Pointing Gesture and Speech of Teachers in Mathematics Learning According to Information, Initiation, and Feedback

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Abstract. The purpose of this research is to describe the pointing gesture and teacher's speech SMPN 2 and SMPN 4 Ternate in learning mathematics according to information, initiation and feedback. Pointing gesture forms an integrated system with assertive and directive speech and contributes to mathematics learning. Information as an explanation in the conversation and example. Initiation in classroom conversation is a form of opening speech as a trigger/stimulus performed by the teacher with the aim of obtaining student responses. Feedback is teacher's comment on student response. The type of research is case study. In this research, case studies aimed at pointing gesture accompanied by teacher's assertive speech in information, pointing gesture accompanied by teacher's directive speech in initiation and pointing gesture accompanied by teacher's assertive in feedback. The result of this research are (1) pointing gesture accompanied by teacher's assertive speech in information, that is teacher giving explanation to student about concept or idea of mathematics in exchange structure of conversation of learning mathematics specially information, (2) pointing gesture accompanied by teacher's directive speech in initiation, that is the teacher asks the students questions about the concept or idea of mathematics in the structure of the exchange of conversation learning mathematics especially initiation and (3) pointing gesture accompanied by teacher's assertive speech in feedback, the teacher explains/elaborates concepts or mathematical ideas and affirming or justifies student answers.

1. Introduction

Gestures are classified into three, namely pointing gesture, representational gesture and writing gesture. Pointing gestures were defined as gestures used to indicate objects, locations, inscriptions, or people with fingers, hands or stationery. Representational gestures were defined as gestures in which the handshape or motion trajectory of the hand or arm represented some object, action, concept or relation. Writing gesture is a hand gesture for writing [1]. The use of gesture accompanied by speech in mathematics learning has been studied by several experts. Pointing, representational and writing gestures with teacher's speech as scaffolding students' algebraic understanding and pointing, representational and writing gestures along with teacher's utterances are used to introduce new material, articulate more abstract material, respond to students' questions and answers [1]. Pointing gestures accompanied by teacher speech can facilitate learning and help the child's understanding of symmetry material [2]. Pointing gestures and teacher's speeches raised in conversation help focus students' attention on Cartesian coordinate material and pointing gesture and teacher's speech is a
medium that facilitates the explanation of Cartesian coordinated material to students[3]. Speech as the smallest unit of verbal communication activity generally states action [4], speech as something that states the act is called speech acts [5]. Therefore, in this study the definition of speech is a speech act. A directive speech act is a message containing a message to encourage partners to do something [6], including requests, questions, bans and advice [7]. Assertive speech acts, ie speech acts that are planned and executed by speakers with the intention of declaring something to be accepted or rejected by the said partner, including states, suggests, explain, describe, affirming and so on [6].

In the exchange of conversations in class, there are at least two speeches, namely the speech acting as initiation and response [8]. Initiation and response are the minimum requirements of conversation in the classroom and must be present in the conversation. In addition, another element that characterizes conversations in the classroom is information as an explanation in the conversation. Information can also be expressed by giving definitions and sample questions [8,9]. Research from [10] shows that teacher and student conversations consist of three parts, namely initiation, response, and feedback and are known as the Birmingham Model exchange structure. Initiation, response, and feedback are components of exchange in classroom conversations [11]. Initiation in classroom conversation is a form of opening speech as a trigger / stimulus performed by the teacher with the aim of obtaining student responses or from students to other students. Initiation that gets response will be followed by feedback. The presence of feedback is voluntarily, ie a response may be followed by feedback and possibly not. The structure of conversation exchange that includes information, initiation, response and feedback is done by teachers and students of mathematics learning [8].

The study of [1,2,3] does not elaborate in detail about directive and assertive as is the opinion [6] and the results of the study [8] on the structure of exchange of conversations in mathematics learning, ie information, initiation, response and feedback. Therefore researchers will explore more about the pointing gesture and teacher's speech SMPN 2 and SMPN 4 Ternate in learning mathematics in terms of information, initiation and feedback.

2. Research Methods
The type of research is case study. In this research, case studies aimed at pointing gesture accompanied by teacher's assertive speech in information, pointing gesture accompanied by teacher's directive speech in initiation and pointing gesture accompanied by teacher's assertive speech in feedback. The main instrument in the research is researcher and research supporting instrument is recording tool and observation sheet. Recorders used are handycam and android phone to collect in detail about pointing gesture accompanied by teacher's assertive speech in information, pointing gesture accompanied by teacher's directive speech in initiation and pointing gesture accompanied by teacher's assertive speech in feedback. The observation sheet is used to overcome the limitations of the video in capturing the details of the lesson such as the details of the mathematics and writings the teacher produced.

Subjects in this research were mathematics teachers of state junior high school 2 Ternate (Sekolah Menengah Pertama Negeri 2 Ternate or SMPN 2 Ternate) and state junior high school 4 Ternate (Sekolah Menengah Pertama Negeri 4 Ternate or SMPN 4 Ternate). The process of selecting subjects with the criteria of teachers who most raised the pointing gesture accompanied by teacher's assertive speech in information, pointing gesture accompanied by teacher's directive speech in initiation and pointing gesture accompanied by teacher's assertive speech in feedback. Several fragments of the conversation in this study were chosen to represent all conversations containing pointing gesture accompanied by teacher's assertive speech in information, pointing gesture accompanied by teacher's directive speech in initiation and pointing gesture accompanied by teacher's assertive speech in feedback. The data collected were analyzed using qualitative analysis techniques, ietanscription of video recording and observation, and writing special notes or general ideas about pointing gesture by teacher's assertive speech in information, pointing gesture accompanied by teacher's directive speech in initiation and pointing gesture accompanied by teacher's assertive speech in feedback. The data collected were analyzed using qualitative analysis techniques, ietanscription of video recording and observation, and writing special notes or general ideas about pointing gesture by teacher's assertive speech in information, pointing gesture accompanied by teacher's directive speech in initiation and pointing gesture accompanied by teacher's assertive speech in feedback.
categories in a series of stories/narratives and interpreting or affirming how about pointing gesture accompanied by teacher's assertive speech in information, pointing gesture accompanied by teacher's directive speech in initiation and pointing gesture accompanied by teacher's assertive speech in feedback. Analysis of qualitative data is done continuously until thoroughly or not obtained again new data or information about pointing gesture accompanied by teacher's assertive speech in information, pointing gesture accompanied by teacher's directive speech in initiation and pointing gesture accompanied by teacher's assertive speech in feedback.

3. Discussion

Teachers and students in grade VII-3 SMPN 2 Ternate together discuss the example of the problem that is Zainul, Evan and Tohir have the same bakso handling. Zainul buys bakso every 2 days, Evan every 3 days, while Tohir every 5 days. If on this day they buy bakso together, determine how many days they eat bakso together. Explain.

Teachers and students in grade VII-1 SMPN 4 Ternate discuss material about the properties of square. Pointing gesture accompanied by teacher's assertive speech in information, pointing gesture accompanied by teacher's directive speech in initiation and pointing gesture accompanied by teacher's assertive speech in feedback can be described as follows:

3.1 Pointing Gesture Accompanied by Teacher's Assertive Speech in Information

Fragment of Conversation A

Teacher: Means the numbers used there, every two days, every three days, and five days. These numbers, we can illustrate with what?

Student: Least common multiple

Teacher: Multiple

The every two day means multiples of two (point 2 using fingers), every three days means multiples of three (point 3 using fingers), every five days means multiples of five (point 3 using fingers)

So, two multiples equal to how much?

Student: Two, four, eight, ten, twelve, fourteen

From the fragment of conversation A, the structure of the exchange of conversation begins with an explanation as information as in speech (1). Furthermore, the teacher asking a question to students as initiation as in speech (2) so that the students answer in response as in the speech (3) and the teacher corrects the wrong student answer as feedback (4), after which the teacher gives explanation as information as in speech (5). Then the teacher asking a question to the students as initiation such as in speech (6) and the students answer as in speech (7) such as response. In the fragment of conversation A (5), the teacher uses the finger gestures to point 2, 3 and 5 on the board to inform students that "The every two day means multiples of two, every three days means multiples of three, every five days means multiples of five". Based on this conversation, teachers of SMPN 2 Ternate use pointing gesture accompanied assertive speech, which is giving explanation to students of grade VII-3 about multiples 2, 3 and 5 in exchange structure of conversation especially information.

Fragment of Conversation B

Teacher: Who can mention the parallel side and the same length.

Student: AB and CD.

Teacher: Okay, AB and CD. We see the AB side is the same length and parallel to the CD side.

Is it true that the AB side is the same length as the CD?

Student: True

Teacher: For example, the length of AB (pointing AB on the board using a finger) is four centimeters.

So how length is the CD side, who can?
From fragment of conversation B, the structure of conversation exchange begins with the teacher asking a question to students as in speech (1) as initiation, the student responds as in speech (2) in response and the teacher explains/elaborates as in speech (3) on as feedback, then teacher asking a question to students as in speech (4) as initiation and students answer as in speech (5) as response. Then, the teacher gives the explanation as information as in speech (6) and asking a question to students as in speech (6) as initiation. Based on a fragment of conversation B (6), teachers of SMPN 4 Ternate use pointing gesture accompanied by assertive speech, that is giving explanation to students of grade VII-1 SMPN 4 Ternate about AB side in square ABCD in exchange structure of conversation especially information. Based on a fragment of conversation A (5) and B (6) teachers SMPN 4 Ternate using pointing gesture accompanied by assertive speech, which is giving explanation to students of grade VII-1 SMPN 4 Ternate about a square, square ABCD and AB side length is 4 cm in the structure of conversation exchange of learning mathematics especially information, furthermore referred to as pointing gesture accompanied by teacher's assertive speech in information.

3.2 Pointing Gesture Accompanied by Teacher's Directive Speech in Initiation
From the fragment of conversation A (2), the teacher says "These numbers (teachers pointing 2, 3 and 5 use fingers) can we illustrate what?". The teacher asking a question to students about multiple of 2, 3 and 5 as initiation to student responses. Based on the conversation, the teacher of SMPN 2 Ternate uses pointing gesture accompanied by directive speech, which is the teacher asked the students of grade VII-3 SMPN 2 Ternate about the numbers that can be used to illustrate two days, three days and five days in order to obtain student response. Therefore, based on a fragment of conversation A (2) the teacher uses pointing gesture accompanied by directive speech, which is asking questions to the students in the structure of conversation exchange of learning mathematics especially initiation, furthermore referred to as pointing gesture accompanied by teacher's directive speech in initiation.

3.3 Pointing Gesture Accompanied by Teacher's Assertive Speech in Feedback
Fragment of Conversation D
Teacher: Who knows, the same multiples are called multiples of what? (1)
Student: Multiples (2)
Teacher: Common multiple, so common multiple of 2, 3 and 5 are 30, 60, 90, ... (pointing 30, 60 and 90 using fingers), this means Zainal, Evan and Tohir will eat bakso together again after 30 days, 60 days, 90 day and so on (3)

From the conversation D, the structure of the conversation exchange begins as the teacher asks the students as in speech (1) as initiation, the students answer as in speech (2) as response and the teacher justifies the student's answer as feedback as in speech (3). Based on the conversation fragment D (3), the teachers use pointing gestures along with assertive speeches, which describe about 30, 60 and 90 are the same number at multiples of 2, 3 and 5 and are called common multiples as feedback on student answers. Therefore, teachers of SMPN 2 Ternate use pointing gesture accompanied assertive speech in conversation exchange structure especially feedback.

In conversation B (3), the teacher says "Okay, AB and CD, we see the AB side is the same length and parallel to the CD side (pointing AB and CD on the board using fingers)". Based on a fragment of conversation B (3), teachers of SMPN 4 Ternate use pointing gesture accompanied by assertive speech, that is affirm/justify the answer of the students of grade VII-1 SMPN 4 Ternate, AB and CD in conversation exchange structure especially feedback.

Based on the conversation fragments B (3) and D (3), teachers of SMPN 2 and SMPN 4 Ternate use pointing gesture accompanied by two assertive speeches, which describe and affirm/justify the answers of students of grade VII-1 SMPN 2 and SMPN 4 Ternate in the structure exchange of conversation learning mathematics especially feedback, this is called with pointing gesture accompanied by teacher's assertive speech in feedback.
4. Conclusion
Based on the discussion then the conclusion in the research is there are three characteristics of pointing gesture accompanied by teacher's speech in learning mathematics, specially on the material of least common multiple and properties of square according to information, initiation and feedback as follows: 
(1) pointing gesture accompanied by teachers’ assertive speech in information, that is the teacher gives explanation to the students about the concept or idea of mathematics in the structure of the exchange of conversation learning mathematics especially information, (2) pointing gesture accompanied by teacher's directive speech in initiation, the teacher ask questions to the students about the concept or idea of mathematics in the structure of exchange of conversation learning mathematics especially initiation and (3) pointing gesture with teacher's assertive speech in feedback, ie teacher explains/elaborates or idea of mathematics and affirming or justifying student's answer.

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