order thinking.

In this case, Lesson study is also seen as an alternative to overcome the problem of learning practices that have been considered less effective than conventional ones. Lesson study can be used as an alternative to encourage changes in the practice of learning mathematics towards a direction that is much more effective and can be understood by students optimally. According to Garfield (2006) lesson study is a systematic process used by Japanese teachers to test the effectiveness of their teaching in order to improve learning outcomes. Based on the research of Dewi (2016), it was found that activities lesson study that have been carried out at SMP Muhammadiyah 1 Kartasura can increase activities and learning outcomes of mathematics. This activity can also increase student participation both in expressing ideas, actively asking questions and being able to discuss during the mathematics learning process.

Transcript Based Lesson Analysis (TBLA) is a technique of lesson study that can be used to analyze situations in the learning process. Through Transcript Based Lesson Analysis the teacher must observe and transcribe the results of the teaching practice process that has been implemented, analyze and reflect on it, then conduct collaborative discussions with other teachers. Analysis of the learning process is important to do, so that later teachers can improve the quality of learning. By doing this, teachers can improve their ability to review teaching scripts as well as their decision-making abilities and professional capital on an ongoing basis (Sarkar Arani, 2017). Learning analysis research using Transcript Based Lesson Analysis (TBLA) has been carried out by Mutiani et al. (2020) the results of his research show that after the implementation of lesson study the TBLA model, an increase in student activity was found, this indicates a good learning community. In addition, students also gain historical thinking skills that appear when they are able to conclude the material by providing analogies and contexts that are expressed chronologically and contextually.

Based on this description, a research was conducted that aims to determine communication in problem-based learning through Transcript Based Lesson Analysis (TBLA) and the learning tendencies based on the results of the analysis of Transcript Based Lesson Analysis (TBLA).

B. Methodology

1. Research Design

This research is an exploratory descriptive study with a qualitative approach. According to Arikunto (2004) exploratory descriptive research is research that aims to describe a situation or a phenomenon, in this study it is not intended to test certain hypotheses but only describes what a variable, symptom or situation is. The assumption of researchers using descriptive research that is exploratory because researchers want to obtain in-depth data on matters relating to communication in problem-based mathematics learning.

2. Research Subject

Subjects in this study were all students of class VIII-D UPT SMP Negeri 1 Gresik which consisted of 32 students.

3. Instruments

The data collection method used in this research is the video documentation method during the learning process and the transcription of the conversation during the lesson. In accordance with this type of research, namely qualitative research, the main instrument in this study is the researcher himself (human instrument). While the auxiliary instruments in this study were documentation with an audio-visual recorder and sheets for lesson analysis the TBLA model.

4. Technique of Data Analysis

Analysis in this study used the Transcript Based Lesson Analysis (TBLA) method. Data reduction was carried out in several stages, such as: making a transcript of the learning activity process that had been documented through an audio-visual recording device, the results of the

transcript of the learning activity process being arranged in a simpler way with good language, analyzing communication and tendencies in learning by looking at the results of the transcript.

C. Findings and Discussion

Research activities begin with the preparation of learning designs, implementation of learning, observation and documentation, and reflection. From these activities, a learning design resume, video documentation and reflection notes were obtained. Based on the existing video documentation, a full transcript was prepared. This full transcript is used as TBLA material, so that a graph of a learning transcript is obtained based on the number of letters and a learning diagram based on the categorization of communication.

Resume of learning design

Meeting activities for coordination of learning designs will be held on Wednesday, September 29, 2021 from 13.00 – 15.00 WIB. Followed by 5 mathematics teachers from UPT SMP Negeri 1 Gresik, Mr. M. Muis, M.Pd., Mrs. Sulasih, M.Pd., Mrs. Mufidatik, S.Pd., Mrs. Siti Djuwarijah, S.Pd., Mrs. Aslikhatin, S. Pd., accompanied by Mrs. Dr. Nur Fauziyah, M.Pd., who is a lecturer from FKIP UMG. Learning activities (open class) are planned on September 30, 2021, to be held on Thursday from 08.30-09.50. The teacher team agreed to choose the material on the function to be implemented (open class) in class VIIID with the model teacher Mrs. Mufidatik, S.Pd.. The learning model that will be carried out is a model problem based learning with strengthening numeracy literacy.

The lesson plan is as follows: explaining the learning objectives while providing apperception with a question card stance. Apperception is arranged by giving a question card stance which contains several questions related to the function material. Then a photo of the motivation related to the function material is shown, it is hoped that students will be more interested in learning more about the function material. Furthermore, students are divided into groups to discuss the completion of the sharing task according to the worksheets that have been distributed. In one group consists of 4 people with details 2 men and 2 women. After the discussion, students display the results of their work. Representatives from the group will present the results of their work. Next, the teacher will give questions about jumping tasks to strengthen students' understanding of the function material. The activity ended with strengthening and reflection on the function material by the teacher.

TBLA results based on the number of letters

The data collection in this study was assisted by 7 (seven) students who served as videographers and photographers. Taking photos and videos is arranged so that all learning activities in the classroom can be recorded properly. Figure 1. Describes the transcript analysis process according to a predetermined format.

Figure 1. Screenshot of Learning Transcript Format by Number of Letters

Based on the full transcript analysis, a graph of learning transcripts based on the number of letters is obtained, as shown in Figure 2. The graph in Figure 2 shows the top part is the conversation session carried out by the teacher, while the bottom shows the conversation session carried out by the students. The horizontal line that limits the conversation session between the teacher and students on the graph is the indexing of the conversation recorded on the full transcript.

From the results of the learning transcript graph based on the number of words, it can be seen that conversations at the beginning of learning activities are dominated by the teacher. Starting from the teacher greets, conveys the learning objectives to the activities apperception. Conversations by students have begun to be seen in the core activities until the end of learning activities. This can be seen in Figure 2, starting from index 81st to 416th. At the 416th index, students are able to present their results their work in front of the class, so that the number of words produced is more from the previous conversation. So it can be concluded that learning activities based on the graph in Figure 2 is student centered learning, where participants students are active in communicating during the learning process and only occasionally ask the teacher about things that need explanation.
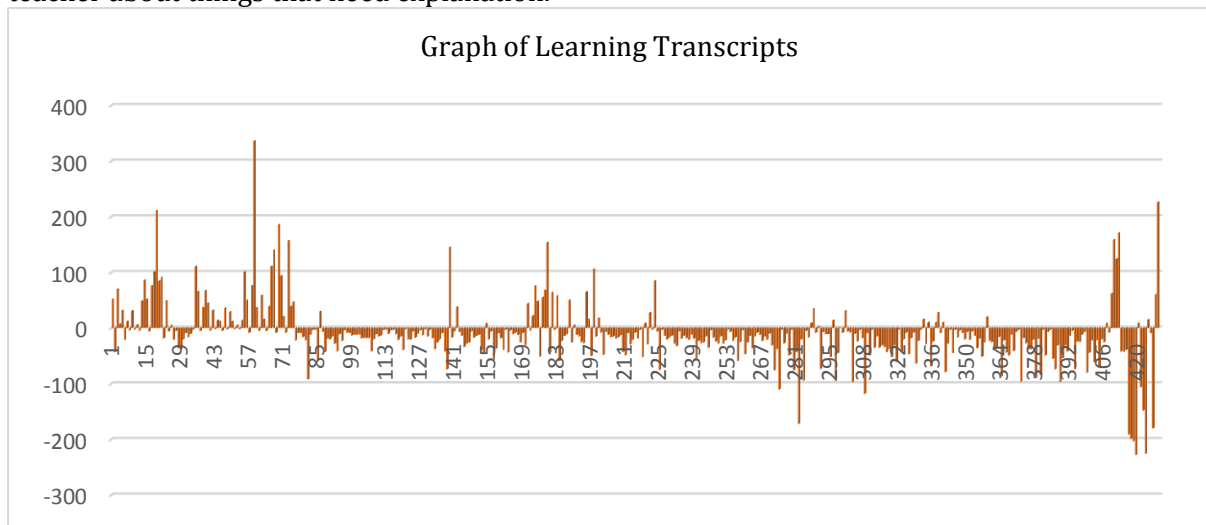

Figure 2. Graph of Learning Transcripts Based on Number of letters

TBLA results based on categorization communication

Based on the results of the analysis of conversation transcripts during the learning of function materials on September 30, 2021, TBLA results were also obtained based on categorization. Figure 3. Describes the transcript analysis process based on categorization according to a predetermined format.
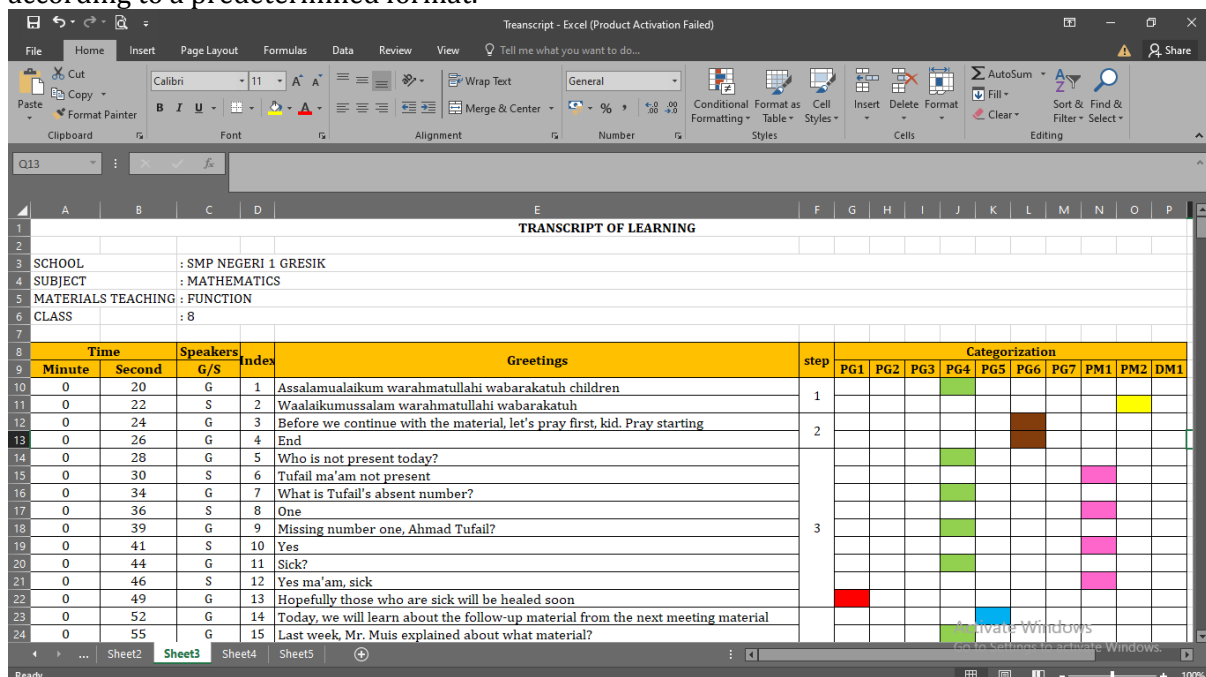

Figure 3. Screenshot of Learning Transcript Format Based on Categorization

Based on the full transcript analysis, obtained a learning transcript diagram based on categorization, as shown in Figure 4. The diagram in Figure 4 shows the categories that often appear in communication between teachers and students. In this study, the category used refers to the Flanders category or commonly referred to as FIAC (Flander's Interaction Analysis Categories), with a total of 10 categories.

From the results of the communication categorization diagram with transcript based lesson analysis, it can be seen that as much as 73% of PM2 (initiation), students communicate with express ideas or opinions during the learning process; as much as 7% PM1 (response), students respond to the teacher; as much as 6% PG6 (giving direction), teacher provide direction to students; as much as 2% PG5 (lecturing), teacher provide an explanation of a procedure; as much as 6% PG4 (asks questions), the teacher asks questions to the students; as much as 2% PG3 (Accepts ideas), receive or develop ideas from students; as much as 3% PG2 (praise or encouraging), the teacher praises or encourages students' opinions; as much as 1% PG1 (accepts feeling), the teacher accepts the opinions of students in a good way and not threatening; as much as 0% PG7 (Criticizing or justifying authority), guru criticize the behavior of students; as much as 0% DM1 (Silence), a state of silence for the learning process takes place.

Based on the results of the communication categorization diagram with TBLA, it can be seen that as much as 80% leads to student conversations during the learning process whether it responds or initiates PM1 and PM2. The rest of the conversation by the teacher can be observed in PG1 to PG7. And silence on DM1. So that it can concluded that the learning activities based on the diagram in Figure 4 is student centered learning, where students are active in good communication it responds or initiates during the learning process.
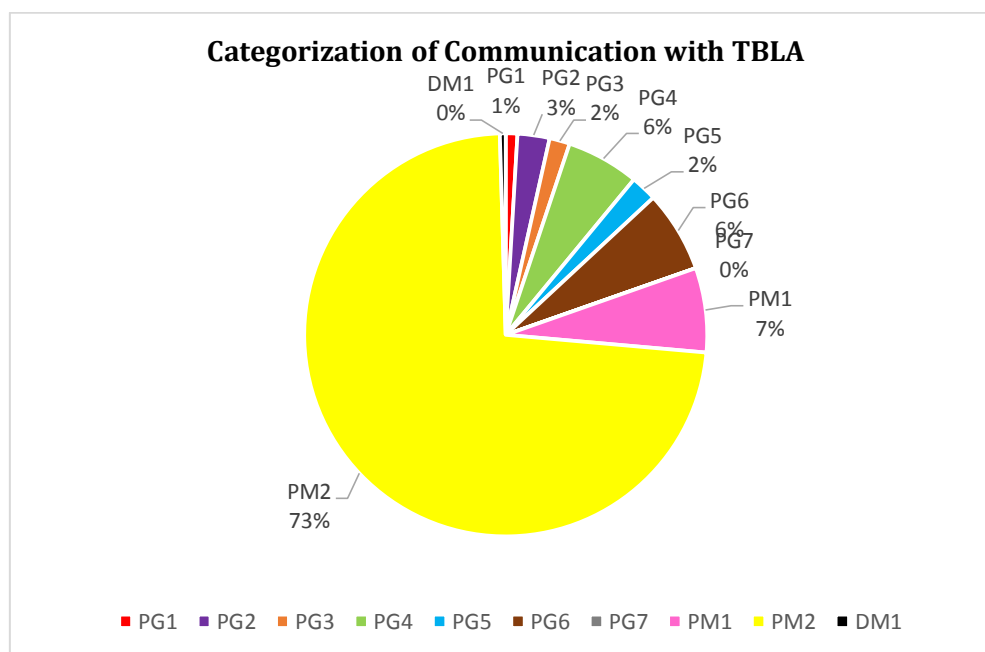

Figure 4. Diagram of Learning Transcripts Based on Categorization

Learning Implementation Results

Implementation of the learning process is basically well prepared. Based on the communication at the plan stage (lesson planning), all teachers agreed to appoint class VIIID as the subject in the open class implementation. All the tools and materials needed in the open class are well prepared.

During the do phase (implementation of learning), students seemed very enthusiastic in learning. Only one or two students seem to not quite understand the learning situation in an open class. At the beginning of the lesson the teacher gave an apperception in the form of a question card stance which contained questions about the concept of function and asked students to pair up and ask each other based on the questions on the question card stance. After students ask each other, the teacher provides reinforcement regarding the concept of function. By giving directions such as:

Teacher: Now you just read the data that you have got. Mrs. Datik will take some samples from you guys.

Teacher: Well, from these four children, it can be seen that all of them have weight. Everything has, no one doesn't have yes.

Teacher: Suppose this four children are in one set, and her weight is also another set, 65, 63, 62, 30. If I make a relationship, then I can connect this right set and the weight set in a relation. Well like that. So each of these children must have one measure of weight.

Teacher: Could it be more than one size?

Student: No

Teacher: No. So surely all children have and only have one.

Through problem-based learning, teachers do not say the concept of function before students collect data first so that they can construct knowledge through interpretation of the data they collect. The following sample transcripts of conversations between teachers and students in the following class illustrate the dominance of the teacher in explaining the procedures for working on sharing tasks.

Teacher: As you did earlier, you data. So each person when weighed must only have one weight. Could there be the same?

Student: Maybe

Teacher: Maybe.. Like that example. Aurel and Azriel both weigh 35. Maybe it's the same, but every child, every person being measured must only have one size.

Teacher: Okay kids, got it?

Student: Understood.

Teacher: Now you form groups. One group consists of 4 members. Then discuss together about the sharing task that Mrs. Datik will give.

Teacher: Work on the cardboard that will be distributed

However, the dominance of this teacher is not visible when students carry out discussions. The teacher only observes discussion activities and occasionally answers questions from students or group members during discussion activities. Group discussion activities are quite conducive and students are very enthusiastic in carrying out group discussions. Almost all group members are active in discussion activities to solve sharing tasks.

During 45 minutes of discussion, all groups were able to complete the sharing task well. The results of each group's discussion activities will be posted on the blackboard and group representatives will present their work. The following is an excerpt of a transcript that shows how the discussion took place.

Student 1: Come on, number four, number four.

Student 2: Does each member of set A have exactly one pair in set B?

Student 1: No, no, because there are still some left.

Student 1: Does every member of set A have exactly one pair in set B? I think Yes because set A gets all pairs

Student 3: Yes

Student 4: I think yes

Student 1: Is this not given a reason?

Student 3: No reason given

Student 2: Is the relation a function?

Student 1: Yes

Student 4: Number 6. So, what is a function from set A to set B? Student 1: When a domain has only one codomain Student 1: What is a domain?

Student 3: The domain is the place of origin. Soekarno, Suharto, NJ Habibie, Abdurrahman Wahid Student 1: Now codomain?

Student 4: This is the codomain

Student 4: Non Partisans, Working Group, National Awakening Party, Democratic

Party Student 3: Done

Overall the learning activities went well. Discussion activities showed that all students were active with each other in the discussion, none of which was dominant. They also help each other. However, there are some important notes as reflections to be corrected at the next meeting as follows: (1) Literacy must lead to questions so that students cannot work on questions before reading. Because most students can work on questions without having to read literacy first, (2) It is necessary to improve on numeracy literacy questions as well as introduce literacy into numeracy.

D. Conclusion

Based on the results of the TBLA analysis, both based on the number of letters and based on categorization, it can be seen that the tendency of conversation transcripts is dominated by students and only a few conversations are dominated by teachers only when the teacher

explains the procedure for working on sharing tasks. The results of the TBLA analysis based on the number of letters show that students are active in communicating with other students or group members, only occasionally asking the teacher about things that need explanation. Students are also active in answering some of the questions posed by the teacher. Likewise, the results of the TBLA analysis based on categorization show that the initiation of students in communicating is greater as shown in PM1 and PM2 around 80% compared to teacher initiation shown in PG1 to PG7 of around 20%. This shows that the interaction communication between teachers and students in problem-based mathematics learning in the classroom is more dominated by students. So that problem-based mathematics learning tends to be student centered learning.

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