Using transcript-based lesson analysis to determine teacher discourse move in science lesson

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Abstract. One of teacher main task is conducting high quality learning process in their classroom. Teacher questioning and feedback in science lesson contribute to make dialogic classroom discourse so that learning process seems more meaningful. As the justice reflection for teacher practice in their class, analysis of lesson transcription was provided to inform the teacher about classroom discussion tendency and the gap for teacher improvement. This data was collected from one junior high school in Bandung, West Java, Indonesia. Three episode of science lesson were videotaped and transcribe. By using Transcript Based Lesson Analysis, teacher questioning, feedback, and student response in classroom were analysed to reveal the discussion tendency whether it authoritative or dialogic. Through this study, teacher can reflect their practices and know how to improve their learning process.

1. Introduction

One of teacher main task is conducting high quality learning process [1]. To make meaningful science lesson, teacher should give contextual problem in the beginning of the class, helps students to explore and probe their ideas expressed in the lesson. It necessary to guide student idea with scientific probe support, so student can apply and expand their scientific concept, and develop their conceptual understanding [2]. Meaningful science through active participation in classroom discussion needs ability of teacher to make question and give effective feedback, that will support teacher to conduct qualify learning process [3]. Through a series of questions, teacher can guide students into conceptual understanding via zone of proximal development (ZPD) and use discussion to get joint understanding [4]. Open-ended question by using ‘Why’, ‘How’, and ‘What do you think?’ will give a space for student to express their idea. When classroom discussion stimulated by teacher question well conducted, it will support exchanging idea among students and increasing information contribution from students [5]. While respond question from teacher, student idea can be appropriate or opposite with scientific concept. Therefore, teacher need to give feedback as oral evaluation in classical discussion to strengthening student understanding. Teacher feedback can be given as affirmation, restating student response, and consolidation. By restating student response, teacher can make those ideas accessed by all of student and make it as ‘joint understanding’ [6].
Teacher questioning and feedback in science lesson contribute to make a dialogic classroom discourse so that learning process seems more meaningful. Those practical can reveal the effectiveness of teacher strategy, tendency of classroom discussion and the lesson gap which teacher should be improved in their next meeting [7, 8]. Lesson transcription from videotape can help teacher as the justice reflection for reveal their teaching practice whether it authoritative or dialogic. In authoritative discourse, teacher tends to establish knowledge form, convey fixed information, need to be acknowledge, demand the allegiance of students. While in dialogic classroom, discourse is open, steadying a line between ideas from others and individual sense making, and treating student utterances as ideas to be actively questioned [2, 9].

Based on that tendency, researchers aim to reveal the pattern of classroom discussion in science lesson. By analysed the discourse pattern, it can be a tool for teacher that will help them reflecting their practices and know how to improve their instruction.

2. Research methods
This research was conducted at one of junior high school in Bandung, West Java, Indonesia. There are 32 students from one class in 7th grade becoming participants. Researchers followed four procedures to do this qualitative study in these three episodes of lesson – Heat Capacity, Convection, and Conduction. First, researchers videotaped the conduction lesson in the classroom. Second, collected data from video was transcribed. Third, from that transcription, data was analyzed by using some framework for teacher question and feedback so classroom discussion tendency can be revealed. And the last, making conclusions.

2.1. Transcript based lesson analysis
From the transcription, researcher presenting four aspect of the classroom discourse (time, subject, dialogue, and move) that driven into the element of analytical framework such as teacher questioning and teacher feedback. Dialogue can be in question, answer, statement, or comment form. Based on framework in table 1, question from the teacher can be classified into elicit, clarify, probe, prompt, extend, or manage the classroom. The higher level of question (top to bottom), it reflects the complex structure of question to stimulate deeper and dialogic classroom discussion. When the extending question dominated the classroom, it can stimulate the student to think more deeply and it can be indicator of conducting high-quality learning process for teacher.

Student response to the teacher question or other students talk reflected how wide and how deep the student understanding. Feedback from the teacher that used to respond student idea whether it true, false or combination of it. Teacher can give neutral, evaluative, challenging feedback or did not provide the feedback for responding ideas of student [3, 10, 11]. Teacher feedback from lesson transcription was categorized based on framework in table 2. Quality of the teacher feedback represent with top to bottom row on table 2, reflecting the teacher ability to drive idea of student towards scientifically concept.

| Type of feedback                     | Code | Description                                                        |
|--------------------------------------|------|---------------------------------------------------------------------|
| No Feedback                          | NF   | None of feedback provided for students                              |
| Affirmation – Direct Information     | AIL  | Teacher was accepting the student response and strengthening it with direct explanation or instruction |
| Explicit Correction - Direct Information | KIL  | Correcting student response and continued with following explanation of the real science concept |
| Focusing and Expanding               | FE   | Accepting student response and asking a series of related question that strengthening a probe or extending conceptual thinking |
| Challenge Reconstruction            | RC   | Giving neutral or evaluative feedback followed by reformulate or restating question or challenge with another question |
### Table 2. Framework of teacher questioning.

| Type of teacher questioning                          | Code | Example                                                                 |
|-------------------------------------------------------|------|-------------------------------------------------------------------------|
| Managing Class                                        | MC   | Still need a time to think?                                             |
| Eliciting Students Idea                               | EC   |                                                                           |
| Factual question                                      | FQ   | What is the function of microwave?                                      |
| New question                                          | NQ   | What will happen if I burn the iron?                                    |
| Repeating question                                    | RQ   | If I burn the iron, what will happen?                                   |
| Another response                                       | AR   | What about your idea, Rina?                                             |
| Asking student to take up a side                      | SD   | How many of you who agreed with Rina?                                   |
| Clarify Student Idea                                  | CS   |                                                                           |
| Guesting student mean                                 | G    | You mean larvae as the tiniest?                                         |
| Asking confirmation                                   | CF   | So, you mean ‘iron will be longer if I heated’ as it expands?           |
| Asking clarification                                  | CL   | What part will be longer?                                               |
| Restating question in another context                 | RC   | In daytime, what will be the cable looks like?                          |
| Proving Student Idea                                  | PB   |                                                                           |
| Observation                                            | O    | How many larvae can be seen?                                            |
| Calling further Observation                            | OB   | Is the pupae moves like larvae?                                         |
| Asking a probe                                         | J    | You said that the size of raindrop is different, how do you know?      |
| Asking for solution                                    | SO   | How do you find out that result?                                        |
| Asking for reason                                      | RS   | Why the high of the tube can be same in the end?                        |
| Considering variety viewpoints                        | VP   | S6 and S8 said that stigma is sticky. How can we know that? We did not feel it when we touch it. |
| Prompting Question                                     | PR   |                                                                           |
| Driving into focal point                              | P    | So what differences between shower rain and heavy rain?                 |
| Helping with visualization                             | VS   | If we cut it, how the vein looks like from here?                        |
| Hinting                                                | H    | Just think about the ‘dirty water’                                      |
| Pointing out flaws in argument                        | FL   | Is it true, just several organs that get blood with lot of CO₂?         |
| Presenting missing aspect from students                | AS   | If we caught on flu and we cannot smell something, will it ok if we put garbage inside the room? |
| Showing contradiction                                  | CON  | When it turns into larvae, they did not in C shapes right?              |
| Asking for Inference                                   | I    | So, why are we doing this experiment?                                   |
| Extending Student Idea                                 | ET   |                                                                           |
| Asking for elaboration                                 | EL   | Could you tell me what your means on ‘becoming bigger’ from the expansion you said before? |
| Collecting opinion                                     | CO   | From S7, anyone who will give some critic?                             |
| Making relation                                        | RE   | Heart rate and blood rate become increased. Are they related each other?|
| Asking direct question                                 | DQ   | Why if the wood is insulator so it cannot transfer the heat?            |
| Giving direct challenge                                | DC   | Why you choose that answer whereas it opposite with our previous agreement? |
| Paraphrasing students question                         | RE   | S₁ ask – will all of the flower can be turn into fruit?                 |
| Challenging for wider idea                             | NC   | Sand can adapt it shape with the container, is the sand a liquid?      |
3. Result and discussion

3.1. Result

Based on the transcription, the amount of student talk and teacher talk in the lesson was presented in Table 3 below. From that table, student talk that focus on the lesson dominated rather than teacher talk in three episodes. It means that teacher give an effective space and time for student to express their idea despite the answer still did not appropriate with science concept.

|                  | Episode          | Heat Capacity | Convection | Conduction |
|------------------|------------------|---------------|-------------|------------|
| Student Talk     |                  | 108           | 198         | 174        |
| Teacher Talk     |                  | 94            | 106         | 146        |

To reveal the quality of that talk, the analysis of teacher question and feedback were provided below. Based on teacher questioning framework, transcription of three lesson episodes was analyzed and the tendency of the question was represented in Figure 1.

![Figure 1. Tendency of teacher question in three episodes of lesson.](image)

In heat capacity lesson, most of teacher question driven to elicit idea of student with some of question that asking a proof to the student. In the next meeting, teacher enhanced the frequent of eliciting question while start to extend those ideas. In the last lesson, teacher reduced the frequent of eliciting question but tried to ask the student to probe their idea and extend the idea to strengthen the scientific concept in the discussion.

Detail of teacher question asked in three episodes of lesson presenting in Figure 2 below. Refers to figure 2, the heat capacity lesson was dominated by eliciting question especially in asking another response and restating the question so that a lot of and various student idea blow up in the classroom discussion. However, the follow up of the idea just arrived in probing question. In the second lesson, teacher push eliciting question and rather than probing the idea, teacher tends to ask student elaboration of the idea. In the third lesson, teacher tried to make discussion smoother by enhancing probing question and extending question.
Feedback of the teacher was taking a role to cultivate students' idea and use it to construct the scientific knowledge in the classroom. These are the profile of teacher feedback during three episodes of lesson.

Based on Figure 3, some displacement was occurred during three episodes of lesson. At the first, teacher tends to accept student idea and satisfied with it, so teacher did not challenge it to make deeper understanding. It reflected from domination of affirmation type during the heat capacity lesson. In the second lesson teacher try to challenge student type during the heat capacity lesson. In the third lesson, teacher focused to strengthen student idea by give a further question and new challenge for student.
3.2. Discussion

From the lesson transcription, authoritative pattern in classroom discussion was indicated by the amount of teacher talk that more than student talks, a short answer from student answer, question form that only completing the sentences; fill in the blank question or convergent question. The authoritative teacher tends to give no feedback or evaluative feedback that represented with some appraisal or show the unsatisfied respond to the student.

On the other hand, dialogic classroom was identified from the amount of students talk dominated the class while the student’s response reflected their deep thinking process. Teacher tends to give divergent question such as “How…”, “Why…” and asking further question to strengthen the concept. Teacher give a neutral and challenge feedback that allows students to deliver their idea despite of that idea was wrong.

In the heat capacity lesson, student talk was dominated, but it comes from many students at the same time so it difficult for teacher to trigger one good idea in the class. Students’ response tends to appear in short answer and it did not reflect their deepness of thinking process. None of teacher feedback that uncover the reason behind student idea, teacher just drag the idea to the correct learning trajectory as teacher wish although it was random. Teacher just gave the direct information to evaluate student idea. In this lesson, student idea was evaluated first (teacher accept the correct idea) after that asking student to probe the correctness of the statement. By using that fact, classroom discussion in this lesson tends to authoritative pattern.

From convection lesson, teacher push eliciting question to collect various answer from student and asking the high achiever student at the last to confirm the correct answer and strengthen the concept. Student in this lesson correlate the lesson with daily life experience, boiling the mung bean, as the model of water particle movement in convection. Teacher gave a much times so the student can discuss with their group about the phenomena. Rather than asking for the reason, teacher asking students for elaborating classroom agreement about the concept to extend the scientific concept. The elaboration focused with the convection tool that has been explored and teacher did not give another media, so the class often stuck in the discussion. The teacher strategy in this second episode brings the discussion more dialogic than the previous lesson.

In last episode, conduction topic, most of teacher question constitute to elicit various idea from student. Based on classroom observation, to make an effective and continued dialogue, teacher ask the low-achiever student first and discuss them with all students to find the flaws of the idea if it present and asking the high-achiever student to elaborate and strengthening the concept built. The next type of question that dominated in classroom was proving student idea. The meaningful science lesson can be fulfilled if the students understood why it can be happened and apply the essence of science to their daily life. Teacher often ask students to probe their statement, challenge it to extend the concept. Teacher used most of focusing and expanding feedback to the students. By focusing and expanding student idea, teacher can challenge them to think again their idea, find more proof that support their opinion, and elaborate their understanding and strengthening their scientific concept. In the end of the class, teacher showed the video about microscopic conduction as the media for confirming the properties of conductor and insulator that became controversial when students express the idea. When teacher faced the student problem and bring it to the whole class, it can enhance student participation in the classroom interaction. Based on fact at the third lesson, teacher had made dialogic atmosphere that appearing lot of explanation from student.

4. Conclusion

Transcript Based Lesson Analysis can be used to reflect instructional practice of teacher. By interpreting the teacher questioning, feedback, and student response in classroom, teacher can reveal the classroom discussion tendency whether it authoritative or dialogic and find the lesson gap from the objective. Through this study, teacher can reflect their practices and know how to improve their learning process for the better instructional practices. The better instructional practice from the teacher, the higher quality learning process can be conducted.
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