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## **The Issues of Our Science Education: An Auto-criticism**

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### **EXTENDED ABSTRACT**

Science is not only important for scientists and students, but also for all citizens. Every time, science is present in our lives, both when we breathe, walk, listen to music, and enjoy the beauty of nature. With science, our various jobs become faster and easier. Therefore, the interest towards science should be embarked from the early ages as it plays as a paramount role in our daily life. Students have studied science for years starting from elementary school to high school. But, in fact, most of our learners are still incapable of describing the surrounding science phenomena, and lack of ability in applying the concepts of science in revealing simple science problems. In addition, they find it difficult to manifest their own stance related to science in the everyday world. Science has been divided into 3 dimensions: Science as a process, product, and an attitude. PISA (2013) categorizes the learning achievement of science into science competence, science knowledge, and science attitude. The science competence is composed of the competence in identifying scientific issues, explaining the scientific phenomena, and exploiting the evidences of science in solving problems. Science knowledge consists of the knowledge of science and knowledge about science. The knowledge of science covers the physical, life, earth and space, and technology systems. The knowledge about science includes scientific inquiry and scientific explanation. We should be concerned about the recent achievement of our science education. Such an indicator among others is the survey result of TIMSS in 2009 and 2013 for the eight-grade learners and 2015 for the fourth grade learners which had placed our learners in the low-level achievement category. Our learners were good in answering the routine questions but they are in trouble in answering the questions that require reasoning and imaginary competences. Such weakness coexists with various studies which demonstrate that the competence of science process skills among our learners is still low. The science process skills are very necessary in conducting scientific investigations. The low competence in science process skills has been an indicator of the poor instructional process using scientific-based approach. Even though the scientific-based approach instruction which put the emphasis on the activities of observing, questioning, collecting information, reasoning has been implemented since 2013, the on the ground practice is still far from ideal. Some studies indicate that our science instruction has been far from the scientific activities itself. Another concern towards the quality of our science education is that there has been a misconception that the highest learning achievement in science instruction is observed in the competence of learners in answering the science questions. Consequently, the instructional process tends to seek the shortcut in the form of merely describing the concepts of science, providing the example of the concept used in doing the science questions and asking the learners to work on the science questions. Furthermore, the principle of science as a process and an attitude are not considered important. Rather, answering the questions is more important than doing observation toward a science phenomenon in the laboratory or other scientific activities. Much less effective science instruction has contributed to the lack of creative ideas and the inability of developing innovative thinking competence as well as less reasoning thinking of the learners. The application of science concept in technology has also not received scholarly attention in our science instruction. For example, in the course of instructional process of induction electromotive force, learners are typically exposed to the application of Faraday and Lenz law in working on the questions rather than designing a project plan on how to utilize the water energy, tides, wind, and so forth though it is a minor project in the form of

picture. Project-based instruction has proven to provide the tangible benefit. Another observable indicator of the poor science instruction is the disconnection between attitude and the knowledge of science the learners have obtained. The knowledge of science appears to be only effective inside the classroom and become useless when they get out of school. One of the examples is the attitude of energy-saving. In the energy-saving teaching, the teacher has formulated one of the lesson objectives is that the learners enable to mention 4 ways of energy-saving. The learners are not difficult to answer the formative test related to the topic. However, at home, most of the parents confessed that their kids just leave the TV on when they did not watch it. We can also discover a lot of garbage which has been carelessly thrown on the side of the streets, rivers, though in the formative test administered after the instructional process, the learners have been exposed to the explicit explanation on the ways of protection from the flood, environmental preservation, and healthy environment. Sadly, those who have carelessly thrown the garbage in inappropriate places are the learners who have studied science subject at the primary, junior, senior high schools even university. A national awareness, therefore, should be developed on the importance of science instruction in order to shift the paradigm of the recent poor science instruction.

Key words: scientific approach, reasoning skills, innovative thinking, science instruction.