

## SCIENTIFIC APPROACH BASED READING TO DEVELOP SKILLS AND CHARACTERS OF THE CENTURY

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### ABSTRACT

The term of scientific approach based teaching and learning has been quite familiar in Indonesian education since it was introduced in Curriculum 2013. However, the implementation of this teaching and learning method seems to be quite far from being perfect. This certainly needs high attention from education experts as this method offers good opportunity for the learning classes to develop the twenty first century skills and characters; critical thinking, creativity, collaboration, and communication. A reading class is not out of the questions. A language teacher could apply a scientific based method in her teaching and learning activities easily by applying the scientific approach learning steps; observing, questioning, experimenting, associating, and networking. However, this quite common SQ3R/PQ3R reading technique could also be considered as scientific teaching and learning instructions. Implementing a reading class using either the scientific approach based learning steps or SQ3R/PQ3R is susceptible to develop the twenty first century skills as each step implemented would give ample opportunity for the teacher and students to develop their skills and characters.

**Key words: scientific learning, critical thinking, creativity, collaboration, communication**

### INTRODUCTION

2013 Curriculum for all school levels which recommends applying scientific approach based teaching has been going on for almost a decade. However, the implementation of the scientific approach based teaching and learning is still far from our expectation. Quite many teachers did not have enough understanding to even design their lesson plans. This kind of evidence was quite clear when the writer had the opportunity handling PPG classes in the previous time. They could probably argue that they should make lesson plans as lesson plans could be copied from the template. Such arguments should not be justified as making lesson plans is also one of the teachers' jobs for their professional career. This could be a bad side in our

country education, as other nations accelerate their education quality as Zudong Zhu (2017; 85); Countries across the world now point, usually with reference to international studies and cross-national comparison, to the importance of teacher education.

People say a good job may come 50 percent from a correct plan. Therefore, to make a good lesson plan is a skill very much needed for a teacher to implement her pedagogical competence. The skill of making a lesson plan hardly develops as teachers do not have structured activities in deepening the skills. They could possibly train themselves making lesson plans when they were in undergraduate study or in joining professional teacher training or Pendidikan Profesi Guru (PPG). To make it

worse, the school headmasters seem not to have high priority on the matter as well. Designing lesson plans is also under the headmaster's supervision. Another bad reason is that the teachers under the teachers' subject group (MGMP) seldom work on such quality teaching in their meeting agendas. They mostly discuss more on administrative matters. As designing lesson plans is a very strategic skill, teachers should keep developing their skills to achieve correct lesson plans fulfilling the required standard and quality.

Besides having less training on developing teaching and learning quality, basically most teachers do not have much experience in doing scientific undertaking. They mostly did scientific assignments only when they had to finish their study in undergraduate study. After that period, they seem to have no assignments to do scientific jobs. This could also frame them to have difficult problems in understanding scientific approach based learning which they have to implement in their professional activities, Mulyasa (2013) stated; consequently, this condition has led teachers to own different beliefs and perceptions regarding scientific approach.

As they have little understanding to implement teaching and learning activities by applying scientific approach based learning, they eventually realized implementing their teaching and learning as what they used to do. They still apply their teaching and learning by doing oral presentations. They make students stay still; listen to the teacher's oral presentation. On the contrary, teachers have to push students to work a lot, as Jacobs recommended (2017; 20) when it comes to learning, students have always been and will always be the powerful ones. Teachers quite often still make learning activities which are not contextual to their students. Teachers often present definitions at the beginning of the lesson. This kind of activity poses students problems as a

definition is commonly in a statement of abstract concept which students cannot grasp the meaning, or even get the context. To understand a definition, students should be able to relate the concept to the contextual events, facts, phenomena, referring to their lives. However, students would find it hard within this condition.

Besides the rhetorical learning, teacher centered teaching habits as aforementioned above, most teachers seem to have an unbeneficial habit to keep talking a lot in such a way that they might forget to give good chances for students to also train their learning. What they explain sometimes and most often does not refer much to the students' need. Describing language features of a text seems to be quite far from what students need for their life sake as the main rational priority to read a text in our daily life is to get the content comprehension.

Doing extensive and intensive activities on the content comprehension is worth doing in reading classes. Quite often after having a teaching and learning on reading observation, it was found out that, in some steps, the classroom activities did not much focus on the way or strategy to get the content comprehension. Instead, the class discussed much on the other ways around such as discussing generic structure of the text, language functions of the text. These kinds of activities do not only get far from the students' life context or needs, these activities also waste of time and energy.

When faced with a question how to develop the twenty first century skills; critical thinking, creativity, collaboration, and communication, for the students, most teachers seem to get difficulty to answer the question comprehensively. It could be quite logical as they might find it hard to implement the teaching and learning activities through scientific approach based learning and teaching. As recommended in the government rules pp 22 2016,

implementing scientific approach based learning is considered compulsory for all education levels in Indonesia. Therefore, having good knowledge of the teaching and learning model academically is quite recommendable.

#### Scientific Approach Based Learning Steps and Their Implementation

We have several scientific approach based teaching and learning modes to go around in our daily practices. This is a good world-wide teaching and learning trend to implement as Nancy W. Gleason (2018; 4) recommended; Many of the new jobs that will exist even ten years from now, we cannot imagine yet. The well-paying jobs will involve creativity, data analytics, and cyber security. Fortunately, the government responded this through pp 22, 2016. The implementation of the teaching method hopefully addresses students' target behaviors relevant to their future needs as Maich (2016; 5) stated; A target behaviour is selected because its change would improve quality of life for the individual undergoing behaviour change.

Basically, the government issued the scientific approach based learning as publicized in 2016 citing that the steps consists of mengamati (observing), menanya (questioning), mencoba (experimenting), menalar (associating), menyaji (networking), and mencipta (creating). However, in Bab IV of the same government regulation, it is clearly mentioned that the teaching and learning implementation, is recommended to apply not only scientific approach based learning, but penyingkapan or discovery learning method, and project based learning method as well.

Understanding the scientific learning steps for teachers in common is not an easy

job. They might have their own perceptions and implementations referring to the specific subjects and particular topics. Having diverse interpretations on the same ground of being scientific is well justified so long as their understanding could form the same basic concept. The basic concept of those steps of scientific approach based learning is logically the first five steps, mengamati (observing), menanya (questioning), mencoba (experimenting), menalar (associating), menyaji (networking), certainly form knowledge, while the last step, mencipta (creating), produces skills.

The first five steps themselves can be split into two main implementations. The steps of mengamati (observing), menanya (questioning), mencoba (experimenting), menalar (associating), can be implemented individually as implementing those steps can be done silently focusing on certain data. Thus individual person can apply scientific steps in his daily activities for his own sake. This activity should end in knowledge or information. Now that he has got the knowledge, he needs to inform this to other people. Therefore, then he needs another one to share (networking). In short, the first five steps do not theoretically provide rooms for developing productivity or creating the target product of the students' learning. The first five steps ends in knowledge which students have to construct.

To make it easier to understand discovery learning, it is recommended that though the discovery learning has its own syntax, it would be better concluded similar or the same as scientific approach based learning steps. The similarity can be seen on the following table.

No.	Discovery Learning (Hosnan, 2014)	Scientific Approach (pp. N0 22/2016)	A Scientific Approach to Teaching (Kimberly, 2009)	Genre Based Approach
1	2	3	4	5
1	Stimulation (leading to get problems)	Mengamati,	Observing	Knowledge
2	Problem statement	Menanya	Questioning	
3	Data collection	Mencoba	Analyzing	
4	Data processing	Menalar		
5	Verification			
6	Generalization			
7		Menyaji	Networking	Skills
8		<i>Mencipta</i>		

Table 1. Syntax of DL, SABL, and GBA

The table above shows clearly that in fact we have no significant difference, or basically similar, among those three teaching models as in column 2, 3, and 4. For language learning, the last one, table 4, seems to be more academically practical, and avoid misleading concept and actions. As we know that *analyzing* should be understood to have activities as *data collection*, *data processing*, *verification*, and *generalization* as found in the discovery learning. We should also understand that analyzing should be understood as covering *mencoba* (experimenting) and *menalar* (associating) found in column 3 above. Therefore, for practicality understanding, applying scientific approach based teaching and learning would be more easily practiced as recommended by Kimberly (2009). Kimberly presented scientific teaching and learning into four steps *Encourage Observation* or observation, *Foster a Sense of Wonder* or questioning, *Push for Analysis* or analyzing, and *Require Communication* or networking.

Surprisingly, if we think deeply, we will have a logical implication that all the steps recommended by the government

could be concluded into two main aspects of learning; knowledge and skills (See column 5 on the table 1). Here is the basic essence of teaching and learning model which applies Student Centred Learning (CTL) on knowledge. Formerly, to present knowledge a teacher used to give lengthy descriptions in oral presentation, while students were listening attentively, focusing their attention on the teacher. At present time, it is the students' job to construct the knowledge by applying the scientific learning steps.

Learning through the development of reading approaches in classroom learning, SQ3R and PQ3R are quite popularly known as a reading strategy to get good reading for comprehension. To our amazement, those reading techniques are basically similar to the scientific approach to teaching. To make it easier to understand, check the table below.

No.	SQ3R	PQ3R	Scientific Approach Based Learning
1	Survey	Preview	Observe
2	Questions	Questions	Question

3	Read	Read	Analyze
4	Recite	Recite	Network
5	Review	Review	Network

Table 2. SQ3R/PQ3R, SABL

From table 2, it is quite obvious that both SQ3R and PQ3R are scientific approach based in nature. The difference lies on their terminology. Both SQ3R and PQ3R apply the third step by reading, while in SABL uses the third steps as analysing. Those two terms refer to the same concept and action; while reading students have to make an analysis of the text to get the answer of the questions posed in earlier step. The next step, reciting in SQ3R/PQ3R is similar to networking in SABL. This means students have already finished analysing the text by reading. In another word, we can also say that students have already analysed the text to get the comprehension by answering questions from earlier step. The answers to the questions posted at the earlier step push the students to recite or do networking. Knowledge has then been constructed successfully.

### **The Twenty First Century Skills Implementation through the Scientific Approach Based Learning**

Most teachers seem to get confused when and how to apply the twenty first century skills; critical thinking, creativity, collaboration, and communication, in their teaching and learning activities. We even found many teachers writing the twenty first century skills; critical thinking, creativity, collaboration, and communication as the main steps of their teaching and learning procedures. That is hardly acceptable as the twenty first century skills are not considered to be recommend-ably teaching and learning syntax. As mentioned earlier, the recommendable teaching and learning methods are scientific learning method,

discovery method, and project based learning method (pp. 22, 2016).

Before getting the answers of the questions when and how to apply the twenty first century skills; critical thinking, creativity, collaboration, and communication, in their teaching and learning activities, we need to make a clear confirmation that the syntax of the scientific approach based learning in concern consists of observing, questioning, analysing, and networking. Besides being simple, this syntax of learning scientifically seems to be quite applicable for language learning. Here is the strategy how to implement the scientific approach based learning and teaching to develop the twenty first century skills.

The observing step is usually considered as the first step in this learning and teaching syntax. It is the step for the teacher to provide life symptoms, factual data, real phenomena which students have to observe physically using their physical and cognitive sights. This is a good training and strategically important as Daniel (2007) recommended; thinking critically should be taught in the context of subject matter. This first step needs students to work hard to get the learning lesson by applying critical thinking. To be critical, students need to have among others; prior knowledge (Elizabeth, 2003: 13), metacognitive skills, and future outlook, to get the lesson from their observing activities. Besides that, to do observing can be done individually or in groups as well. Being accomplished individually, one may have his/her own actions individually and silently. When observing is accomplished in learning small groups, collaboration, communication, and also creativity may also develop as well.

The second step is questioning skills. Questioning skills could be applied well as the inseparable process of observing. Questioning needs critical thinking (Willingham, 2007; 1) Critical thinking is not a set of skills that can be deployed at any

time, in any context. It is a type of thought that even 3-year-olds can engage in—and even trained scientists can fail in. Nilson (2018) also pointed similarly as saying; Critical thinking scholars also agree that questions are central to students acquiring critical thinking skills. We must ask students challenging, open-ended questions that demand genuine inquiry, analysis, or assessment. Students should raise questions based on what they observe. Good and critical questions must come out from data, facts, and phenomena being observed. Therefore, the questioning activity should be understood as a logical action for the learners to get answers from what they observe. This is not an easy activity. Quite many students do not succeed making critical and contextual questions well. Making questions needs good understanding as Elizabeth (2003; 14) stated; comprehension is not a passive process, but an active one. However, it is understandable as they have never trained to do so in their classroom activities. When the teacher trains this questioning exercises well, I believe, students would be able to develop their questioning skills proportionately. Questioning skills is quite good and strategic competence for every student to learn and develops for their own beneficial life context at present and also in the future.

The third step is analysing. Within this step, the students should analyse the data, the factual evidences, phenomena, which they observe to come to information or a conclusion. How to analyse depends very much on the students' logical thoughts. Students may make a semantic mapping or general trends based on the data they observe. Thus, this analysing step pushes students to work hard to develop their thinking. When the teacher applies cooperative learning, students may have

their small group discussions. They then practice collaborative and also communicative learning. However, a teacher can also apply individual learning which makes individual students to finish the job of his own. The analysing step should get the result by answering the questions posted in the earlier step. The first three steps; observing, questioning, and analysing, should end up in an understanding in the form of information or knowledge. This is in accordance to Jacobs' ideas (2017; 20); Constructivism tells us that teachers cannot pour knowledge into students' heads; students must construct that knowledge for themselves.

The fourth step is networking or socializing. It is the time for students to pass the result of their work so far to other parties. Networking step encourages students to develop not only their creativity skills, but also communication skills, and collaborative skills. Creativity is implemented on the need for them to produce language products in their reports. Collaborative work is needed for them to work together in building a good team for their groups. Communication skills are much needed both for running the works within their own team and also making perfect presentation to other plenary class.

From the description, it is quite clear that the implementation of the scientific approach based teaching and learning is the main vehicle to make it possible to develop the twenty first century skills well. Therefore, the success of the scientific approach based learning is primarily important for every teacher to do her professional careers. Holding the class by applying cooperative learning is also worth doing as this facilitates all the twenty first century skills applicable in every steps of the scientific approach in learning as seen in the following table.

No.	4C SABL	Critical Thinking	Creativity	Collaboration	Communication
1	Observing	à √	à √	√	√
2	Questioning	à √	à √	√	√
3	Analyzing	à √	à √	√	√
4	Networking	√	√	√	√
5	Creating	√	√	√	√

Note: ∑; individual learning      √; cooperative learning

Table 3. SABL and 21ST Century Skills

## CONCLUSION

The implementation of the scientific approach based teaching and learning in reading is a quite strategic effort for a teacher to develop lots of skills quite necessary for students' life at present and also in the future. This scientific approach in teaching will exactly develop students' way of thinking into logical and scientific as well. Besides, students also develop their skills in accordance with the needs in this century, popularly known as the twenty first century skills (4C); critical thinking, creativity, collaboration, and communication. These four skills are hopefully developed into the students' daily attitudes to get a success for their lives. Consequently, teachers should also work hard developing their pedagogical as well as professional competence to get along with the need for this century advancement.

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