Providing Quality Education for All through Teacher Professional Development and Curriculum Development

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Improving the quality of education is very important. In the global scene, it is a goal of Education for All and a significant part of the theme of Education 2030. In the Philippines, UP NISMED since it is its mandate, upholds this thrust and contributes to its attainment. This is specifically in science and mathematics education at the basic and teacher education levels through curriculum development, professional development of teachers, and research. However, due to various constraints its contribution is limited in extent.

JICA provided a boost in pushing this thrust at UP NISMED forward through the project-type technical cooperation called the Science and Mathematics Education Manpower Development Project (SMEMDP) with UP NISMED as the central implementing agency. The Department of Education, Department of Science and Technology, and Commission on Higher Education served as cooperating agencies. Notably, SMEMDP took place in 1994 – 1999, even before the advent of Education for All. Relative to quality education, Education 2030 which was formulated in 2015 made reference to learner-centered pedagogical approaches and teachers who are empowered through training to use such approaches to develop learners' higher order thinking skills, among others. It also referred to teaching and learning materials that exemplify these approaches.

Notably, SMEMDP focused on materials, methods, and professional development of teachers thereby addressing the "teaching by telling" approach which was predominantly being used in teaching science and mathematics in the country, then. Its ultimate goal was to enhance and upgrade the capabilities of science and mathematics teachers in elementary and secondary schools that will lead to effective learning of science and mathematics, through the training provided by teacher trainers trained at UP NISMED. SMEMDP was primarily about capacity building. Its purpose was to make UP NISMED a highly competent Institute to train science and mathematics teacher trainers at elementary and secondary levels who can play a lead role in planning and management of teacher training courses focused on laboratory experiments and *practical work*, and in the development of instructional methods and materials.

SMEMDP involved technical transfer from Japanese experts to UP NISMED staff, counterpart training of UP NISMED staff in Japan, provision of needed equipment and books, development of instructional materials and methods utilizing practical work, conduct of national training of leader trainers to enable UP NISMED teacher educators to apply acquired knowledge and skills and use developed instructional materials, follow-through of leader trainers in the different regions, and conduct of

training courses for classroom teachers. The training scheme followed the cascading model.

SMEMDP was a comprehensive and large scale intervention for the improvement of science and mathematics education. It included all the science and mathematics subjects in the elementary and secondary levels, namely elementary school science, elementary school mathematics, high school earth and environmental science, high school biology, high school chemistry, high school physics, and high school mathematics. The participants represented all the 14 regions of the country and consisted of classroom teachers, administrators, and teacher educators from teacher education institutions. This arrangement ensured that the project was supported by all stakeholders. To a great extent, SMEMDP became a vehicle for "quality education for all" where "all" can be taken to mean the wide coverage of the beneficiaries of the project.

Through SMEMDP, national training curricula were developed and training programs were conducted, sourcebooks in science and mathematics for teacher trainers were published, and posters, video lessons, and improvised materials were made. And after the project ended, UP NISMED continued to develop sourcebooks and other curriculum materials for classroom teachers. It also used the outputs of the projects and the enhanced knowledge and skills of the staff in conducting teacher training programs under other projects for participants in the Philippines as well as from other countries such as in Asia and Africa.

Since 2006, the Philippines through UP NISMED has been participating in the APEC Lesson Study Project led by Khon Kaen University in Thailand and University of Tsukuba in Japan. It introduced lesson study to a few schools, colleges, and universities in the country and used this school-based professional development model to promote teaching mathematics through problem solving and teaching science through inquiry. UP NISMED recognizes that teacher training programs are necessary and important but they are not sufficient. Lesson study can overcome the limitations of training programs in deepening the content knowledge and pedagogical content knowledge of teachers which is very important in empowering them for the country's K to 12 curriculum reform. UP NISMED has documented the outputs as well as the experiences and learnings of its staff and the teachers with whom they are collaborating in lesson study through two books and a guidebook on how to conduct lesson study.

Teachers and their administrators in schools where UP NISMED is doing lesson study are encouraged by the pieces of evidence that strongly show that both teachers and students are learning much through lesson study. In relation to this, future international cooperation as far as the Philippines is concerned should relate to sustaining and scaling up of lesson study. It may be good to have Japanese teachers or educators work with teachers in the schools and with teacher education faculty in teacher education institutions to do lesson study. The whole process can lead to a model on how lesson study can be made part of the school culture in

improving student learning and thinking by enhancing teachers' competence through lesson study. It may also be good if Japanese textbooks and other curriculum materials on science and mathematics can be made available to teachers and teacher educators which they can use as they develop research lessons. And most importantly, it may be good to conduct joint research on themes such as what exactly teachers learn in lesson study and what students learn in research lessons. UP NISMED is very willing to take the lead role in implementing this future collaborative work with Japan.