

Basic Science Development Program of the Philippines for International Cooperation

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Introduction

Science is frequently perceived to be of great importance because of its links to technology and industry which, from a national perspective, may be areas with high priority for development. Consequently, science is included as a core element in elementary and secondary levels despite conceptual complexity and high cost of implementation. Another justification for the inclusion of science in school curricula is that all citizens need to achieve a degree of “scientific literacy” to enable them to participate effectively as citizens in modern societies.

Studies indicate however, that many of our Filipino learners are not attaining functional literacy, without which they find it too difficult to meet the challenges posed by our rapidly changing world.

Current Problems in Basic Science Education of the Philippines

Students performance in National Achievement Tests show that aside from Mathematics, Science continues to be the most difficult field of study in basic education. As for the 1999-2000 National Elementary Achievement Test (NEAT) , pupils gave correct answers to less than 50% of the questions in Science (48.61%) and mathematics (45.69%).

In comparison to our science syllabus, there are fewer topics in the science syllabi of countries with high achievement in the Third International Mathematics and Science Study (TIMSS). The national mean score in Science was also only 48.7% in the 1997 National Secondary Achievement Test (NSAT). This indicates that these are more difficult subjects for the students, and for which additional contact time maybe needed and innovative teaching techniques should be devised.

The main factors which can be cited to account for the low performance in science of the Filipino student include the lack of science culture and deficiencies regarding the school curriculum, the teaching learning process, instructional materials and teacher training.

One of the roots of the unsatisfactory achievement of our students is our congested curriculum. The elementary curriculum in the Philippines is overcrowded, Grades 1-3 in particular. Having too many subjects limits the extent to which teachers and students can focus on those basic skills critically important for performance and success in the later grade levels. The various syllabi (like biology, chemistry and physics) in basic education cover so many topics that could not generally be covered within the school year.

Other aggravating problems are the lack of textbooks and lack of science equipment. For instance, poorly equipped laboratory rooms which commonly beset

many high schools, have hindered the conduct of scientific investigations and hands-on activities.

Efforts to improve the quality of basic science education have never been as extensive as in the current decade. The various accomplishments undertaken fall in different areas such as curriculum and instructional materials development; provision of physical facilities and equipment ; institution building; and teacher training. This paper focuses on curriculum development.

The 2002 BEC (Basic Education Curriculum) of the Philippines

To help raise the achievement level of our students, we need a refined curriculum whose components have been re-clustered into fewer learning areas; with better integration of competencies and topics within and across these learning areas; and with more time not for additional subject matter that will overload our learners but for the mastery of essential competencies and for personal analysis and reflection on the major concepts.

A process of reviewing the curriculum of Philippine basic education started in 1997, which took into consideration both worldwide trends and Philippine realities. The 2002 BEC is not a sweeping change but a restructuring of the 1983 New Elementary School Curriculum (NESC), and the 1989 New Secondary Education Curriculum (NSEC). It is focused on the basics of improving literacy and numeracy while inculcating values across learning areas to make it dynamic. The implementation of BEC is this school year 2002-2003.

The Dept. of Education (DepEd) envisions every learner to be functionally literate, equipped with life skills, appreciative of the arts and sports, and imbued with the desirable values of a person who is makabayan (patriotic), makatao (mindful of humanity), makakalikasan (respectful of nature), and maka-Diyos (godly). The DepEd has the mission to provide quality basic education that is equitably accessible to all, and to lay the foundation for lifelong learning. The over all aim entails the acquisition of life skills, a reflective understanding and internalization of principles and values, and the development of the person's multiple intelligences.

The Learning Areas of the 2002 BEC

Table 1 shows the learning areas from Grades 1 to 6 and First to Fourth Year. There are five learning areas: Filipino, English, Science, Mathematics and Makabayan. In specific terms, the learner's linguistic literacy and fluency shall be developed in Filipino and English; scientific and technological literacy in Science and Technology; numeracy in Mathematics; socio-cultural and politico-economic literacy in Makabayan.. Filipino is the medium of instruction for Makabayan, and English as the medium of instruction for Science and Mathematics.

Science Program in the 2002 BEC

Science aims to help every Filipino learner to gain a functional understanding of scientific concepts and principles linked with real-life situations, and acquire scientific skills, attitudes, and values necessary to analyze and solve day-to-day problems.

Table 2 shows the comparison between NESC and the restructured curriculum. In Grades 1 and 2, simple scientific concepts and skills are taken up in English and

Makabayan. Science begins as the children are taught to observe, monitor, and describe their interaction with their immediate environment. In Grade 3, the teaching of Science as a separate learning area begins. Science from grades 3-6 includes basic health concepts, and thus the nomenclature Science and Health. Time allotment for Science is increased in Grades 4-6.

Table 3 reflects the NSEC and the restructured curriculum. In First Year, Integrated Science builds on elementary Science, and presents basic concepts in earth science, biology, chemistry, and physics. In Second Year, the learners focus on Biology, which deals with the living world of human and non-human species, human interactions and relationships with the environment, and the problems we face relative to health, reproduction and heredity, food production, resource management and conservation. In Third year, learners focus on Chemistry, which deals with the properties and chemical behavior of matter, atomic structure, chemical changes, and technology affecting the environment and society. In Fourth Year, the graduating students have the option to take up either Physics or Advanced Chemistry.

The learners need more time to do pre-laboratory work and to conduct investigatory projects outside the structured laboratory settings. Thus, the one-hour allotment shall be the teacher-student contact time for structured learning in the classroom and the laboratory.

Content is delivered using a variety of media and resources. From a textbook driven coverage of content, schools are encouraged to use, Information and Communication Technology (ICT) and community resources to widen access to knowledge and to enrich learning.

The teaching- learning process is interactive where learners, the teachers, instructional materials and information technology interact with one another. Learning is assessed using a variety of measures. The purpose is to gather information about the learners' progress in holistic terms. The restructured curriculum involves innovative, interdisciplinary and integrative modes of institutional delivery.

Meeting the Challenges of the Future

With much time, effort and resources spent in designing the 2002 Basic Education Curriculum, do we expect the birth of functionally literate Filipino learners in the next ten years or so? This remains to be a question until monitoring activities are done.

With the problems of the Philippine basic education that need to be addressed, the future may hold little promise. If our presence in this forum is an expression of our strong commitment to pursue science education, there may be hope for us. If we can work towards our goals not as singular countries but as part of a larger regional society; or if we foster international cooperation, then we can fully harness and organize resources in our respective nations for the improvement of basic education in general and science education in particular in the whole Asian region.

REFERENCES

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Table 1. Learning Areas for Basic Education

Grade/ Year Level	Learning Area 1	Learning Area 2	Learning Area 3	Learning Area 4	Learning Area 5	
1	Filipino	English (w/ Science)	---	Mathematics	Makabayan (w/ Science)	
2	Filipino	English (w/ Science)	---	Mathematics	Makabayan (w/ Science)	
3	Filipino	English	Science and Health	Mathematics	Makabayan	
4	Filipino	English	Science and Health	Mathematics	Makabayan	
5	Filipino	English	Science and Health	Mathematics	Makabayan	
6	Filipino	English	Science and Health	Mathematics	Makabayan	
First Year	Filipino	English	Integrated Science	Elementary Algebra	Makabayan	
Second Year	Filipino	English	Biology	Intermediate Algebra	Makabayan	
Third Year	Filipino	English	Chemistry	Geometry	Makabayan	
Fourth Year	Filipino	English	Advanced Chemistry (Track A)	Physics (Track B)	Business Math & Statistics (Track A) Trigonometry & Adv. Algebra (Track B)	Makabayan

Table 2. The NESC and the Restructured BEC for Grades 1 – 6

SUBJECT AREAS	Daily Time Allotment					
	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6
GMRC	20	20	20	20	20	20
Filipino	60	60	60	60	60	60
English	80	80	80	80	80	80
Mathematics	60	60	60	40	40	40
Sibika/Kultura/HKS	40	40	40	40	40	40
Science and Health	40	40	40	40	40	40
MSEP	20	20	40	40	40	40
EPP	-	-	-	40	60	60
Total Minutes Daily	320	320	340	360	380	380

Restructured Curriculum

Learning Areas	Possible Daily Time Allotment					
	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6
FILIPINO	80	80	80	60	60	60
ENGLISH	100	100	100	80	80	80
MATHEMATICS	80	80	80	60	60	60
SCIENCE AND HEALTH	Within English and Makabayan		40	60	60	60
MAKABAYAN	60	60	60	100	120	120
Sibika at Kultura HKS	(Sibika at Kultura)			40 (Heograpiya)	40 (Kasaysayan)	40 (Pamahalaan at Sibika)
EPP	Introduced only in Grades 4-6			40 minutes per day Eduk. Pantahanan at Pangkabuhayan (EPP)		
* MSEP	Integrated in Sibika at Kultura			20	40	40
* EP/GMRC	within every learning area					
Total Minutes Daily	320	320	360	360	380	380

Table 3. The NSEC and the Restructured BEC for the Secondary Level

NSEC

SUBJECT AREAS	Daily Time Allotment			
	1 st Year	2 nd Year	3 rd Year	4 th Year
Values Education	40	40	40	40
Filipino	40	40	40	40
English	40	40	40	40
Mathematics	40	40	40	40
Araling Panlipunan	40	40	40	40
Science & Technology	80	80	80	80
PE, Health & Music	40	40	40	40
T H E	80	80	80	80
Total Minutes Daily	400	400	400	400

RESTRUCTURED CURRICULUM

LEARNING AREAS	Possible Daily Time Allotment			
	1 st Year	2 nd Year	3 rd Year	4 th Year
Filipino	60	60	60	60
English	60	60	60	60
Mathematics	60	60	60	60
Science and Technology	60	60	60	60
Makabayan	180 mins/day for 4 days & 60 mins for 5 th day			
* Social Studies	60 (Philippine History)	60 (Asian Studies)	60 (World History)	60 (Economics)
* TEPP	60 minutes/day for 4 days			
* MSEPP	60 minutes per day for 4 days			
* Edukasyon sa Pagpapahalaga	60 minutes per week on its own, but within every learning area everyday			
Total Minutes Daily	300 (minimum) – 480 (maximum) minutes per day			

Reference: The 2002 BEC (Basic Education Curriculum), Department of Education