GOALS OF SCIENCE EDUCATION IN THE PHILIPPINES

by:

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Science is important to everyone. Science education should support the development of scientific literacy in all students as well as motivate them to pursue careers in science, technology and engineering.

Science is useful because of its links to technology and industry, which from a national perspective are areas of high priority for development. Science provides ways of making sense of the world systematically. It develops students’ scientific inquiry skills, values and attitudes, such as objectivity, curiosity, and honesty and habits of mind including critical thinking. All these are useful to the individual student for his own personal development, future career, and life in general. These skills, values, attitudes, and dispositions are likewise useful to the community that an individual student belongs to, and are further useful to the country that he lives in.

The learning of science is also important for the nation’s cultural development and preservation of its cultural identity. Science is most useful to a nation when it is utilized to solve its own problems and challenges, keeping a nation's cultural uniqueness and peculiarities intact. Thus in many countries, science teaching and learning is linked with culture. Science is seen as an essential part of culture and a powerful way of thinking.

In the Philippines and around the world, people are talking about a science and technology-based world and a knowledge-based economy. Given the expectations and skills required to in such an environment and the varied problems of science education in the country, there is a need to rethink what are the goals of science education. The current direction of curriculum development in many countries is towards scientific
literacy, where the science education needs of all students are differentiated from those who have an interest in scientific careers.

Science educators have established consensus on the goals of school science in the Philippines. Using some criteria, the goals have been identified by the Department of Education as follows: science education should develop fundamental understandings of natural systems; develop understanding of, and ability to use the methods of scientific investigation; prepare citizens to make responsible decisions concerning science-related issues; contribute to an understanding and fulfillment of personal need, thus contributing to personal development; and inform students about careers in the sciences (Ibe, 1997).

The Philippines had a good science curriculum, why it is still far behind in the international standards in science education. TIMSS is the largest international study of student achievement ever undertaken. When TIMSS was first conducted in 1995 among 42 countries, the Philippines placed 41st in science. With similar results obtained in TIMSS, it is evident that there is no significant improvement of our students. Recent results of TIMSS, still the science in the Philippines is below the standards. Although there was study showed that Filipino students have a better attitude toward the two subjects (Science and Math) than the international standard. But even if these students spent more time studying science and math and were more inclined to join related clubs, "this did not translate to a performance better as would have been expected.

To develop meaningful instructional programs for science education, goals need to be in place to direct the outcomes of curriculum development and teaching. Goals are program terminal outcomes that focus curriculum writers or teachers who structure content for learners. Goals provide direction so content can be delivered for long-term impact to students who study the subject. They go beyond everyday teaching objectives; they are directed at long-term learning and programmatic outcomes. Goals are arrived at through at least three different sources: empirical, philosophical, or subject matter (Zais, 1976). Empirical goals are usually developed by surveying the members of society and
using this analysis to determine the directions of education. Philosophical sources of educational goals are derived from the thoughts of the great thinkers of the time and their beliefs of what schooling should be. Subject matter sources for curriculum goals are commonly used by professions to structure the importance of their subject to the greater education of all. Some criticize using the motives of subject matter specialists since they often become narrow and technical.

Experts in the academe, they must look beyond the development of engineers, doctors, scientists and other science related professionals. They must seek goals that take curriculum designers and experts beyond the limits of these specific professions toward the goal scientific literacy for all. As Tyler (1950) stated, “What can a particular subject contribute to the education of young people”

The main argument of this paper, is to re-evaluate the goals of science education in the Philippines and if these goals provide avenues for students to engage in science and encourage them to take science-related careers.

**Philippine Science Curriculum**

The new science program has many innovations. One of which is the decongestion of the competencies and arrangement in spiral progression manner. In the old curriculum, a specific discipline is being offered per grade level. First year will take up general science, the second year will deal with biology, the third year will study chemistry, and the seniors will master physics. But in the new science program, the different disciplines in science which are life science, chemistry, physics and earth science, have been incorporated in every level.

According to the K to 12 Curriculum Guide Science 2013, the aim of the science curriculum is to produce scientifically literate citizens who are informed and active participants of the society, responsible decision makers, and apply scientific knowledge that will significantly impact the society and the environment. Specifically, the science
curriculum is designed to enhance three learning domains of the students. These are performing scientific processes and skills, understanding and applying scientific knowledge, and developing scientific attitudes and values. These learning domains are the basis for drafting the survey questionnaires in this study. With the improvement of the various learning domains, it is the goal of the K12 curriculum to produce students who possess the following qualities.

1. Critical/creative problem solver

2. Responsible Steward of Nature

3. Innovative or inventive thinker

4. Informed Decision Maker

5. Effective communicator

**Special Science Curriculum**

Special science curriculum is designed to ensure that the students upon graduation from a secondary school, will be able to learn more independently acquire academic excellence and develop the capability to cope with new knowledge in technology (DOST-SEI). Special Science curriculum places major emphasis on knowing basic facts, understanding science concepts, applying science concepts to solve problems and develop explanations using laboratory equipment and performing science experiments. Special science curriculum is the Secondary Development Program (SEDP) based curriculum enriched with supplemental activities for Science and Technology and Mathematics Classes and with additional subjects in science. It is also called enriched curriculum. Special science curriculum is effective in enhancing creative thinking and critical thinking abilities, laboratory performance skills, content mastery and scientific attitude among the students.
Various local studies were made on special science curriculum. One reflected that the effectiveness of special science curriculum in selected Department of Science and Technology Special Education Institute (DOST-SEI) node schools in Manila, Philippines. It revealed that some of the strength of special science curriculum includes integration of the lesson to the recent technological trends and development, the school’s provision of advanced information in science and technology and the teachers encourage students to develop critical thinking skills.

Government Perspective

Quality education is the best that the country can offer, a call that leads to quality employment for a better quality of life. Hence, lawmakers should still be in the lookout for potential advancements in the current status of our education system.

Public education in the Philippines has long been neglected by the government. The Philippines spent for education only about 2.3 per cent of the Gross Domestic Product (GDP). Public expenditure on education as a percentage of GDP gives an indication of how a country prioritizes education in relation to its overall allocation of resources. Though the Philippines Government allocates the biggest bulk of budget for education as mandated by the Constitution, the amount is still far below the standard of at least six per cent of the GDP prescribed by the United Nations.

This reality obviously brings several challenges to the education sector. One, classroom shortage is evident in many public schools in the Philippines. Classroom to student ratio is increasing every year. Worse, there are remaining towns which do not have elementary schools. Two, teacher shortage is also of paramount concern. Teacher to student ratio is getting higher every school year. Obviously, teachers accommodate forty to sixty students per subject in a classroom, not to mention the number of subjects they teach and workload they have. Three, instructional materials are sacrificed due to tight public finances. Students rely on borrowing or sharing books, or using old ones. Book-to-
student ratio has not actually been addressed by competent authorities. Many public schools likewise do not even have access to the World Wide Web. Fourth, latest technological innovation for education is still an elusive dream to many public schools and students.

If there was one thing I could change to improve education in the Philippines that would be by reforming the mindset of our leaders and policy makers towards investing on Philippine public education system especially investing on science education in particularly, through science education it will steadfast the growth and development of our country and we can compete with the power house country in the world, with the other sectors calling for a total reform of the educational system in the country. I believe in the power of collective action to influence our leaders and policy-makers. Our policy-makers are the one responsible why there is minimal budget in education though it has the biggest chunks in the national budget.

**Science Education Goals of other Countries**

The current framework of the Singapore Science Curriculum is centered on Science as an Inquiry. It focuses on the acquisition of general inquiry processes and science process skills which scientists use to make sense of the natural environment.

In the Singapore education system, Science is introduced formally at grade 3 and it remains a core subject area throughout a child’s ten years of compulsory education from the elementary to high school levels. The science education aims at equipping individuals with the skills, processes, and attitudes needed to acquire knowledge about the natural world as well as producing competent individuals in research and development in the various scientific disciplines.

Based on the practices of Singapore education system, the Philippine education agency can adopt the best practices of Singapore education system in terms of science
curriculum. Since, science subject in Philippine education system also introduced at grade three level and its goals have also similarity with Singapore science curriculum.

In the international tests, Singapore students ranked first in the science achievement test of the 2015 Trends in International Mathematics and Science Study (TIMMS). Although students have performed very well in science, the Ministry of Education has constantly reviewed and improved the science curriculum so that students can be exposed to instruction and assessment that focus more on promoting their higher-order thinking and real world problem solving skills. These two skills are essential for preparing highly qualified knowledge workers to meet the needs of the 21st century knowledge-based economy (Hargreaves, 2003).

In the Japan education system, The science-technology-society approach in science education was chosen as an innovative model for Japanese students. This approach to science education requires in-service training and situational practice, individual teachers can never develop by themselves, and systemic change in science education is the only way to develop real innovation in science education in Japan. This means a multidimensional support system in the real sense for the science education required for improving students’ scientific literacy.

The main goal of Science education in Japan is to help students learn science history and the relation between human life and science in order to develop their scientific perception and thinking. (Kumano, 2014)

In international test, Japanese students ranked third in the science achievement test of the 2015 TIMSS. Through the years, Japan was becoming a world leader in science. The Japanese people and their government continued to study and work to gain prominence. These unusual efforts set the tone nationally and made possible Japanese economic development. One reason for the country’s economic and national success is that Japanese citizens believed that they were involved with the ongoing
process of developing a well-organized centralized education system in science education in particular.

Science education standard in South Korea is Socio-Scientific Issues (SSI) and Competency-based Science Education. Socio-scientific issues are somewhat controversial topics that exist at the intersection of science and society. Socio-scientific issues represent an opportunity to expand the relevance of science education for students and teachers. Through this approach it has a tendency to encourage both scientific and moral reasoning, helping students make personal connections to science content. Competency-based focuses on helping students develop skills of scientific reasoning and inquiry.

Based on the report, despite Korean students have high levels of achievement in 2015 TIMMS, ranked second in science. Students often report low levels of interest and engagement with science as a subject.

The science curriculum in Philippines had undergone rapid changes over the years. It focused on enabling citizens to make reasoned decisions, when faced with issues in modern society related to science and technology. Recent calls for Philippines’ educational improvements in science education have focused on the need for science related professionals to be competitive in the international arena. Research and development in science education, science, and the science of learning have progressed substantially since the first science curriculum of the Philippines. Research-based understandings of learning also diverge from that which informed the recent efforts at systemic, standards-based reform.

The Philippines’ Science Curriculum envisions the development of scientifically, technologically, and environmentally literate and productive members of society. They must possess effective communication and interpersonal and lifelong learning skills as well as scientific values and attitudes. These skills will be acquired through a curriculum that focuses on knowledge relevant to real world and encompasses methods
of inquiry. These will be implemented in a learning environment that promotes the
collection of ideas and instills respect for others.

Since the goals of science education in the Philippine are clearly stated in science
curriculum: produce scientifically literate citizens who are informed and active
participants of the society, responsible decision makers, and apply scientific knowledge
that will significantly impact the society and the environment.

These goals were also related with the goals of science education in Singapore,
Japan and South Korea. These countries are TIMSS top scorer in terms of science
education achievement test is concerned. Why Philippines science achievement test
conducted by TIMSS is still no significant increase or may be closer to these countries.
Furthermore, understanding science and the extraordinary insights it has produced can
be meaningful and relevant on a personal level, opening new worlds to explore and
offering lifelong opportunities for enriching people’s lives. In these contexts, learning
science is important for everyone, even those who eventually choose careers in fields
other than science.

An effective science curriculum goes with the combination of a good curriculum
design, effective teachers and sufficient instructional materials, and good school
environment that result to students motivated to learn. It is important that teachers
must be equipped and well trained to execute teaching using variety of instructional
strategies effectively in science curriculum. Furthermore, in-service training should be
conducted among science teachers to better execute effective cooperative learning in
the classroom to ensure that scientific process skills are enhanced among students.

Clearly, a more specific review of the current goals science education is needed. If
the current science curriculum promotes or achieving its stated goals.

The real change for the science education in Philippine will occur only if the
government prioritize better science curriculum and grant funds for research and
development as well as provide more scholarships for students will take courses related to sciences. In order to achieve the stated goals of science education in the Philippines, experts in the academe conduct more researches where the science education is leading, design a science curriculum appropriate for Filipinos students not copy from other countries because it is effective to them. It can be noted that significant changes in science education in the Philippines were influenced and funded mainly by foreign institutions and governments. The trends of science education in US brought and influenced significant innovations in the development of science education curriculum in the Philippines. Filipino teachers and some Filipino scientist were not consulted most of the time during the process of conceptualizing and developing the science curriculum. We need a science curriculum that feasible and suitable for Filipino students that will make Philippines a power house in the field of science, it should highly emphasis on science practical works not on Filipino values and health education. It is important in making the science curriculum responsive and relevant to the needs and demands of time.

References:


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