

SCIENTIFIC APPROACH: AN ENGLISH LEARNING-TEACHING (ELT) APPROACH IN THE 2013 CURRICULUM

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Abstract

The primary focus of the study is to investigate the practice of a teacher implementing scientific approach in English learning-teaching in one junior high school in Bandung and reveal the difficulties encountered by the teacher in the process. In particular, this study portrays the occurrence of activities and the quality of the teaching process through pedagogical microscope. This study employs a descriptive-qualitative research design. The data were procured from classroom observation, teacher's lesson plan analysis and interview. Those data were analyzed by Pedagogical Microscope instrument (Suherdi, 2009). The findings show to some extents. First, the finding shows that all the five stages of scientific approach were completely executed in four meetings of delivering one material or one Basic Competence (*KD*) eventhough the five stages were not always conducted in every meeting which was different from lesson plan made. The teacher provided plenty activities in each stage. Scientific approach implemented by the teacher could engage students in active learning activities and develop various students' contributions. The ways the teacher led the active learning activities and students' contributions were varied depending on the stages. Scientific approach implemented successfully fostered students' critical thinking and developed high-thinking level of students' learning behaviour. Second, the difficulties encountered by the teacher during implementation were the problem on the students with low English proficiency, time allotment, and the teacher's teaching management.

Keywords: ELT approach; scientific approach; the 2013 Curriculum; teaching practice; pedagogical microscope

INTRODUCTION

Indonesia's Educational Curriculum has changed for several times as an attempt to improve its education quality. The latest curriculum, KTSP (*Kurikulum Tingkat Satuan Pendidikan*), Indonesia's curriculum which had been applied since 2006, is replaced by the 2013 Curriculum.

Some of the highlighted aspects in this new curriculum are in the process of learning and the aspects assessed which cover integrated attitudes (affective), skills (psychomotor), and knowledge (cognitive) (Mulyasa, 2014, p.68-69). Learning process in the 2013 Curriculum is mainly concerned on constructive and contextual learning in which learners are used to constructing their own knowledge based on the meaningful context for them (Kemendikbud, 2013b).

Practically, this learning process will lead learners to do 'research' activity such as observing, experimenting, and associating.

Those learning activities are then covered into a scientific-based process (Abidin, 2014, p.17; Hosnan, 2014, p.39). Thus, learning methods promoted in this new curriculum are learning process which uses scientific principles in its process, or the method that is included into scientific approach. Unfortunately, in some particular subjects, material, or situations, this scientific approach might not be implemented procedurally.

Scientific approach is promoted as the main learning approach for all subjects, including English, in the 2013 Curriculum (Abidin, 2014). It is claimed that scientific approach is "a more effective learning approach to reinforce students' learning outcomes; learner is an active subject of learning or learner is subject of learning process" (Permendikbud No.68, 2013).

Knowing how to apply scientific approach in English learning-teaching is a need and becomes significant to fulfill the

requirement of implementing the 2013 Curriculum. Since scientific approach has not been familiar in language teaching, specifically in English learning-teaching, it maintains a question on “how is scientific approach applied in English learning-teaching” especially to meet demands of the new curriculum and ELT itself.

Derived from the preceding elaboration of issues, this research is designed to investigate the practice of scientific approach of the 2013 Curriculum in English learning-teaching in junior high school to reveal how and what activities conducted and what difficulties faced by the teacher in implementing scientific approach in English language teaching.

The 2013 Curriculum

The 2013 Curriculum has been administered nationally in the first two grades in each level of high school and elementary school in 2014. The purpose of the 2013 Curriculum, as stated in Permendikbud (Regulation of Indonesia Ministry of Education and Culture) No 68/1/2013, is to prepare Indonesian people to have life skill competence as an individual and citizen who are faithful, productive, creative, and able to contribute to society, nation, and mankind life.

As stated in Permendikbud No. 68/2/2013, theoretically, the 2013 the 2013 Curriculum is learner-centered curriculum which is standardized by the government to aim life skill competences.

To assist the demand of learning process in this curriculum, Abidin (2014) states that “there are five steps of learning activity that must be conducted in learning process: (1) observing scientifically, (2) developing intellectual curiosity through questioning, (3) constructing critical thinking, (4) experimenting, and (5) communicating” (p.122). Since “the 2013 Curriculum stresses on modern pedagogic dimension of learning using scientific approach”(Kemendikbud, 2013b), therefore scientific approach is emphasized as one of the main learning approaches in the 2013 Curriculum.

Scientific Approach in the 2013 Curriculum

Scientific approach is one of the learning approaches promoted by the 2013 Curriculum. This approach also emphasizes

on process of searching knowledge and students as subject of learning through applying science principles. Since the students become the subject of learning, the learning method promoted is ‘learning by doing’ which is largely promoted by an American educator and philosopher John Dewey (1859-1952).

Since learning is a search for meaning, learning objectives should be established that connect to important issues for the student.

In addition, scientific approach in learning process means learning process which is organized to make learners actively construct concepts, laws, or principles through activities of observing, hypothesizing, collecting data, analyzing data, drawing conclusion, and communicating the concepts, laws, and principles found (Hosnan, 2014, p.39; Saddhono, 2013, p.440). It is expected to encourage students searching knowledge from multisources through observation and not to be given by teachers only. Scientific approach also emphasizes on communicating skill as well as scientific principles. As described by McCollum (2009),

A learning approach can be regarded as scientific approach if it covers some criteria explained by Ministry of Education and Culture. They are: (1) the teaching materials come from facts or phenomena that logically can be explained, (2) teacher’s explanation, and teacher-student interaction are based on objectivity, (3) teaching materials build students’ critical thinking and accuracy in identifying, understanding, and resolving problems, (4) it encourages and inspires students to think hypothetically in looking at difference, congruence and links to each learning material given, (5) it fosters students to understand, apply, and develop pattern of rationale and objective thinking towards learning materials, (6) it should be based on concepts, theories, and empirical facts, and (7) learning objectives are composed in simple, clear and attractive presentation way (Kemendikbud, 2013a).

Stages of scientific approach

The stages of learning in scientific approach in the 2013 Curriculum context generally are divided into five main stages. They are observing, questioning, experimenting, associating, and communicating. (Abidin, 2014, p.132; Hosnan, 2014, p.37; Kemendikbud, 2013; Mulyasa, 2014;

Suharyadi, p.1350; Saddhono, 2013, p.441; Permendikbud No. 103 Year 2014). Each of the stages will be elaborated.

Observing

The first stage is observing. Observing is “a deliberate and systematic activity to study a social phenomenon or real object through utilization of the five sense” (Hosnan, 2014, p.40) and involving descriptive skill (Halonen, et al., 2003, cited in Mutaqqin, 2015). In this stage teacher contextualizes learning activity for students in the classroom.

In language learning-teaching, the materials in form of fact that can be observed, as described by Kemendikbud (2013b) for instance are interpersonal or transactional text, specific text, functional text, and linguistic features of a text, video, or recording. Teaching materials in form of concepts are for instance social function of a text, while the material in form of procedural can be structure of the text observed. The activities can be watching or listening a video of conversation, watching a short movie or video, reading story book, text, magazine, brochure, or posters. Besides, “repeating/copying/imitating guided examples”, in which the students do not only receiving information but also they can repeat and practice the activities provided by the teacher (Muttuqin, 2015), are also covered in activities of observing stage. Therefore, observing stage becomes a vital role in leading students to the next stage, so that by doing the activities students’ curiosity is also built here.

Questioning

The second stage is questioning. Questioning is the process of constructing knowledge in form of concepts of social function in particular material, procedure of structure text through group discussion or class discussion (Kemendikbud, 2013; Abidin, 2014; Mulyasa, 2014). Based on the regulation of Ministry of Education and Culture (Permendikbud No 81a, 2013) in this stage, students pose questions from what have been observed in the previous stage for gaining more information and comprehension about the material.

The question expected in this stage also must requires criteria of good question: (1) compact and clear, (2) inspiring, (3) focus on a

particular subject, (4) probing and divergent, (5) valid and reinforced question, (6) increasing cognitive level, and (7) promoting interaction. Thus, in this stage, students pursue their own knowledge to construct a concept, principle, procedure, theory or law of the material learned. It can be obtained through classroom discussion, or group discussion (Abidin, 2014, p.137; Hosnan, 2014, p.40; Kemendikbud, 2013b).

Experimenting

The third stage is experimenting. In this stage, students get real or authentic learning, for example they have to do experiments. As stated in the Regulation of Indonesia Ministry of Education and Culture No. 81/2013, in doing the experiment, the students have to read other sources or collect extra information by several ways such as, doing experiment, observation, and interview, reading texts or books or other sources or functional texts. In addition, experimenting might be started by visiting new places, try new things, seek information through various sources (Dyer et al., 2011) It is intended to develop the ability to communicate and collect information through various sources. The teacher provides learning sources, worksheets, media or experiment tools. Therefore, the roles of teacher in this stage are as director and as the controller who plan and manage the activity of collecting data and its process (Brown, 2001, as cited in Nugraha, 2015). The teacher may give feedback during the process of the activity.

Associating

The fourth stage is associating. In this stage, students and teacher are engaged into learning activities, such as text analyzing, and categorizing.

The information or data that have been collected from the previous activity, experimenting, must be analyzed to draw conclusions. Students then will process the information from the teachers and draw the conclusions out of that information. As stated on the Policy of Indonesia Ministry of Education and Culture No. 81a/2013, associating process must through: (1) processing information that has been collected from the result of experimenting and observing activity and, (2) processing the information collected to find solutions from

variety of sources that have different opinions to the contrary. Thus, students are expected to be able to relate the result of learning or experimenting to the reality they find.

Communicating/Networking

The last stage is networking. In this stage, students communicate, demonstrate, and publish their learning product as a form of collaborative learning in which they face various changes. In collaborative learning, the learners interact with empathy, mutual respect, and receive a deficiency or excess, respectively in order to create social interaction to gain meaningful learning (Wahyudin, 2015). The teacher gives feedback, suggestions or more information related to students' work. There are interactions between teacher and students and among the students.

In this stage, teacher holds role that provides correct information and the reciprocal scaffolding (Brown, 2001, cited at Nugraha, 2015). This can be done through dialogue and discussion between teacher with the students. Thus communicating stage is in which students report or deliver the results of the observing, experimenting and concluding based on the result of the analysis orally or written or in other forms to let others know what learners have learned (Abidin, 2014; Arauz, 2013; Hosnan, 2014, p.77; Mulyasa, 2014).

METHOD

To meet the purposes of the study, the research employed descriptive qualitative research design since it places stress and describes in detail of what goes on in particular events or situations or activities rather than comparing the effects of a particular treatment (Burns, 1995, p.12; Creswell, 1994, 2012; Fraenkel, Wallen, & Hyun, 2012, p.426).

In accordance with the research design and research questions related to analyzing teaching practice, classroom discourse analysis is employed as the main approach to investigate the stages of scientific approach and to seek what happen in every stage rigorously. The significant reason for using classroom discourse analysis in this study is its level of accuracy in describing classroom activities which can reveal the intricacy

meaning hidden behind teaching-learning practice (Suherdi, 2010: 9). The classroom discourse analysis approach chosen in this study is systemiotic approach, using **Pedagogical Microscope** as the tool to analyze the elements of teaching learning process. As stated by Suherdi (2009), classroom discourse analysis, specifically Pedagogical Microscope is considered to be an ideal instrument to give a holistic and in-depth understanding of what actually happens in classroom and how the teacher implements scientific approach in teaching English. It can be seen through the elements of teaching-learning process such as teacher-students' interaction, and students' contributions (students' learning behavior and students' language characteristic) appear in every stage (Suherdi, 2009, p.12).

Site and participants of the research

This research was conducted in one public junior high school in West Bandung. The participants who were involved in this study were one teacher and 38 students. The teacher is a national instructor of the 2013 curriculum and she has been using the 2013 curriculum and implementing scientific approach in her teaching-learning activities.

Data collection techniques

The data of this study was collected through three main techniques: classroom observation, document analysis, and interview.

Classroom observations were conducted twice a week started from 2nd to 12th November 2015. The detail was presented in the table as follows:

Table 1. Classroom Observations

Teacher 1 (T1)
• Monday, 2 nd November 2015
• Thursday, 5 th November 2015
• Monday, 9 th November 2015
• Thursday, 12 th November 2015

During this classroom observation, videotaping, field-notes, observation sheet were employed as the main techniques of collecting data in observation. The researcher played role as non-participant observer which means, the researcher was an 'outsider' who visited the site, videotaped and recorded notes without becoming involved in the activities of participants.

The document analyzed is the lesson plan, specifically the learning activities and its *Kompetensi Dasar* and *Kompetensi Inti* stated in teacher' lesson plan of one material. The lesson plan was collected before the teacher conducted teaching practice.

Interview is necessary to reveal how scientific approach is perceived by teachers and to seek the depth of teachers' perception of the difficulties faced towards scientific approach in the 2013 Curriculum in teaching English. It was administered in the last day of the research. The interview was recorded to be then transcribed.

Data analysis techniques

The data analysis was conducted into three stages, namely: classroom observation, written document analysis, and interview.

The data gained from classroom observation were in two forms, which were the transcription of videotaped observation and the description of classroom situation in observation process from observation sheet and field note (see Appendix). Those data were corroborated each other to answer the question of how scientific approach is implemented in teaching English. The transcription of videotaped classroom observation was analyzed using **Pedagogical Microscope instrument** (Suherdi, 2009) which include analysis of teacher-students' interaction and students contribution seen through Bloom's Taxonomy. Bloom's Taxonomy (see Appendix) is used in assessing the learning outcomes and in portraying detail of students' contribution in each stage.

The data obtained from teachers' lesson plan were analyzed in term of their content.

The content such as indicator, objectives and learning activities were analyzed to find out whether the aspects in lesson plan has met the criteria of scientific approach's principles.

The analysis of interview was conducted in several steps. First, the data from interview were transcribe. Second, teacher's answers were categorized based on the focus of study. Third, the data were interpreted and concluded to answer the second research question of this study that is difficulties faced by the teacher in implementing scientific approach.

FINDINGS AND DISCUSSIONS

The findings and discussions were divided into two main parts. The first part presents the implementation of scientific approach in English learning-teaching by the teacher of one junior high school in Bandung. The second part presents the difficulties encountered by the teacher in implementing scientific approach in English learning-teaching.

The implementation of scientific approach

The teacher taught one material using scientific approach completely in four meetings. It was conducted twice a week started from 2nd November to 12th November 2015. Referring to the five stages of scientific approach, the teacher did not apply all of the stages in every meeting eventhough in the lesson plan made, the stages should have been conducted in every meeting. The observation results of the four meetings are depicted in the following table:

Table 2. Stages of Scientific Approach in the Classroom

Stage of Scientific Approach	1 st meeting	2 nd meeting	3 rd meeting	4 th meeting
Observing	V	V	V	-
Questioning	V	V	V	-
Experimenting	V	V	V	V
Associating	V	V	-	V
Networking	V	V	V	V

According to the table above, there was a significant discrepancy of the learning activities conducted with the lesson plan. However, Reiser and Dick (1996) argue that teacher can change teaching strategy to achieve teaching-learning goals. Nevertheless, all stages of scientific approach were still

conducted completely by the teacher in delivering one material or *Materi Pokok*.

Observing

Observing, specifically in language learning context, is the stage of obtaining information through observation of the object or

phenomenon in form of video, picture, text, or social or natural phenomenon (Abidin, 2014, p.132; Hosnan, 2014, p.40; Kemendikbud, 2013; Mulyasa, 2014). In the practice of the participant (Teacher), the teacher conducted observing activities through various activities to start teaching the material. They are observing short dialogues and their pictures,

observing pictures and their description, and watching Video.

From the activities conducted, the objectives of observing stage are attained. It is proven by the interactions happened in the observation stage. The table below shows the distributions of classroom interaction in observation stage:

Table 3. Distribution of classroom interaction pattern (exchanges) in observing stage

Category of exchange	Exchange		Observing Stage			TOTAL
			Observing 1	Observing 2	Observing 3	
Knowledge exchange	Teacher's initiated exchange	JL	2	7	5	14
		TB	15	20	24	59
		TU	26	24	24	74
	Students' initiate exchange	JL	-	--	-	-
		TB	3	-	-	3
		TU	-	-	-	-
Total					150	
Action Exchange	Teacher's initiated exchange	TA	1	1	3	5
		MA	26	25	5	56
		SA	-	-	-	-
	Students' initiate exchange	TA	2	-	3	5
		MA	-	-	-	-
		SA	-	-	-	-
Total					66	
Skill exchange	Teacher's initiated exchange	TK	1	-	1	2
		MK	-	-	-	-
		SK	2	13	-	15
	Students' initiate exchange	TK	4	-	-	4
		MK	2	--	-	2
		SK	-	-	-	-
Total					121	
TOTAL			89	90	65	237

The table above shows the teacher's and students' role in observing stage. It can be seen from the exchanges appeared. The total exchanges in observing stage is 242 exchanges, which more than the half has been identified as knowledge-oriented exchanges.

The teacher's genuine (TB) and display questions (TU) means that the teacher gave questions about the about students learning experiences and students interest of the materials (TB) and questions about previous learning materials to relate materials in every meeting (TU). It is relevant to the objective of observation stage that it is aimed to get students' prior knowledge and to check students' learning ability and readiness. It shows that the teacher contextualized and gave a meaningful learning activity, because he brought the learning material in accordance with students' learning ability. (Permendikbud, 81A, 2013; Hosnan, 2014, p.40; Abidin, 2014; Mulyasa, 2014).

MA means that teacher gave direction for students such as directing the students to observe and examines to the material. SK means that teacher asked students to perform language skill such as repeat teacher's pronunciation. Here, the teacher roles as the instructor, the fact that teacher instruction or MA (23,2%) is the third of dominant exchanges and SK (6,3%) is the fourth exchanges in this stage suits with the characteristic of this stage where the teacher should roles as the instructor in observing activity.

Another aspect that is considered to be important to see what happened and what kind of students' leaning behaviors appeared in observing stage is students' contribution. To sum the students' contribution, here is the table of students' contribution:

Table 4. Students' Contribution

Learning Behavior	Obs. 1	Obs. 2	Obs. 3	Total
C1	65	83	72	220
C2	4	-	3	7
C5	-	-	6	6
A1	2	1	10	13
A2	-	1	-	1
P1	22	1	25	48
P2	-	4	-	4
P3	-	-	7	7
TOTAL	93	90	123	306

In observing stage, students learning behaviors are still in low level. In cognitive aspects, the activities conducted in observing stage mostly requires students to recall or recognize information (C1) and comprehend meaning (C2) such as exhibit memory of previous material learned through question-answer activity or comparing and describing pictures, short dialogue and video. In psychomotor aspect, the activities conducted mostly got students to watch video and repeat teacher's action (P1), and few of them got students to carry out task from written or verbal instructions (P2; P3) such as copy an action or repeat teacher's utterance and reproducing activity such as write and read from video or text given to be observed.

However, there is interesting data that synthesizing (C5) and articulating (P3) that are categorized into high-thinking level appeared in this stage. It happened because in the third meeting, observing activity was derived from students' homework. They composed the list of daily activities then presented (TK & MK) to be the introduction of that day's materials then the teacher added videos to complement observing activity.

In the first meeting, observing stage is reflected in instructional activities in lesson plan (LP 1) in which **students observed short dialogues and its pictures and they wrote down what was new for them**. The excerpt of the lesson plan is as follows:

Observing

- Students observe short and simple dialogues which contain expressions of asking and stating numbers.*
- Students write what they do not know related to the pictures and dialogues that they see and read.*

(Data 1#, LP 1, 03/11/2015)

In the practice, the students read the dialogues on the book which each dialogue was illustrated by a picture. The teacher gave opportunity for students to practice observing and get important information through reading dialogue, and looking the picture as applied in scientific approach.

The students were also asked to read the dialogue aloud. In the next meeting observation, the Teacher also conducted observing stage by some techniques. As stated in the lesson plan and the practice observed, the first activity is **showing some pictures of people with different professions**. The second activity is **observing daily activities of specific profession that is zookeeper**. The last is **showing a video about daily activities of a man**.

By showing the picture of some people whose the professions are different and teacher display questions (TU), it was aimed to give an overview of what peoples usually do. The excerpt is as follows:

12	TU				And then, who is beside Cristiano Ronaldo?
	TB	W	C1	Ss	Al-Ghazali
13	TU			T	Who is he?
	TB	W	C1	S4	Actor
	JL			T	An actor, right!
	TB	Ph	C1	S5	Ahmad Dani's son
	JL			T	Yes, Ahmad Dani's son
14	TU				What does usually Al-Ghaza do?
	TB	Ph	C1	S6	Plays music
	JL			T	Yeah, playing music.
	x1				Because he s also DJ, right?
	TB	W	C1	S1	Acting
	JL			T	Oh ya, he usually acts.
15	TB				okay, anybody want to be like... like Al-Ghazali?
	JL				No
17	TB			T	No? Why?
	TB				He is very handsome right?
	JL	W	C1	Ss	Yes
18	JL			T	He is very talented too.
	KaJ	W	C1	Ss	Yes

(Observation Transcript#2, 05/11/2015)

The conversation above was aimed to help students to identify the picture and to

bridge them to the topic being discussed. Through the pictures shown and teacher's questions (TU & TB), students were also directed to observe the social phenomena that happen around them and to check whether the topic is interesting and familiar to the students or not. It was intended to contextualize the object being learnt accorded with students' ability, existing knowledge, interest as the purpose of observing stage in scientific approach.

In meantime, **the teacher also asked the students to repeat the teacher.** By asking the students to repeat the sentences, the teacher also gave examples and how to state it. The teacher successfully let the students used their sense to observe not only through looking, reading but also through listening

The next activity is **that teacher showed a video (song) of daily activities.** Video in language teaching is suggested as the form of material to be observed.

After watching the video, the teacher reviewing the video by asking what activities that were mentioned in the video. **The teacher, then, asked the students to write the sentences appeared in the video.** Some of them are asked to write the sentences on the whiteboard.

The fact that the teacher frequently asked the students to repeat, rewrite and read aloud as efforts to elicit students' learning experience is relevant to be done in observing activity to build a firm based to the learning activities.

Questioning

The second stage is questioning. Questioning is the process of constructing knowledge in form of concepts of social function in particular material, procedure of structure text through group discussion or class discussion. In the practice, questioning phase was conducted as continuation of the observations. The Teacher conducted questioning stage in some forms of activities, such as classroom discussion started by teacher's questions (TU) to trigger students' critical thinking and students' question, and in form of guessing game.

In the activities of questioning stage conducted in each meeting, the teacher mostly led the students in classroom discussion to come up with questions where the teacher

posed. It is seen from the distribution of interaction which was dominated by teacher's display questions (TU) to prompt students generating questions. However, the fact that the numbers of students' initiated exchanges are significant in the skill exchanges confirms that the teacher provided opportunities for students to perform more initiative activities (MK) during the teaching process. This is important to indicate that the teacher was successfully bringing scientific approach's characteristic in which students have the main role in leading their own learning process.

In the Table 5, 152 exchanges have been identified to appear in questioning stage and they are dominated by knowledge-oriented exchanges (102 exchanges) and few of them are skill (30 exchanges) and action (20 exchanges) oriented exchanges. It shows that learning activities related to cognitive domain (knowledge) still become the focus of this stage. Teacher's display questions (TU) mostly appeared in the classroom discussion.

In the meantime, students' contributions in questioning stages of the first and second meetings seen from students' linguistic characteristics were mostly in the form of word and phrase responses, while in the third meeting, students' contributions were dominated in form of sentence (question).

Students' learning behaviors appeared in this stage was various. This variation is influenced by the way teacher led learning activities, such as discussing structure of present tense in the dialogue or recalling students experience related to the material. Table 6 depicts students' contribution from the viewpoint of students learning behaviors. From the Table 6, students' contributions were dominated by recognition information (C1) and the questions were around recalling students' prior knowledge. However, there is an interesting fact that the number of students' high thinking level contributions (C3 & C4) in this stage is high.

The purpose of questioning stage is to emerge students' curiosity, attention, and critical thinking so that students can ask high thinking level question and good question. In the practice, teacher's strategy to foster students' high thinking level learning behaviors were by prompting students' responses towards the materials being learned or posing prompt questions. It was successful, indicated by the presence of high thinking

level behaviors in the classroom discussion (C3 & C4). Students' high thinking level behaviors were because the teacher posed analyzing questions, where the students compared and broke down the concepts of present tenses, such as asking the students to comparing the writings and dialogues provided in the textbook.

In the next meeting, after listening to some examples of daily activities of several students, the teacher was going to show a picture to the students. She invited the students to ask her with 'yes no' question to guess the picture and named the activity as Guessing Game.

56	TK MK TK	W	C1	T S8 T	No, it just has 2 legs. Chicken? Chicken? No. An animal, and then has 2 legs. It can be big or small.
57	JL				Does it live in the water?
58	MK TK JL	St	C1	S12 T	Does it live in the water? No. I'll give you a clue...
59	JL				Does it fly?
60	MK TK	St	C1	S30 T	Does it fly? No.

(Observation Transcript#9, 05/11/2015)

52	SK ro			T Ss	Okay, please ask me questions! ...
	rph MK	St	C1	T S27	Seperti quiz siapa dia, kan, ayo come on. Is it an animal?
53	TK SK			T	Is it an animal? Yes, that's right. Good! Next!
54	MK	St	C1	S35	Is it small?
	TK			T	Is it small? It can be small it can be big.
55	MK	St	C1	S29	Does it have 4 legs?

The guessing game is teacher's strategy to initiate and conduct an interactive learning teaching process. In this game, the students were required to generate questions and it could reach the learning goal in that stage. This game created positive learning environment to the students, especially to prompt the students' critical thinking and curiosity. Within this activity, the students practice their skill in generating questions (MK). It was successfully inviting almost students to pose questions.

Table 5. Distribution of classroom interaction pattern (exchanges) in questioning stage

Category of exchange	Exchange	Classroom discussion 1	Observing Stage		TOTAL	
			Classroom discussion 1	Guessing Game		
Knowledge exchange	Teacher's initiated exchange	JL	9	7	18	
		TB	8	8	20	
		TU	26	31	63	
	Students' initiate exchange	JL	-	-	-	
		TB	1	-	1	
		TU	-	-	-	
Total					102	
Action Exchange	Teacher's initiated exchange	TA	2	4	6	
		MA	6	6	12	
		SA	-	-	-	
	Students' initiate exchange	TA	2	-	2	
		MA	-	-	-	
		SA	-	-	-	
Total					20	
Skill exchange	Teacher's initiated exchange	TK	1	-	1	
		MK	-	-	-	
		SK	10	3	17	
	Students' initiate exchange	TK	-	-	-	
		MK	1	-	11	
		SK	-	-	-	
Total					30	
TOTAL			66	59	37	152

Table 6. Students' Contribution

Learning Behavior	Ques. 1	Ques. 2	Ques. 3	Total
C1	43	63	43	149
C2	7	5	1	13
C3	22	7	-	29
C4	8	4	-	12
A1	1	3	1	5
A2	-	3	8	11
P2	8	4	-	12
TOTAL	94	82	60	

Different from classroom discussion which were various and many of the students generated questions requiring analysis, the questions produced by the students in guessing game were identical in which they were generally in group of low-thinking level questions since the questions only required 'yes'/'no' answer. In guessing game activity, the teacher invited students as much as possible pose questions. The teacher said that

T: ...the purpose of stage in every meeting can be various. For example, in the classroom discussion I wanted to get the students produce high-thinking level questions so that I mostly initiated asking them question. But, in guessing game, I needed them making questions as much as possible.

(Interview#1, 5/11/2015)

Thus, as confirmed from the interview, the objective of questioning stage in this activity was different from the first two meeting.

Experimenting

The third stage is experimenting in which students get real or authentic learning; they have to do experiments. In doing the experiment, the students have to read other

sources or collecting extra information with several ways like observation, and interview.

In the first meeting, the students practice the dialogue provided in the textbook and completing cloze test of 'how many', 'how much', 'there is', 'there are'. In the second meeting, every student did experiment or collected information through survey in which they asked their classmates about their daily activity. In the third meeting, individually they analyzed a text given by teacher related to a description of daily activities. In the last meeting, they were given a task to observe a place and report the situation, what people do, and what happen there.

The teacher gave plenty opportunities for students to get real and authentic learning experience. The teacher also provided learning sources, worksheets and media. The teacher directed the students to collect information to accomplish the tasks given so that the interaction happened mostly in giving-receiving direction and instructions of the activities (action exchanges). The table below shows the distributions of classroom interaction in experimenting stage:

Table 7. Distribution of classroom interaction pattern (exchanges) in experimenting stage

Category of exchange	Exchange	Observing Stage					TOTAL
		Exp. 1	Exp. 2	Exp. 3	Exp. 4		
Knowledge exchange	Teacher's initiated exchange	JL	3	1	5	3	12
		TB	3	4	2	2	11
		TU	2	2	2	6	12
	Students' initiate exchange	JL	-	-	-	2	2
		TB	3	-	-	-	3
		TU	-	-	-	-	-
Total							
Action Exchange	Teacher's initiated exchange	TA	1	1	1	1	4
		MA	-	-	12	12	24
	SA	-	-	-	-	-	
	Students' initiate exchange	TA	1	-	-	-	1
		MA	-	-	-	-	-

		SA	-	-	-	-	-
Skill exchange	Total						
	Teacher's initiated exchange	TK	-	-	-	-	-
		MK	-	-	-	-	-
		SK	3	3	2	-	8
	Students' initiate exchange	TK	1	-	-	-	1
		MK	1	1	1	1	4
		SK	-	-	-	-	-
Total							
TOTAL		17	12	25	26	80	17

Due to the limited mobility of the researcher to observe every group working, the number of students' genuine questions (TB) related to the work were only few of them were recorded, and in fact, the teacher almost visited every group and walked around to help the students who needed.

The fact SK was initiated by teacher is implied that the teacher's roles as director and manager where she gave direction to the students what they had to do and behave (Brown, 2001, as cited in Nugraha, 2015) in the activities of experimenting stage. In the group working of describing people or animal or thing, the teacher still participated to control the group discussion and to make sure the students do the task well. The teacher gave direction, went around the class and gave feedback and help whenever needed by the students as expected in scientific approach (Hosnan, 2014).

The number of MK in every meeting, which MK indicates students performing language skills, does not mean the students only once performed language skill in observation activity. It was considered as one series of exchange of performing language skill in which they did to accomplish some tasks.

To see what the students did in this stage, it is important to discuss students' contribution in this stage. It is seen from students' learning behavior based on Bloom Taxonomy and its language complexity. The table below shows students' contribution in experimenting stage.

There is an interesting data that students' learning behavior in low-thinking level also has large portion in this stage. Even though the number of high thinking level behaviors such as applying (C3) and analyzing (C3) and planning or generating (C5) is not high that the total of them is only 47, 6%, they are significant in portraying students' contribution. The limitation of the

researcher's mobility in recording all the students' activities in different group is the main reason to consider all of the process experimenting conducted by students such as practicing conversation, interview, and observation as one series of students' learning behavior. In fact, within that number, it covers almost all the activity such as using some expression (C3), analyzing and comparing (C4), and composing text and report (C5) in every meeting.

Table 8. Students' learning behaviors in Experimenting Stage

Learning Behavior	Exp. 1	Exp. 2	Exp. 3	Exp. 4	Total
C1	2	5	6	7	20
C2	1	-	-	-	1
C3	-	1	-	-	1
C4	-	1	1	1	3
C5	-	-	3	1	4
A1	3	3	12	12	30
A2	1	-	3	1	5
P2	-	1	-	-	1
TOTAL	7	10	24	21	63

Table 9. Field Note 3

Observed Teacher's Behavior	Observed Students' Behavior	Comments
The teacher went around checking students interviewing each other.	Every student got turn to ask and told their daily activities.	Some of the students seemed to be excited to tell their daily activities and some of them seemed to get difficulties to ask and tell their daily activities.

(Researcher's field note, 1st Meeting#, 3/11/2015)

As shown in the table above, students' attitude that could be observed by the researcher was enthusiast in doing the

interview. Most of the students even interviewed more than four friends.

Through this activity, the teacher gave an opportunity for the students to experience asking and telling their daily activity. The structure of simple present discussed in the previous stage was used. They expanded their knowledge through practicing simple present tense in the interview (C3). This kind of drill is an effective way of getting students to experience how to say new language and to make an accurate production in which they practice using the language repeatedly.

In the next experimenting stage, the **student did an observation of a place and everything happened there**. The places were canteen, teacher's room, library, yard, etc. They were divided into some group, group of five persons. Every group observed one place and its surrounding. They got a task to make a report from a certain place and write down anything in the place and what people usually do in that place.

T : "Do you understand what to do now?"

S : "Yes."

T : "Observe the place that you have chosen, you write what you see in that place it can be animals, things, how many or much, and then what usually happens, what do people usually do in that place. Report them."

(Observation Transcript#11,
05/11/2015)

In this observation, **the students also practiced communicative** skill needed in group discussion, observing and investigate of what can be found in place they observe, and composing what can be reported from the place. As one criteria demanded by Ministry of Education and Culture, this activity can be regarded as scientific learning because it encourages and inspires students to think hypothetically in looking at different and congruent data in the place they visited and links to each learning material given.

Associating

In the practice, after gathering information through interview of some friends of their daily activity, the students compared friends' daily activities with a zookeeper's activities. The data collected from the interview was compared with zookeeper's activities such as "does zookeeper...". After comparing the activities, they made new form of stating the

activities in forms of sentences and paragraphs.

In the last meeting, the students composed descriptive text and drew the place from the data collected in the observation of place they visited. The students processed the data collected into various forms, such as text and drawings or map. They construct knowledge by making sense of their environment through exploration and opportunities to work with.

From the activities conducted, the objectives of associating stage are attained. It is proven by the fact that the interactions happened in the observation stage in every meeting were almost dominated by students' activities in processing the data collected. Table 10 shows the distributions of classroom interaction in observation stage.

Total exchanges in associating stage shown in the table above is not the real exchanges happened in the practice due to the limited researcher's mobility in recording and transcribing associating stage. It means, exchanges predicted in the table were the conversation and the activities of classroom. It is not the interactions of the individual students. Knowledge exchanges are dominated by giving explanation and clarification from the teacher of the concept created by the students (JL and TU), while the skill exchanges are dominated by students' performance in applying concepts of present tense, such as making report and descriptive text (MK & TK).

From the students' contribution above, it can be seen that students learning behaviors appeared in the associating stage, where the students comparing daily activities and making text from observation, were mostly in high-thinking level (C3 & C5). However, the psychomotor aspect appeared was only performing skill (P3).

Since the process of knowledge construction is the process of adaptation students' prior knowledge and their experience, the activity seen may be depended on them. After collected information through interview, process of analysis and comparing (C3) happened in adapting to their own daily activity and the prior knowledge of zookeeper's daily activity. In the last meeting, where they collected information from observation, they are synthesizing and transforming (C5) the data into various forms,

requiring their prior knowledge of present tense, language skill, and another skill (drawing).

Communicating

In collaborative learning, the learners interact with empathy, mutual respect, and receive a deficiency or excess, respectively in order to create social interaction to gain meaningful learning (Wahyudin, 2015). In this stage, teacher holds role that provides correct information and the reciprocal scaffolding. The teacher gives feedback, suggestions or more information related to students' work. There are interactions between teacher and students and among the students. In the practice, the teacher mostly conducted communicating stage by classroom discussion.

In Table 12, it can be seen that in this stage, the students performed language skills such as presenting report and their works done in the experimenting stage and associating stage. Moreover, the process of evaluation also happened in this stage where the students and students gave feedback to their works. The process of communicating students' work were labeled MK in which the students performed language skills such as reading aloud their works, presenting table of comparison, and presenting report they made as result of observation in experimenting stage and associating stage. Besides, the evaluation process was indicated by the interactions initiated by teacher's display questions (TU) in which the teacher asked the students to give comments to their friends work.

Table 10. Distribution of classroom interaction pattern (exchanges) in associating stage

Category of exchange	Exchange		Observing Stage			TOTAL
			Classroom discussion 1	Classroom discussion 1	Guessing Game	
Knowledge exchange	Teacher's initiated exchange	JL	4	5	-	9
		TB	5	5	-	10
		TU	2	2	-	4
	Students' initiate exchange	JL	1	2	-	3
		TB	1	3	-	4
		TU	-	-	-	-
Total						30
Action Exchange	Teacher's initiated exchange	TA	-	-	-	-
		MA	2	2	-	4
		SA	-	-	-	-
	Students' initiate exchange	TA	-	-	-	-
		MA	-	-	-	-
		SA	-	-	-	-
Total						4
Skill exchange	Teacher's initiated exchange	TK	1	2	-	3
		MK	-	-	-	-
		SK	3	2	-	5
	Students' initiate exchange	TK	-	2	1	3
		MK	2	1	-	3
		SK	-	-	-	-
Total						14
TOTAL			21	26	1	48

Table 11. Students' contribution in associating stage

Learning Behavior	Assoc. 1	Assoc. 2	Assoc. 3	Total
C1	6	4	-	10
C3	-	2	-	2
C5	4	-	5	9
A1	-	-	3	3
A2	1	-	-	1
P3	1	-	2	3
TOTAL	12	6	10	28

Table 12. Distribution of classroom interaction pattern (exchanges) in communicating stage

Category of exchange	Exchange	Observing Stage				TOTAL	
		Exp. 1	Exp. 2	Exp. 3	Exp. 4		
Knowledge exchange	Teacher's initiated exchange	JL	2	5	9	4	20
		TB	1	1	17	9	28
		TU	3	12	12	3	30
	Students' initiate exchange	JL	1	-	-	-	1
		TB	3	-	-	-	3
		TU	-	-	-	-	-
Total							
Action Exchange	Teacher's initiated exchange	TA	-	-	-	-	-
		MA	2	2	15	7	26
		SA	-	-	-	-	-
	Students' initiate exchange	TA	3	1	6	-	10
		MA	-	-	1	-	1
		SA	-	-	-	-	-
Total							
Skill exchange	Teacher's initiated exchange	TK	-	-	-	-	-
		MK	-	-	-	4	4
		SK	7	5	7	-	19
	Students' initiate exchange	TK	-	-	-	-	-
		MK	9	3	6	-	18
		SK	-	-	-	-	-
Total							
TOTAL		31	29	73	27	160	

Table 13. Students' contribution in communicating stage

Learning Behavior	Exp. 1	Exp. 2	Exp. 3	Exp. 4	Total
C1	21	13	23	16	73
C2	-	1	-	1	2
C3	-	14	-	-	14
C4	8	-	7	-	15
C5	9	-	12	6	27
C6	9	-	-	-	9
A1	7	-	9	8	24
A2	-	-	12	-	12
P1	12	-	12	-	24
TOTAL	66	28	75	31	200

Students' behaviors that appear in every activity in this stage were dominated by cognitive domain and psychomotor domain. It shows that the learning outcomes in this stage reached the main objective of evaluating demanded in the networking stage.

The difficulties encountered by the teacher in implementing scientific approach

This section presents the analysis of the difficulties or problems faced by the teacher in implementing scientific approach in English learning-teaching. The main data was obtained from the interview which uncover

the teacher's experience and from the observation to get some sort of confirmation from the data found in the observation.

The data of the interview discovered that the teacher encounter some problems in implementing scientific approach in her English teaching. There are three main problems stated by the teacher who have been implemented scientific approach since she was pointed by the government to be an instructor of 2013 curriculum in some junior high schools in Bandung. They are the problem on students, time allotment, and the teacher herself. The problems then are discussed in the following subparts.

Time Allotment

Another problem that is being the teacher concern in implementing scientific approach in teaching English is the time allocation. It was admitted by the teacher that, the activities and time allotment planned in lesson plan sometimes cannot be conducted precisely. Thus, the challenge for the teacher is to make the learning as effective as possible while the stages of scientific approach are successfully conducted.

To deal with the insufficient time and unexpected factors, the teacher reduces the time allocation of other activities or even the teacher does not execute some activities

According to the teacher, although the five stages of scientific approach are not conducted in one meeting, it does not mean that the learning-teaching process is not successful.

Teacher's Ability

The last problem mentioned by the teacher and the researcher observation is the teacher's ability in managing learning-teaching process. Teachers' ability is very important to ensure the success of learning. Teacher has to play many roles, such as controller, director, manager, facilitator, and resource.

Teacher as controller is related to teacher's ability to create climate in which the students can do the learning activity. This role is very important to handle several situations which might happen in classroom activities. The teacher had difficulties to get students follow the directions and the activities. It is also related to the students with low English proficiency. The teacher expected everyone participating in activity, while in fact, some students had difficulties in following the teacher pace. The teacher has strategy dealing with this condition. She tended to invite them first in the interaction and let the interact actively in group discussion and to clap his hands and tell the students to be quiet.

Teacher as manager is related to the ability to plan the activities and execute the plan. The teacher should have the ability in adjusting the plan with the time they have. The activities are the prime part of the plan. The activities should be laid out in sequence of their occurrence and the approximate time to complete the activity.

CONCLUSION

The finding shows that all the five stages of scientific approach were completely executed in four meetings of delivering one material or one Basic Competence (KD) eventhough the five stages were not always conducted in every meeting. The activities in every stage were various depended on the stage. Scientific approach implemented by the teacher could engage students in active learning and develop various students' contributions. How the teacher led the active learning activities and students' contributions were varied depend on the stages.

Scientific approach implemented successfully developed students' critical thinking and fostering high-thinking level of students' learning behavior. The difficulties encountered by the teacher during implementing scientific approach are the problem on students, time allotment, and the teaching management.

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