What Students Say: Scientific Approach as a New Learning Paradigm in Industrial Era 4.0

by Mister G Maru

What Students Say: Scientific Approach as a New Learning Paradigm in Industrial Era 4.0

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Abstract-The article elaborates students' perception toward the enactment of scientific approach as a new learning paradigm in the context of English as a foreign language in industrial era 4.0. It focuses on English subject based on 2013 Curriculum. This study involved 133 students in one junior high school in North Sulawesi. In collecting the data, questionnaries and interviews were employed. The questionnarie was given to all students and the interview was conducted to selected students as the sample to investigate their opinion toward the implementation of scientific approach in learning English. The findings showed that students have positive responses toward the five phases of scientific approach. In particular, in the second phase of questioning, it is reported that students still have difficulties to formulate good questions and in the last phase of communicating, students were reported difficult to communicate their ideas and opinions both in oral and written forms. Based on the result, it is suggested that for a more effective implementation of scientific approaches a new learning paradigm in the industrial era 4.0, teachers must be creative and innovative to create a more enjoyable and conducive atmosphere in the process of teaching and learning

Keywords-students' perception; scientific approach; new learning paradigm

I.   INTRODUCTION

Any education institutions need a kind of curriculum as a critical component in their activities. This may contain analytical foundation, directions as well aims to be attained. The content of curriculum should provide sufficient information of input, process and output of learning. As a focal part in education, curriculum involved both physical as well as non-physical domain including thinking process, process of managing information, establishing positive [1].

In order to be successful, educational system should take into a serious consideration the important role of curriculum. In achieving the objectives, suitable and appropriate curriculum should be in place. The curriculum in Indonesia has changed and developed over time from 1947 to 2013. The school curriculum has been modified and improved to create an authentic education and better learning opportunities for the Indonesians. For about seven years, the government has considered the curriculum of KTSP or SBC curriculum as the one that should be applied in Indonesian schools. Due to the rapid development of the modern era with modern pedagogical methods that come to existence, the KTSP curriculum may have been judged to be less practical especially that it includes too many school subjects for the students. Therefore, the government proposed a new curriculum called "Curriculum 2013" to replace the old one. The changes of curriculum are usually complemented by different educational goals. This should be in line with nation's goals for education. The change of curriculum could be explained as the adjustment of goals and objectives, content, design [2] or it could be done in simpler ways by modifying the learning activities and adding one more topic to the curriculum [3]. In fact, in order to educate the people in the society about the changes in the world, curriculum change is inevitable [4]. The 2013 curriculum emphasizes on the modern pedagogical dimension in learning activities using scientific approach. In principle, learning activity is an educational process that provide an opportunity for students to develop their potential abilities. It is expected that the curriculum can increase the students' attitude, knowledge, and skill needed for them to contribute to society, nation, and mankind. Therefore, learning activities aim at empowering all potential students to have competence skill. The function of teacher as facilitator is providing students with useful phase [5]. It encourages the students to construct new information and interpret their phases in the classroom. Dealing with case, the teachers can guide them for more meaningful learning. Moreover, in the 2013 curriculum, the function of teacher is as a facilitator who assists the students to find something new by discovering, as what the process of scientific approach has included. The 2013 curriculum promotes scientific approach teaching and learning process through 5 stages: (1) observing), (2) asking questions, (3) collecting information, (4) associating or data analyzing, and (5) communicating.

The 'attitude' component was placed on higher priority than skill competencies and knowledge in

Curriculum 2013. "The 2013 curriculum is expected to lead to a better-quality education and progress for future generations of Indonesian" [6]. The philosophy is to develop students' life to be more religious, artistic, creative, communicative, and various dimensions of intelligence value required by the learners, community, nation and mankind. It is hoped to give a good impact toward the students' competences [6].

The impact of curriculum change is mostly experienced by students although many changes to Indonesian curriculum is for the sake of better outcomes for Indonesian students. The curriculum change may give good as well bad impacts for the quality of education [7].

The activities taking place during a course including knowledge, skills and attitudes should be specified in the curriculum as well methods of assessment. The effectiveness of course delivery and resources availability should be clearly indicated in the curricula [8].

The demand of 21st century for a new approach has been answered by the 2013 curriculum. The so-called scientific approach has been implemented to develop the students' skill, knowledge and attitude. In scientific approach, the learning process consists of five phases constructed from observing, questioning, collecting information/experimenting, associating, and communicating. Moreover, the implementation of this approach is expected to promote good attitude, skills, and knowledge of students. The attitudes are acquired through activities, for instance showing good manner when studying in class, responding to tasks given enthusiastically, and showing respects to fellow students. Absorbing knowledge is done through the several activities such as remembering and understanding the lesson and applying what is understood. Having understood the material will lead students to the activities of analyzing, evaluating, and creating. Acquiring skills are accomplished through observation, asking questions, implementation, association and communication [6].

Approaches to learning can be counted as a scientific approach if they meet the seven learning criteria: first, the material for learning is based on facts or phenomena explained logically, not imaginatively as in a legend or a myth. Second, interactions between teachers and students which involved explanation and response should be free of prejudice. Third, it should encourage and inspire students make critical thinking as a habit which will lead to identification, understanding, solving problems and application of learning materials[9]. Fourth, the students would be able to think hypothetically at the differences, similarities, and other links from learning the material. Fifth, the students would feel persuaded and motivated to understand, implement, and develop patterns of rational and objective thinking as a response to the learning material. Sixth, concepts, theories, and empirical facts that can be justified should be the basis. Seventh, the formulation of learning objectives should be done in a simple and clear, yet an attractive presentation system [10].

Perception is understood as the ability to recognize something, be it the shape of figure, a manner of walking, a way of holding the head, the familiar article dress, or some combination of them [10]. It is arguable that interpreting the information as a representation of a situation could be regarded as perception. This is the result of stimulus-response as part of making sense of the sensory organs [11].

II. RESEARCH METHOD

Data were collected from multiple sources. The population of this research was all students at one junior high school in North Sulawesi, in which one eight grade class was chosen as the sample. This research used mixed methods of data collection to allow data to come from various information sources [12]. In collecting the data, questionnaire and interview protocols were employed. The researcher developed a questionnaire and pilot-tested to a small group of students prior to administering to the sample for this research. This pilot-test was to make sure that the statements were easy to understand and responded by the students. In this questionnaire, a 4-point Likert scale was used for the questions to measure the views of the respondents. Each item was rated on a 4-point Likert scale ("Strongly agree", "Agree", "Disagree", and "Strongly disagree") from 1 to 4.

Thirty items of questionarries were translated into Indonesian. The questionnaire items were categorized in five indicators based on five phases in scientific approach they are: Observing (item 1-6), Questioning (item 7-12), Collecting Information (item 13-18), Associating (item 19-24) and Communicating (item 25-30). Using Indonesian language is easier for junior high school students to understand the questionnaire. The data collected through questionnaires were coded and analyzed in term of mean scores and percentage. Interview results were described by giving some explanations according to the students' opinions.

III. RESULT AND DISCUSSION

Information collected from the questionnaire revealed that students' responses about the implementation of scientific approach in learning English based on indicator 1 (Observing): 47% of students chose Strongly Agree, 41% of students chose Agree, 11% chose Disagree, and 1% chose Strongly Disagree. Students' responses about the implementation of scientific approach in learning English based on indicator 2 (Questioning): 36.7% of students prefer to choose Strongly Agree, 45.8% of students prefer Agree, 15.8% chose Disagree, and 1.7% chose Strongly Disagree. Students' responses about the implementation of scientific approach in learning English based on indicator 3

(collecting information): 35.8% of students prefer to choose Strongly Agree, 36.7% of students prefer Agree, 25.8% chose Disagree, and 1.7 % chose Strongly Disagree. Students' responses about the implementation of scientific approach in learning English based on indicator 4 (Associating): 34.2 % of students prefer to choose Strongly Agree, 51.7 % of students prefer Agree, 13.3 % chose Disagree, and 0.8 % chose Strongly Disagree. Students' responses about the implementation of scientific approach in learning English based on indicator 5 (Communicating): 35 % of students prefer to choose Strongly Agree, 48.4 % of students prefer Agree, 15.8% chose Disagree, and 0.8 % chose Strongly Disagree.

In this study, the researcher selected two students as respondents being interviewed and they are coded as student 1 (S1), Student 2 (S2). The students were selected based on the result of questionnaire to clarify and to confirm their perceptions.

Indicator 1: Observing

The response of the interviewee about the first phase stated in the following transcriptions below:

The activity of Observing trains the students to listen and see what they observed. It also helps them to learn new things. This is reflected in interviewees' responses as follow:

"Menurut saya tahap mengamati melatih kemampuan saya menyimak dan melihat hal-hal yang sedang diamati dan lebih mengenal hal-hal yang belum saya ketahui sebelumnya" (S1)

Observing also makes them more seriously in learning and accustomed them to listen, read and observe something in relations to teaching materials. As stated by S2:

"Menurut saya tahap mengamati membuat saya lebih teliti dalam menyimak, membaca, melihat apa yang diamati dalam hubungannya dengan materi pembelajaran. Tahap ini juga melatih kesungguhan saya dalam belajar"

S1 admitted that there are no difficulties for her to do an observation, this phase is interesting for her.

"Tidak ada kesulitan yang saya alami, bagi saya tahap mengamati sangat menyenangkan dan tidak membosankan"

Whereas, student 2 had a difficulty to understand the object that she observed in relation to teaching material.

"Saya mengalami kesulitan dalam memahami apa yang saya amati dan menghubungkannya dengan materi pembelajaran"

Indicator 2: Questioning

The second phase "questioning" can enhance the students' skill of asking questions about what they have observed and it gave them braveness to speak. In this phase

they can also ask about something they do not understand, as stated by Student 1:

"Menurut saya tahap menanya dapat membantu saya lebih berani dalam berbicara dan mengajukan berbagai pertanyaan tentang apa yang saya amati. Saya juga bisa menanyakan hal-hal yang tidak dipahami dalam proses pengamatan"

Questioning can build student's curiosity as well as help the students to think critically and to formulate the questions, it is reflected on S2 statement as follow:

"Menurut saya tahap menanya membantu siswa untuk berpikir kritis dan merumuskan pertanyaan. Tahap ini penting karena membantu siswa untuk memenuhi rasa ingin tahu dan memahami hal-hal yang tidak dimengerti dalam proses pengamatan"

S1 was able to formulate questions in simple sentences, but S2 was still difficult to formulate questions and to ask something because of her limitation in speaking English.

"Tahap menanya juga membuat saya mampu untuk merumuskan pertanyaan meskipun dengan menggunakan bahasa inggris yang sederhana"(S1)
"Di dalam tahap ini saya mengalami kesulitan di dalam menanyakan hal-hal yang saya amati, bagaimana merumuskan pertanyaan karena saya belum mampu berbahasa inggris dengan baik" (S2)

Indicator 3: Collecting Information or Experimenting

The response of the interviewee about the third phase stated in the following transcriptions below:

(S1): Tahap mengumpulkan informasi membuat saya berpikir lebih kreatif, saya juga bisa bekersama dan bertukar pendapat dengan teman dalam kelompok. Tahap ini menyenangkan dan tidak membosankan karena saya mencari dan mengumpulkan informasi yang berhubungan dengan kegiatan pembelajaran sesuai dengan petunjuk dan bantuan yang diberikan oleh guru.
(S2): Menurut saya tahap mengumpulkan informasi membuat siswa berpikir kritis dan juga bisa melatih ketelitian dan kesopanan dalam mendapatkan informasi yang diperlukan dalam proses pembelajaran. Dalam tahap ini saya sulit untuk berkomunikasi dengan guru dan teman karena saya kemampuan saya dalam berbahasa inggris masih kurang

Based on the transcriptions above, Student 1 argued that the third phase can make her think creatively. She can also have some discussions and work together with

her friends to get the information needed. She admitted that this phase is interesting for her beacuse teacher also helped her in collecting the informations.

Student 2 argued that by doing this phase she can think critically. In the third phase students are trained to be more careful and polite to find the information in teaching and learning proccess. She admitted that it is difficult to communicate with the teacher and her friends because she cannot speak English fluently.

Indicator 4: Associating
This phase makes the students creative and think globally in analyzing the collected information. Working together with teacher and their friends can help them to summarize learning material, as stated by S1 and S2 as follow:

> *"Tahap ini menantang saya lebih kreatif untuk mengolah dan menganalisa informasi yang didapat dan dengan bantuan guru dan diskusi dengan teman saya bisa membuat kesimpulan tentang materi yang sedang dipelajari" (S1)*
> *"Tahap menalar atau mengasosiasi membuat siswa berpikir lebih luas atau memiliki wawasan yang luas di dalam menganalisa informasi yang didapat dan membuat kesimpulan" (S2)*

It is not easy for students to analyze the collected information because they still have difficulties to speak and write in English.

> *"Saya mengalami kesulitan di dalam mengolah informasi karena kemampuan saya dalam berbahasa Inggris baik berbicara maupun menulis masih sangat kurang" (S2)*

Indicator 5: Communicating
The students argued that this last phase makes them able to speak, to share their ideas and opinions, read and present the result of group discussion in front of the class.

> *S1: Tahap ini membuat saya mampu berbicara di depan kelas membagi ide-ide dan pendapat saya dan bisa mempresentasikan hasil diskusi kelompok.*
> *S2: Tahap mengkomunikasi-kan membantu siswa agar lebih lancar dalam membaca dan berbicara dengan menggunakan bahasa inggris.*

They are also able to communicate with their teacher and friends using simple sentences as stated by S1:

> *Saya juga bisa berkomunikasi dengan teman dan guru dengan menggunakan bahasa inggris yang sederhana meskipun masih ada kesalahan-kesalahan yang saya buat dalam percakapan. Saya bisa mempresentasikan hasil diskusi kelompok di depan kelas.*

Student 2 is interested with this phase because it made her confidence to share her opinions and she can communicate with English.

> *"Saya senang karena tahap ini juga membuat saya lebih percaya diri untuk mengungkapkan pendapat dan berkomunikasi dengan menggunakan bahasa inggris meskipun saya belum lancar dalam berbahasa inggris"*

However, both of them still have difficulties in expressing or presenting their ideas and opinions because they can't speak English fluently.

They are also difficult to write English sentences because of lack grammar and vocabularies.

> *S1: Saya juga mengalami kesulitan dalam menulis karena tidak terlalu memahami struktur kalimat yang benar dalam bahasa Inggris"*
>
> *S2: Saya mengalami kesulitan di dalam menulis hasil pembelajaran karena kurangnya perbendaharaan kata dalam bahasa Inggris.*

The interviewee's responses revealed the difficulties students may come across in implementing the five phases of scientific approach are in their ability in English skills especially in speaking and writing.

Based on the result of descriptive analysis above, it can be said that the students of grade 8 have good responses to the implementation of scientific approach. It it is determined by the positive perception toward the five phases of scientific approach. However, the students admitted that they still have difficulties in mastering the five phases of scientific approach. Specifically in the second phase, they have difficulties in formulating good questions and in the last phases communicating, they were difficult to express their ideas or opinions orally because they cannot speak English fluently. English grammar and the lack of English vocabularies are their problem in writing a good sentence.

IV. CONCLUSION

The findings and discussion may lead to a conclusion that students have positive perceptions about the implementation of scientific approach in learning English. The overall mean score and the percentage of students' responses showed that all students have good responses in learning English using scientific approach.

The third phase collecting information obtained the higher mean score and the second phase questioning obtain the lowest mean score. The result of interview showed that the students still have difficulties in formulating a good question because they can't speak English fluently. They were also difficult to write their ideas in a good English sentence.

Thus, it could be recommended that for a more effective implementation of Scientific Approach, teachers must be creative and innovative in the process of teaching and learning to make the students enjoy and able to study with the approach. Since students still have difficulties to speak and write in English, the teacher must focus on students' speaking and writing skills to make them able in expressing their ideas or opinions written or orally during the process of learning. It is also recommended that future research may be conducted to investigate students' opinions about 2013 Scientific curriculum in learning English or in different subjects at Junior High School Level.

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