

PRE SERVICE TEACHERS' UNDERSTANDING OF SCIENTIFIC APPROACH

Atikah Wati

English Education Department_Wiralodra University

atikah_wati@gmail.com

ABSTRACT

This study investigated the implementation of scientific approach in apprenticeship program. It is aimed to describe and capture how pre service teachers implement scientific approach which consists of observing, questioning, exploring, associating and communicating in their teaching practice. What problems they faced during their teaching practice and how pre service teachers solve those problems. This study used a qualitative research design. The subjects of this study were three students of English Department of Wiralodra University who were doing apprenticeship program. Observation and questionnaire were used to validate the data. The findings showed that the three pre service teachers had implemented scientific approach in their teaching speaking although there still a lot of imperfectness and it can be concluded that between 1st, 2nd, and 3rd teacher candidates, the 3rd was the best to implement the scientific approach. The three pre service teachers also found problems in their teaching such in the process of questioning stage. However, both teacher candidates were able to solve the problem by not ask too many questions to the students, but have to guide the students to ask questions to help the students do the activity independently.

Keywords: Pre service teachers, scientific approach, teaching practice

INTRODUCTION

According to Syahmadi (2013: 35), Scientific Approach in teaching and learning process consists of “Observing, Questioning, Associating, Experimenting, and Networking”. By applying this approach, teachers are expected to use multimedia, develop their intuition, create short questions, allow the students to identify the problem, and allow the students to work independently without many help from the teacher so that the students can stand by their own. In other word, the teachers should facilitate the learning process by asking guided questions that help students to discover the content for themselves. Students are expected to become active and engage learners so that it will stir curiosity in order to build students critical thinking and communication skills.

However, the implementation of revised curriculum 2013 with its scientific approach considered hard to do, especially for pre service teachers in Wiralodra University. There are several reasons why it is hard to be applied because many pre service teachers do not really understand the change of the curriculum what are the revised and how to implement the approach in the teaching and practice in the classroom. Other reason as stated by Wachidah in Hapsari (2013) is the curriculum of

2013 is competence based, operationally integrating the four aspects of competence, there are religious values, attitudes, knowledge, and skills. By integrating the competence, skill and moral education in teaching and learning process, it build difficulty for the teacher even more for pre service teachers to construct the content of the teaching and create the classroom atmosphere as it should be in the term of scientific approach which consist of observing, questioning, associating, experimenting and networking.

That is why this study investigated and captured the case of scientific approach used by pre service teachers which is the students of Wiralodra university who are doing teaching practice (PPL) in several school in Indramayu in the case of how are the implementation of scientific approach in their teaching, what problems that the pre service teachers found in implementing scientific approach in teaching and learning process in the classroom and how do they solved those problems. Three pre service teachers were chosen as the participant of this study. Each of them practiced in apprenticeship program (PPL) in different school in the area of Indramayu.

LITERATURE REVIEW

Scientific approach

The curriculum 2013 emphasized the modern pedagogic dimension which is scientific approach. In scientific approach, the teaching and learning process should consist of observing, questioning, associating, experimenting, and networking (Syahmadi, 2013:35).

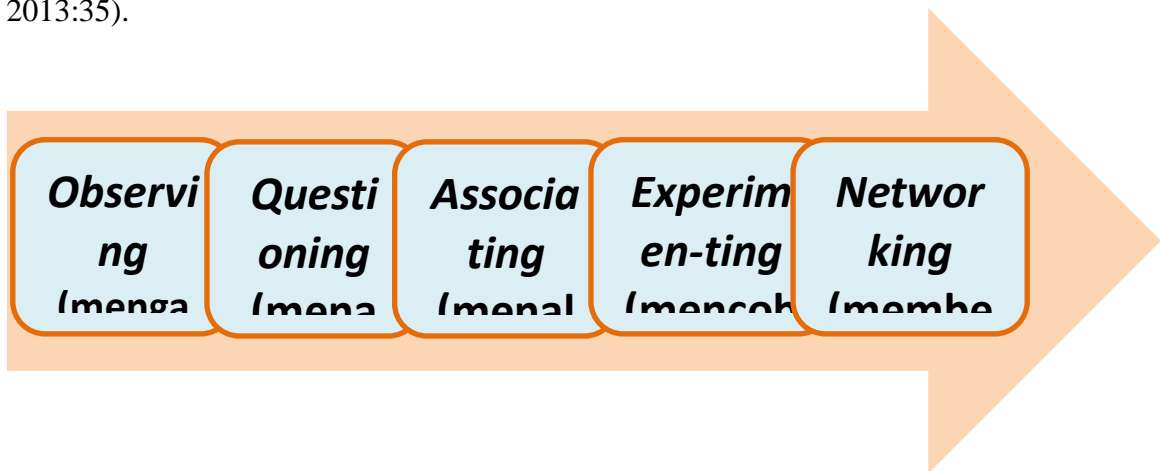


Figure 1

The Steps of Scientific Approach in the Teaching Process

1. Observing

Observation is commonly used in education as a tool to support understanding and development. It is one common way of getting information which can help teacher makes sense of educational situations, gauge the effectiveness of educational practices, and plan attempts for improvements (Malderez, 2002). Observing in teaching using scientific approach can be done by viewing, observing, reading or listening with or without the instrument of teaching (Syahmadi, 2013:35).

2. Questioning

A question is any sentence which has an interrogative form or function. In scientific approach, questioning may be started by teacher guidance until the students can do the activity independently as their habit. The students may question the factual to the hypothesis question (Syahmadi, 2013:35).

3. Associating

Associating means the students should be able to analyze and conclude the data based on its categories and differentiate it into different structures (Syahmadi, 2013:36).

4. Experimenting

Experimenting is one of the most important process skills because it also includes the observing, questioning, associating and communicating. In experimenting, the students can determine the data from the question; they can determine the data from the book, things, experiment or corpus (Syahmadi, 2013:35)

5. Networking/communicating

Networking or it can be defined as communicating in language teaching. Communication can be defined as a process by which the students assign and convey meaning in an attempt to create shared understanding. In scientific approach, by communicating the students should be able to express the concept has been observe in the form of spoken or written (Syahmadi, 2013:36).

Scientific Approach in Curriculum 2013

The “Curriculum 2013”, a means of integrating values systems, knowledge, and skills, has orientation on developing the learners’ competencies, the changing of teaching-learning methodology towards teaching-learning process which gives priorities on the learning experiences through observing, inquiring, associating, and communicating so as to enhance the values of competitiveness and build prime characters (*Kemendikbud*, 2012: 10). To achieve all of these, the teaching methodology involves not only exploration, elaboration, confirmation, but also observation, inquiry, analysis, reasoning, description, inference, evaluation, and “creation” (*Kemendikbud*, 2012: 25).

The differences between curriculum 2013 and Education Unit Level Curriculum are located on the competence aspect of knowledge. curriculum 2013 puts attitude on the higher priority than skill competencies and knowledge. It stated that English, Social Science, and Science are removed from the elementary school subject list. Social science and science are integrated into other subject, whereas English can be learned as extracurricular. The following is the table of completion of curriculum formulation mindset translated from Syahmadi (2013:9).

Table 1

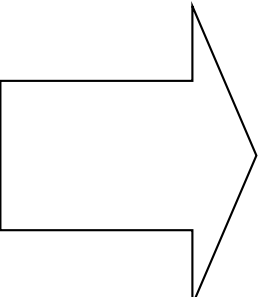
The Curriculum 2013 Formulation Mindset

No	KBK 2004	KTSP 2006	Curriculum 2013
1	The standard competence derived from the content standard		The standard and standard competence derived from the needs
2	The content standard defined based on the Subject objectives (Standard competence Subject) that can be specified into standard competence and basic competence subject.		The content standard derived from the standard competence through the free subject basic competence
3	The separation between the subjects forming attitudes, skill and knowledge.		All the subjects must share the contribution in the forming of attitudes, skill and knowledge.
4	The competence derived from the subject		The subject derived from the competence objectives
5	The subject played its own rule, the subject stand by itself.		All the subjects are bound by the basic competence.

Based on the table above, it can be concluded that there are several differences of curriculum 2013 and the previous curriculum. Firstly, all subjects should have contribution to form the students' attitudes, skill and knowledge. Secondly, should be focused on students and environment needs. And the last, it should be focused on the goal or objectives that will be achieved.

Curriculum 2013 also focused on the process of learning rather than the goal that will be achieved. It is believe that if the process is good than the goal will be better than. So, the mindset of the teacher and students in the process of teaching and learning in the classroom also should be change. The following is the table of the completion of mindset translated from Syahmadi (2013: 10).

Table 2
Mindset Completion in Curriculum 2013

1	Teacher centred		Students centred
2	One direction		Interactive
3	Isolation		Networking
4	Passive		Observing
5	Abstract		Real life context

6	Private learning		Team learning
7	Broad		Focus on the target
8	Single favor stimulation		All stimulation
9	One equipment (blackboard)		Use educational multimedia
10	One way relationship		Cooperative
11	Overall production (the students get the same document)		Based on student need (students potential)
12	Universal method		Use various method (students initiative)
13	One side of knowledge		Multidiscipline
14	Teacher control		Students responsibility
15	Factual thinking		Critical thinking
16	Transfer knowledge (teacher knowledge to students)		Exchanges knowledge (teacher to students, students to students)

On the second table, curriculum 2013 learning process rather focused on the scientific approach which consists of observing, questioning, associating, experimenting and networking. The knowledge in this curriculum is used as stimulant to the process of teaching and learning in all subjects. For the students, they should have responsibility to find out what they want to know or observing or discovery learning. curriculum 2013 also focused on the use of language for communication, creative, systematic, and critical thinking.

The Characteristics of English Using Scientific Approach in Curriculum 2013

Even though curriculum 2013 still sustains the ideas of the previous curriculum (KTSP) and uses genre based approach, there are significant changes on how curriculum framework defines the notion of competence and performance.

In terms of competence, Wachidah in Hapsari (2013) mentions that “the competence in the content-standard need reformulating. Content standard will integrate the four aspects of the competence in the form that is not skill based (listening, speaking, reading and writing skills)”.

The (English) teaching-learning materials of the “curriculum 2013” should be relevant to competencies needed by the learners and job markets. Essential teaching-learning materials have to contain the “core” materials which are suitable with the

learner's backgrounds and needs. The (English) teaching-learning process is conducted as student-centered learning and contextual learning (*Kemendikbud*, 2012: 25).

The scope of English in curriculum 2013 consists of interpersonal, transactional and functional text as way to develop the academic potential communication through recount, narrative, procedure, descriptive and report. The strategy that used in curriculum 2013 is still focus on communicative competence to gain the English four skills. It should cover the moral education (religious value and attitudes) and sociocultural aspect to cover the national character.

METHODOLOGY

This study used case study, Yin (1984) in Nunan (1992: 76) defined case study as a study that investigate a contemporary phenomenon within its real context. This study is trying to investigate and capture the implementation of scientific approach by pre service teachers of Wiralodra University in apprenticeship program in several schools in Indramayu. So, this study is carry out in small case, a single case (Stake, 1985 in Nunan, 1992) and use multiple data gathering (Yin, 1984 in Nunan, 1992).

Three pre service teachers were chosen as the participant. Pre service teachers participation is voluntary; it means that the students who are taken as participants are those who are willingly to be recorded during the teaching and learning practice in the school. The purpose is to ensure that recording would not have any adverse affect on their performance.

Observation, survey (questionnaire), and interview were used as instruments of this study. The observation is used to gain the data from natural setting without any intervention. Video recording used to capture the application of scientific approach in teaching and learning process in the classroom. Observation sheet also used to make sure that the pre service teachers follow the steps and method in scientific approach. And the transcription is used to make the analysis easier. The questionnaire used to gather data is the combination of open ended questionnaire to give chance to the participants to clarify their answers. Semi Structure interview is used as the third way to gather data. Interview in this study is used to clarify pre service teacher answer in observation. So their answers in questionnaire and interview are valid.

FINDING DAN DISCUSSION

1. Data from Observation

Observing

Observing can be done by viewing, observing, reading or listening with or without the instrument of teaching (Syahmadi, 2013:35). In teaching and learning process the 1st pre service teacher did indirect observation by listening to students' answer to get information about the readiness of students in teaching and learning process by asking previous material which has relation toward today's meeting because the previous material still has connectivity with the material will be discussed that day. The 2nd pre service teacher conducted the observing through questioning kinds of narrative story using pictures to recall the students understanding about narrative text. Similar to the 1st and the 2nd pre service teachers, the 3rd pre service teacher starts the class by asking previous material that has been learnt before. The teacher tries to observe the capability

of the students by observing the their answers. The previous material are really important for the next meeting, because the previous material can be the starting point of students to absorb another material that will be given by teacher in the next meeting.

Questioning

The second step of scientific approach that should be done by the pre service teachers is questioning. Based on the curriculum 2013, Questioning may be started by teacher guidance until the students can do the activity independently as their habit. The students may question the factual to the hypothesis question. Questioning is one of basic element in scientific approach, in this research the writer did not find any questioning that proposed by the 1st and 2nd pre service teachers, 1st and 2nd pre service teacher in this case believed had wrong understanding related to the second step of scientific approach, questioning. The 1st and 2nd pre service teacher mostly delivered the questions where in this case the question should be delivered by the students, the role of the teacher in this step is only to guide the students and if the students did both understand the material they should ask the questions to clarify their understanding. That is why, the 1st and 2nd pre service teacher failed to implemented the second step of scientific approach.

On the other hand, the 3rd pre service teacher tried so hard to guide the students by giva information to the students her experience story about men and women equality. Unfortunately, the students seem really familiar with the topic/theme so they did not offer any questions to the teacher. This case happened not because the 3rd pre service teacher did not try to implement questioning, but because the students response and understanding about the text. Because of that, the 3rd pre service teacher questioning considered succeeds to make the students even more curious to the material given.

Associating

The third step of scientific approach that has been applied by the teacher is associating. Associating means the students should be able to analyze and conclude the data based on its categories and differentiate it into different structures (Syahmadi, 2013:36). In teaching and learning process, the writer found out that the teacher tries to conduct assosiating throught assignment by asking the students to create invitation, after that, the students are given several situation that relate to the invitation. The student are allowed to respond the assignment by accepting or refusing the invitation to conclude the data by giving the example to her students; the teacher wants to know the students understanding toward the real invitation conversation. The 2nd pre service tried to engagaed teh students by gave pictures, unfortunately, the text taht the 2nd pre service teacher is not authentic, she choose “the mousedeer and crocodile” which in curriculum 2013 with its scientific approach considered unauthentic and not supposed to give to the students anymore because it only teaching narrative text without any attitude (Know why). While the 3rd pre service teacher tries to force her students to find an alternative expression of agree and disagree. The teacher tries to know the students understanding in the concept of agreement by conversation. From the conversation, the writer can see that even if the answer of first student is wrong but the other student unconsciously

repeated the wrong answer. It means that each student have possibility to influence the other students.

Experimenting

The next step is experimenting. In experimenting, the students can determine the data from the question; they can determine the data from the book, things, experiment or corpus (Syahmadi, 2013:35). In the process of experimenting, the 1st pre service teacher uses paper, the reasons are first to help her keep focus on her rehearsal. Second, make her students know kind of information about invitation. And the last, help the students determined the data from the text. This paper really useful to make the students more focus in learning the material, because the students can see some expression that usually use in making invitation directly from the paper. While the 2nd pre service teacher uses video and quiz in the process of experimenting, to make her students curios and know the sample of narrative text. The students have to listened the video and after that the students work in group to answer the questions.

“I have a quiz. You must answer these questions. I have some questions, I need to work in group in orderly line. The first group, the second group, the third group and the fourth group. Okay?”

Furthermore, the 3rd pre service teacher uses her own story and audio to help her did the improvisation in delivering the material in experimenting stage. The 3rd pre service teacher uses story and audio to make her students understand kinds of expression in hortatory text.

Okay. I think because you have understood well about hortatory text. And now we are not going to discuss about it. But we are discussing about the expression. The expression which is usually use by hortatory text itself. But before that, can I tell you a little story about how I feel today?

The students listen the story of the teacher, and indirectly teacher insert that expression on her story. The 3rd pre service teacher uses an attractive story so her students' unconsciously learned the material. Based on that story, the students indirectly learn the expression of agree and disagree. The students don't realize that the teacher is already taught them. That's one of the ways to determine the data from the questions.

Networking/Communicating

The last, networking or it can be defined as communicating in language teaching, the students should be able to express the concept has been observe in the form of spoken or written (Syahmadi, 2013:36).

In this last step of scientific approach, the 1st pre service teacher asks the students to work in pair and make short conversation with the expression of invitation. The students are allowed to choose to refuse or accept the invitation with the theme that has been given by the teacher before.

Ok look at the assignment. Attention please, make a group of two and then work together to give oral plan use of expression of invitation. The group consists of two students. And then you can use expression of invitation. Attention please, the first is your friends invite you to go to birthday party.

The second go to Bali. The third go to the library, the forth go to shopping, and the last go to swimming. And the theme whatever you want, you just choose the theme in this paper, alright. The respond you can use accepting or refusing. You got I, what I mean.

The 2nd pre service teacher tried to ask the students to re-tell the story have been heard before, the mousedeer and crocodile. Actually, by asked the students to re-tell the story, the 2nd pre service teacher missed the real meaning of communication/networking in scientific approach. Because in networking/communicating, the students should be able to express the concept have been observed in the previous steps of scientific approach while by re-tell the same story since the beginning of the end of the class, the teacher only wants to know the memorization skill that her students have, not give chance to communicate in real meaning and situation.

The 3rd pre service teacher conducted almost the smae activity with the 1st pre service teacher. She asked the students to try to make short conversation using agree and disagree expression in pairs and then the students practice in front of their friends. One of the samples is:

- T : It's okay, let's try it which group are ready?
- Ss : Me miss
- T : Yes come forward and please read it louder
- F1 : Do you know Syahrini
- F2 : Of course I know, why?
- F1 : I think she is lebay (laugh) called herself as princess
- F2 : I don't think so, she is great and I think she's just like real princess
- F1 : Ouwh
- T : Ok, you use I don't think so to show your disagreement. Give applause to them. Next group please. From boys

To conclude the data description, the following is the summary of the implementation of scientifiv approach by three pre service teachers in apprenticeship program

Table 3
The Implementation of Scientific Approach

No	TC	Observing	Questioning	Associating	Experimenting	Networking
1	The 1 st	By asking the understanding about the material will be discussed.	X	Give more examples about the material whether it is accepting or refusing invitation	Used paper to show the students kinds of real invitations.	Asked the students to make real conversation about invitation and practice it in front of the class.
2	The 2 nd	Used pictures to bring the			Asked the students to listen	

		students to the previous material.	X	X	and watch video of narrative story.	X
3	The 3 rd	he previous material (indirect observation) by listening students answer.	Motivated the students to ask question related to the material	Asked the students to find an alternative expression that related to the expression they've learn.	acher story and use audio to help students to improve their understanding.	Asked the students to express the expression and practice it in front of the other students.

2. Data from questionnaire

Questionnaire were delivered to three pre service teachers to find out their problems and the strategy to solved the problem in implementing scientific approach. The following is the result of the questionnaire:

Table 4
The Problem and the Strategy to Solve the Problem in Scientific Approach

No	TC	The Problem Found in Teaching Practice	The Strategies to Solve the Problem
1	The 1 st	<ul style="list-style-type: none"> a. Failed to implement the second step of scientific approach, questioning. b. Used so many code mixing, she used too much Indonesia language in her teaching and still apply translation concept. c. Did not give any reflection to the teaching and learning process, she did not review, conclude or give feedback to the students performance 	<ul style="list-style-type: none"> a. Do not ask too many questions to the students, but have to guide the students to ask questions to help them do the activity independently. b. As the role model, teacher should give good sample in speaking English. c. Give feedback and reflection in each teaching.
2	The 2 nd	<ul style="list-style-type: none"> a. Failed to implement three steps of scientific approach, questioning, associating and communicating. b. The students are given only one video to be listened based on that video the students cannot differentiate the material in different structure. 	<ul style="list-style-type: none"> a. Learn more about how to implement the steps in scientific approach b. Give more example and resources so that the students know the variation of the texts c. Should create more creative activity in the classroom

		<p>c. The students are only asked to re-tell the story without implement the material that has been given before.</p> <p>d. The 2nd pre service teacher always cuts the story in the middle of the story, without any explanation why it should be cut and why it does not continue by other students.</p> <p>e. There is not direct correction if the students have grammatical error in their speech.</p>	<p>d. Let the students to finish their story, or give time limitation to perform.</p> <p>e. Always give feedback for any mistakes</p>
3	The 3 rd pre service teacher	The 3 rd pre service teacher did not give conclusion toward the students' performance in front of the class.	Always give construction feedback to the students.

CONCLUSION

The understanding of the 1st pre service teacher in applying scientific approach is good enough. Based on five steps of scientific approach, the 1st pre service teacher were able to implement four steps of it on her teaching. While the understanding of the 2nd pre service teacher is still below average, the 2nd pre service teacher only apply two steps of it even though in open-ended questionnaire, the 2nd pre service teacher can explain five steps of scientific approach in curriculum 2013. But, in the implementation of scientific approach the 2nd pre service teacher cannot implement all of the steps. Whereas, the understanding of the 3rd pre service teacher in the implementation of scientific approach is good. Because based on five steps should be implemented in scientific approach, the 3rd pre service teacher implements all of the steps on her teaching.

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