



Exploring Verbal Interaction of Non Language Subject Classroom

Eksplorasi Interaksi Verbal di Kelas Non Bahasa

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Abstract

Given the important role of verbal interaction in teaching and learning process and shaping students' attitude have been the subject of interest of several researchers. The aim of the study was to explore the pattern of verbal Interaction of non language subject at one of the fledgling international standard schools (FISS) in Padang. The site of the study is SMA 1 Padang. Participants of the research were 2 Physics teachers along with their students. Data of this study were drawn from direct classroom observation, and intensive interview; and these data were analyzed quantitatively and qualitatively. The result of study reveals that the highest occurrences of teacher-students interactions patterns are Explanation (E), Asking Question (AQ), and the category of Accept and Used of idea of Pupils (AUIP). Meanwhile, students-teacher interaction consisted of three categories, namely Classical Response (CR), Individual Response (IR), and student initiation (SI). Classical response was found to be the highest occurrence. It indicated that the teacher was still dominated the classroom interaction that needs to be shifted to students-oriented.

Keywords: classroom interaction; FIAC; pattern; verbal interaction, non-language, Physics

Abstrak

Peran penting interaksi verbal dalam proses belajar dan mengajar serta pembentukan sikap siswa telah menjadi perhatian beberapa peneliti. Tujuan dari penelitian ini adalah untuk mengeksplorasi pola interaksi kelas non-bahasa di salah satu sekolah berstandar internasional (FISS) di Padang. Lokasi penelitian adalah SMA 1 Padang. Partisipan penelitian adalah 2 guru Fisika bersama siswa mereka. Data penelitian ini diambil dari observasi kelas langsung, dan wawancara intensif; dan data ini dianalisis secara kuantitatif dan kualitatif. Hasil penelitian mengungkapkan bahwa pola interaksi tertinggi antara guru-siswa adalah Penjelasan (E), Tanya Jawab (AQ), dan kategori Terima dan Pakai Gagasan Murid (AUIP). Sementara, interaksi siswa-guru terdiri dari tiga kategori, yaitu Respon Klasik (CR), Respon Individual (IR), dan Inisiasi Siswa (SI). Respon Klasik merupakan kategori interaksi tertinggi. Ini menunjukkan bahwa interaksi dalam kelas masih didominasi guru yang perlu digeser ke berorientasi kepada peserta didik.

Kata kunci: interaksi kelas; FIAC; pola; interaksi verbal, non-bahasa, Fisika

INTRODUCTION

Verbal interaction is one of the aspects that can be studied in classroom interaction. It has been studied in language classroom (Allwright, 1984; Camargo, Camargo, Carvalho, & Oliveira, 2018; Mardiana, Zainuddin, & Gultom, 2019; Walsh, 2006). However, it is not only important in language class, but also in non language class, such as science class (Chin, 2006). One of the non language subjects that is offered as a school subject in senior high schools in Indonesia is Physics. It is generally viewed as one of very important subjects, beside Biology Mathematics.

Specifically, Adeyemo (2010) claims that Physics is an essential part of the intellectual life of a man. However, many students have become disinterested and even disillusioned with the study of science (Adeyemo, 2010). The underlying reason for this is often extremely complex since it involves math, logic, and language comprehension. Therefore, students should be given motivation to maintains an individual life long interest in learning Physics subject through verbal interaction.

Teacher's verbal interaction plays an important role to help students in developing their interest. The quality or students' achievement was assumed to derive from the process of teaching and learning in the classroom (Prabhu, 1992). Everything that happens in the classroom happens through a process of live person to person interaction (Allwright, 1984). Verbal interaction plays a very important function in learning process (Walsh, 2006) since it is the way to assist or help the learner. It is generally known as 'scaffolding' (Chaudron, 2006; Hamzah & Rozimela, 2018) that is designed to provide assistance to enable learners to accomplish a task and develop understanding (Gibbon & Hammond, 2001, p. 3).

Allwright defines the term of interaction in two perspectives, as "the process" and as a social matter. Interaction is the process whereby lessons are 'accomplished' (Allwright, 1984). It is product of action of all the participants, "acting reciprocally", acting upon each other (Thomas, 1996, p. 7). It is the collaborative exchange of thoughts, feelings, and ideas between two or more people resulting in a reciprocal effect on each other (Brown, 2000). Similarly, Amy defines classroom interaction as classroom behavior that refers to the interaction between the teacher and learners, and among the learners, in the classroom (Amy, 2001, p. 120).

The first major attempt to examine classroom interaction systematically was Flanders' Interaction Analysis categories (FIAC), which analyzed teachers' use of language in the classroom (Amy, 1997): Accepts Feelings (AF), Praises or Encourages (PE), Accepts or Uses Ideas of Pupil (AUIP), Asking Question (AQ), Explanation (E), Giving Direction (GD), Criticizing or Justifying Authority (CJA).

Given the important role of verbal interaction in teaching and learning process, and shaping students attitude in the classroom, classroom interaction has been the subject of interest of several researchers in language classroom (Camargo et al., 2018; Irona & Ratmanida, 2018; Taous, 2013; Pujiastuti, 2013; Pierson, 2008; Walsh, 2006; Wu, 1993; Amy, 1985). Research on classroom interaction has focused predominantly on teachers' teaching behaviors they exhibit. Amy (1985) found that the teacher talk took up more than 80% of the total talk, and that there is no instances in which the students initiated a question. Even, Wu (1993) reported that no students volunteered to answer questions in class. However the used of verbal interaction are important in developing students's language skill (Irona & Ratmanida, 2018; Taous, 2013).

On the other hand, some researchers also report verbal interaction in non language class (Chin, 2006; Kalu, 2008; Lim, Park, Ha, Lee, & Kim, 2019; Rabgay, 2014) in Science and Physics class. Chin (2006) focused only on question and answer not all classroom interaction. Meanwhile, Kalu (2008) who studied 516 students and 15

Physics teachers in Nigeria using Science interaction categories (SIC) to code and analyze interaction behaviours during physics lessons. Then, Lim et al. compared the effectiveness in classroom interaction (Lim et al., 2019). However, the previous researchers did not show a complete classroom verbal interaction in non-language/science class yet. Therefore, there is a need on linguistic exploration on verbal interaction in non language class since it play important role in learning process.

Thus, this study is intended to explore the pattern of interaction between teacher and students in Physics Class. It is expected to give information about language and non language classroom interaction. This current study used Flanders’ Interaction Analysis categories (FIAC) as proposed by Flander (1970) since it includes more complete information on interaction analysis.

RESEARCH METHOD

The research was conducted at Physic class at SMA N 1 Padang. This school is one of fledgling international standard schools (FISS) in Padang. The participants of this research were two Physics teachers along with their students purposively. The number of participants was 28 (twenty eight) students. This subject was actually taught by two male teachers teaching at different schedule. One of them taught this subject twice a week, the other teacher taught only once a week.

Data were collected from a variety of sources: classroom observation and intensive interviews with teachers and students. The compilation of these data is used to answer the research questions as shown on Table 1 below.

Table 1. Research Question and Data Sources

Research questions	Data sources
How do classroom interactions take place between T-S and S-T and?	Classroom observations followed by audio taped recording and teacher and Students’ interview

Classroom observation took place over three months. It observed what the teacher did in class (such as wrote on board, helped students to understand the lesson, helped students facing problems in understanding or doing the task, used of classroom aids, etc), what the teacher and students said in class (such as responded to the students asking questions, responded questions from the teacher, etc). The researcher also took notes on students’ response, attitudes and behavior during classroom communication practices. In addition, the researcher also paid attention to what happened during silent period in the classroom.

Systematic observation procedure was designed to find the phenomena under study. Data were collected in 5 stages as follows: (1) Recording classroom interaction using audio recording equipment; (2) Observing types of interaction and the use of languages reveal during the lesson, and took notes on those aspects; (3) Interviewing the teacher. The researcher conducted interview with the teacher to find out more about description of actions and events (Maxwell, 2013, p. 76).

RESULT AND DISCUSSION

This research adapted Flanders’ observation system, designed to code teacher and student behaviours during science lesson for the whole classroom interaction. To explore the classroom interaction, Flanders’ interaction Analysis category (FIAC) about the communication going on in the classroom was adapted. The FIAC was used as the initial categories to explore the classroom interaction. The categories were then developed along with the actual process of teaching and learning. The FIAC categories in this study were particularly on teacher’s talk and student’s talk.

Teacher-Student Interaction Pattern

Teacher-student interaction is defined as an interaction between teacher and students, which is limited to teacher talk. It comprises the following categories; Praise or encourage (PE), Accept or use idea of pupils (AUP), Ask questions (AQ), Explanation (E), Giving directions (GD), Responding students questions or (RSQ), Criticizing or justifying authority (CJA). The frequencies of each category that based on audio tape recording analysis are shown in chart below.

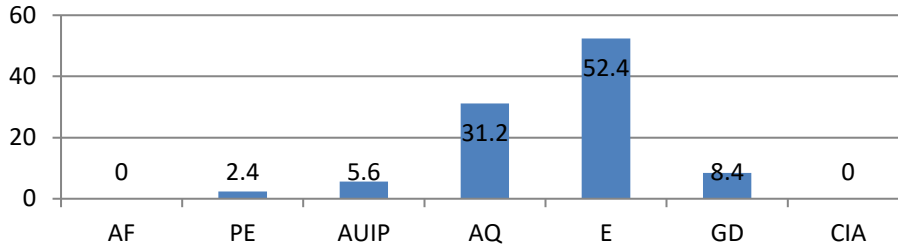


Chart 1. Teacher-Student Interaction Pattern

From all of interaction pattern between teacher and students, it reveals that explanation E is the most frequently appear in Physics class (52.4%). Explanation are the activity that involves teacher expresses opinion, gives facts about content or procedures. This category also includes the teacher expresses his/her own ideas or gives his/her own explanation. E (Explanation) is exemplified in the excerpt below.

- 28 T : *Lah kita lanjut. jka m_u kita ganti dengan $m_u = \frac{m}{Na}$.. massa molekul zzzzz.sudah tu,* E
kalau apak ganti lo K itu dengan ini, ya persamaan umum $k = \frac{R}{Na}$ coba kalian GD
masukkan!
 ” let’s continue, If I change m_u to $m_u = \frac{m}{Na}$, , ... then , if I change $K = \frac{R}{Na}$,
- 29 SS : *Tiga perzzzzz.* CR
“three per” zzzzz
- 30 T : *Teruskan sampai selesai* PE
“continue, till it completely finished”.
- Silent** students continued completing the rest of the problems, and one of the students wrote the answer on board

(excerpt 1)

As the example illustrates, the interaction between the teacher and the students contains two Es. It is identifiable in “lah kita ...” (turn 28, excerpt 1) and “Teruskan ...” (30, excerpt 1) These statements were expressed in Bahasa Indonesia.

The teacher gives the E when the teacher continued introducing how a conceptual content was generated to the class (see turn 28). He systematically showed the process of how a conceptual content was generated. He began introducing it, ”Let’s continue, If ...” (28, excerpt 8, site #A). Then, he led students to the next step of the process (28, excerpt 8). After that, he had students try the process (28, excerpt 1) which was responded by the students classically (29, excerpt 1). He finally let or encouraged students complete the process by themselves, “keep continue until it completely finishes” (see turn 30). This interaction could be formulated into E, because the teacher guided students to follow the lesson systematically.

The second most frequent pattern in the interaction is Asking question (AQ). Data show that AQ 78 times (31.2%) out of 250 occurrences of FIAC in teacher-students interaction. It comprises of asking questions about content or procedure based on teacher’s ideas, with the intent that students will answer. AQ is exemplified in the excerpt below.

16. T : *Relationship between the effective velocity temperature velocity (the teacher wrote this title on the board) dah? Ini hubungannya kita lihat berdasarkan yang pertama pelajaran kita semester 1 energi kinetic rata atau berdasarkan coba rumus energi kinetic dulu pelajaran semester 1?* E
AQ
17. SS : *setengah mp^2* CR
18. T : *jadi DK sama dengan setengah mp^2 . Nah sekarang kita buat CPS ya? kali massa sebuah zzzzz ini V.. tergantung apa lagi? ya zzzzz. Relation of temperature jadi relation temperature hubungan tekanan, coba yang nomor 4 kemaren? ya $C = [\frac{2}{-} + 3 K]$* AUIP
E
19. SS : $[\frac{2}{-} + 3 K]$ CR

(excerpt 2)

As the example illustrates, the interaction between the teacher and the students contains an AQ. It is identifiable in questions, *coba rumus energi kinetic dulu pelajaran semester 1?* “How about the energy Kinethic a topic of semester one?” (turn 16), *Tergantung apa lagi* “what does it depend on?” (turn 17), *coba yang nomor 4 kemaren? ya $C =$* “How about number four yesteday? (turn 18). These questions were expressed in Bahasa Indonesia, which was understandable. It can be inferred from the students’ response that the students responded classically to the teacher’s question

The third most verbal interaction conducted by the teacher is giving direction (GD) that reaches 8.4% of the total interaction. As Physics involve practical activity, such as, measuring, it requires teachers to give direction on doing practicum. Data of this study shows that GD appears 21 times (8.4%) out of 250. GD is exemplified in the excerpt below.

37. SS : *Betuul.* CR
38. T : *Sekarang please do exercise 5* GD
- Silent. majority of students were busy doing the task, few of them were talking with others or seeing their mobile phone while doing their tas1.
39. S : *kerjain modul pak?* SI

(excerpt 3)

AS the examples illustrates, the interaction between the teacher and the students contains two GDs. The GDs are identifiable in the commands or orders statements, *Sekarang please do exercise 5* “now please do exercise five”

Then, forth verbal interaction frequency is Accepts or Uses Ideas of Pupil (AUIP). Data in this study show that AUIP appears 14 times (2.4%) out of 250 occurrences of FIAC in teacher-students interaction. AUIP is exemplified in the excerpt below.

1. T : *..... Nah, sekarang ya, kita buat lagi, nah ini yang average, jadi average V4 kita peroleh dari, ya N1 kecepatannya?* E
[Now, we make, this is the average, so the V4 average is obtained from, yea N1 it’s velocity?]
2. SS : *Zzzzz* CR
3. T : *A..haa ini kita tambahkan, tambah ?* AUP
[all right, this is added, added to]

(excerpt 4)

As the example illustrates, the interaction between the teacher and the students contains an AUIP. It is identifiable in a statement *A..haa ini kita tambahkan, tambah?*, expressed in Bahasa Indonesia which translates into “all right, we add, added to” (see turn 3). In the occurrence of AUIP above, the teacher expressed the AUIP, when the students managed to answer the teacher’s question (see turn 1-3).

The last, verbal interaction is Praises or Encourages (PE) which reaches 2.4%. PE is exemplified in the excerpt below

20. T : *kalu apak ambiak limo factor pengalinyo atau derajat kebebasan limo berarti partikel itu bergerak* E
21. SS : *zzzzz.....* CR

22. T : *A...Tuuha....., apa tadi..?* PE
 AQ
 23. SS : *zzzzz.....* CR
 24. T : *yes, berarti dia bergerak translation and rotation* PE
 [excerpt 5]

As the example illustrates, the interaction between the teacher and the students contains two PEs. The PEs are identifiable in the short praise expression, a... tuuha (see turn 22), a Minangkabau expression which translates into “that’s it”, and the expression “yes” (see turn 24). In the first occurrence of PE above, the teacher expressed the PE when the students managed to complete the teacher’s unfinished statement (see turns 20-21). Although the students’ response was not clearly audible, it can be inferred from the teacher’s response (line 22) that the students attempted to complete the teacher’s statement. After saying *A..tuuhaa*, the teacher asked the students to repeat what they had said.

However, the researchers did not find teacher-students interactional that involves Accepts Feelings (AF), Criticizing or Justifying Authority (CJA), and Responding to Students’ Questions or Problems (RSQP). The inavailability of accept feeling may be influenced by the characteristic of the subject that involve facts or exact.

Students-Teacher Interaction

Student- teacher interaction in this study is defined as an interaction between students and teacher, which is limited on students talk. It comprises of two categories, student’s response and student’s initiation (Flanders, 1970). The category of student’s response is then divided into two more specific categories, namely Classical Response (CR) and Individual Response (IR). Therefore, the categories that are formulated for student-teacher interaction will consist of three categories namely, classical response (CR), individual response (IR) and student’s initiation (SI), as described below.

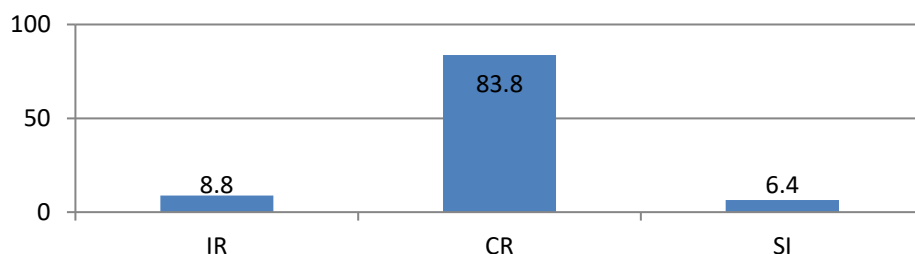


Chart 2. Student-Teacher Interaction Pattern

From all of interaction pattern between students and teacher , it reveals that explanation CR is the most frequently appear in Physics class 57 times (83.8%) out of 68 occurrences of FIAC in students-teacher interaction. CR is exemplified in the excerpt below.

- 20 T : *Ya. Jadi gaya tarik menarik antara satu atom dengan atom yang lainnya* E
 21. SS : *kecil* CR
 22. T : *sangat kecil sekali .. ya small. Jadi interaction course-nya is small, ya, sangat kecil sekali. So, sehingga dia..di.. [abaikan]* AUIP/
 E
 (excerpt 6)

The CRs were seen as a means to indicate that the students responded teacher’s questions, completed the teacher’s statement in chorus, and completed the teacher’s statement together with the teacher. It also indicates that the meaning had been negotiated since the teacher extended his or her explanation as the students contributed their ideas, which was affirmed by the teachers. This consequently means that the

relationship between the participants was unequal, in which the teacher's role was dominant, i.e. as one who controls the interaction

The second most frequent pattern is in the interaction is individual response (IR). This category is used to indicate talk by a student, in which the student expressed individually in response to a teacher, i.e. in answering a teacher's question spontaneously, or in answering teacher's question as appointed by the teacher. Data of this study shows that IR at site #A 6 times (8.8%) out of 68 occurrences of FIAC in teacher-students interaction. IR is exemplified in the excerpt below.

43. T : *dah yang terahir, internal energi jadi apa itu energi dalam internal.. ada yang bisa jawab?* AQ
44. S : *energi rotasi, translasi dan vibrasi* IR
45. T : *ya, ada yang lain?..* PE/AQ
- (excerpt 7)

As the examples illustrates, the interaction between the student and the teacher contains IR. The IR was identifiable in the student's individual response to the teacher's question, *energi rotasi, translasi dan vibrasi* (turn 44) The IR was expressed in *Bahasa Indonesia*. It happened when the teacher asked a question for (turn 43). One of the students appeared spontaneously to give a response (see turn 45), it was assumed that the student's response had been relatively appropriate.

The third most verbal interaction of student teacher interaction is Student's Initiation (SI). Data of this study shows that SI 5 times (6.4%) out of 68 and 5 times (6.0%) out of 83 occurrences of FIAC in teacher-students interaction. SI is exemplified in the excerpt below.

1. S : *Tanya pak? Untuk rumus energi genetic ini pak a disitu kan kita bisa pakai P dengan nrp zzzzz, terus kalau cari energi dalam jadikan Fn x nrp nya jadi pembulatannya berbeda tu pak a jadi hasilnya* SI
2. T : *bedanya terlalu besar?* AQ
3. S : *ndak ribuuannya pasti sama* IR
- (excerpt 8)

As the example illustrates, the interaction between the student and the teacher contains SI. It is identifiable in the question, "*Tanya pak? Untuk rumus energi genetic ini pak a disitu kan kita bisa pakai P dengan nrp zzzzz, terus kalau cari energi dalam jadikan Fn x nrp nya jadi pembulatannya berbeda tu pak a jadi hasilnya*", *Can I ask a question, sir?*" (turn 1), this question was expressed in *Bahasa Indonesia*. The student expressed the SI when she encountered a problem in carrying out a task. She then approached the teacher for a help.

It may be concluded that the students-teacher interaction category consists of three categories, namely classical Response (CR), Individual Response (IR), and student initiation (SI); where the classical response (CR) was found to be the highest occurrence. It indicated by the way of the students responds to teacher's question that can be classical response to teacher's question or the teacher direct the question to specific student (individual response). However, the dominant interaction is still classical response.

Discussion

This research find that explanation is the highest pattern of verbal interaction conducted by teacher and students in non language classroom interaction. Explanation is the activity that involves teacher expresses opinion, gives facts about content or procedures during classroom activity. This category also includes the teacher expresses his/her own ideas or gives his/her own explanation. With regard to this, Amy (1995) makes a rough distinction between procedural explanation and content explanation. The former refers to explanation regarding the organizational aspect of the lesson, for

example when the teacher explains how an activity should be conducted or gives instruction about homework. The latter refers to the explanation of the subject content of the lesson (1995, p. 30).

On the other hand, in language class the highest verbal interaction giving direction. It is reported that English language class has more giving direction (GD) interaction (Mardiana et al., 2019). In language class, direction can be about language function, practical exercise related to language skill, reading, writing, listening, and listening procedure.

The second dominant verbal interaction used by the teachers is asking question as evidenced in the classroom. It is also supported by the interview transcripts, appears to conform to the claim that the questions asked by the teacher was not aimed to evaluate what students know as in traditional learning. This question and answer mostly used by the teacher to elicit what students think and to help them construct conceptual knowledge (Chin, 2006). It also a kind of scaffolding by using verbal interaction. Based on the finding, it can be found that the teacher was fully aware that students not only need a current or the latest concept but they also need the previous related one. It is also supported by Amy that questions are very important aspect of classroom talk (Amy, 1995).

Moreover, this research also discovers that teachers are still dominated the classroom interaction in science class. This finding confirm previous researchers that in science class teachers tend to dominate verbal interaction (Rabgay, 2014). Similarly, language teachers also dominated verbal interaction in language classroom are reflected in studies carried out by Amy (1985) who studied two ESL classrooms and found that the teacher talk took up more than 80 percent of the total talk, and that there is no instances in which the students initiated a question. Wu (1993) analyzed four English teachers who teach in two Secondary Schools in Hongkong, reported that no students volunteered to answer questions in class. In fact, verbal interaction plays important role in developing students' language skill (Taous, 2013) therefore various verbal interaction are implemented.

CONCLUSION

This study was undertaken to explore the pattern of of non language classroom interaction that takes place between teacher-students, student-teacher. This reseach discover that explanation (E) and question and answer (QA) dominated classroom verbal interaction. The second highest category was AQ followed by AUIP. These three categories appear to interweave with each other frequently. However, teachers were mostly aware that this verbal interaction mostly used as a kind of scaffolding. They do not only explain the latest concept but they also guide them with the previous related concept. For further research, verbal interaction might be used to see the effective classroom management of the teacher by comparing their teaching experience and preservice teacher.

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