 ISSUES OF EDUCATION FOR SUSTAINABLE DEVELOPMENT (ESD)  
IN TEACHER EDUCATION CURRICULUM IN INDONESIA:  
PROGRESS AND CHALANGES  

ASEP SUPRIATNA  
Faculty of Mathematics and Science Education  
Indonesia University of Education (UPI)  
Jl. Dr. Setiabudi No. 229 Bandung – Indonesia Tlp/Fax:0062-22-2001108  
e-mail: aasupri@upi.edu

Introduction
This paper explores educational efforts towards sustainable development particularly the role of education in the creation of sustainable communities. It is based on critical analyses of current teacher education curriculum especially the curriculum of Mathematics and Sciences Education in Indonesia. The paper aimed at describing some progress as well as challenge on educational program related to the implementation of ESD concepts in teacher education curriculum. Although there is no specific policy from the government regarding the implementation of ESD in the current curriculum, implicitly, its concepts are already included in some courses such as environmental chemistry and biology. Issues of ESD also implicitly included in school-science teaching especially when prospective teachers are carrying out teaching practices at schools and through lesson study activities implemented collaboratively between faculty members, prospective teachers, and school-science teachers.

Progress and Challenge Regarding the Implementation of ESD
According to the minutes of the meeting between Japan International Cooperation Agency (JICA) and Authorities Concerned of the Government of Republic of Indonesia, the overall goal and purpose of the Indonesia Mathematics and Science Teacher Education Program (IMSTEP) are as follows. The overall goal is to improve students’ scientific thinking and experimental skills as well as their understanding of science and mathematics in lower secondary education in Indonesia through institutionalizing and disseminating outputs of the Project. The purposes are: (1) Quality of in-service training
in science and mathematics education will be improved by the institutionalized participation of university. (2) Education to prospective teachers in science and mathematics at the three universities (UPI, UNY, and UM) will be improved.

IMSTEP has set up a triangular approach as illustrated in the following figure.

![IMSTEP APPROACH](image)

Figure 1. Approach of the IMSTEP
Source: Saitos’ presentation

Three components of teacher training programs (pre-service, on-service, and in-service) will contribute to the enhancement of quality in mathematics and science education. Among teacher training programs should be inter-connected for couple of reasons. Faculty members at pre-service teacher training program needs feedback on school reality and contemporary teachers’ needs to produce good prospective teachers. On the other hand, both piloting teachers (on-service teacher training) and MGMP teachers (in-service teacher training) need consultancy to intervene students and to develop teachers’ professionalism. Piloting teachers may share piloting experiences with MGMP teachers and its opportunity to disseminate the piloting outcomes. By collaboration among those teachers training program, it is believed that quality of science and mathematics education will be improved.

In order to accomplish the triangular approach, piloting activity has been implemented in three universities (UPI, UNY, and UM) since 2001. The objective of piloting is to improve science and mathematics learning in pilot schools and to get feedback for improving quality of pre-service
training program at the three universities. We apply several principles into piloting activity, namely, school empowerment, support school policy, hands-on activity, daily life including the consideration on environment, and local materials. We utilize optimally available science and math facilities at schools. In case, school does not have any science and math facilities, teacher educators and teachers develop collaboratively hand made teaching materials by utilizing local materials. We follow the applied curriculum at schools. Teacher educators and science and math schoolteachers develop collaboratively teaching model (teaching plan, practical work activities, teaching materials, and assessment model) and apply it at real class. To improve student active learning in science and mathematics, we develop the hands-on and daily life based teaching model. We also enhance the quality of piloting activity in the IMSTEP Follow-up program implementation through improving in post-class discussion, video and printed documentation, as well as evaluation of the impact. Post-class discussion is an important part of the piloting activities by which the observers and the teacher in charge could share their findings and understanding of the lesson observed. The impact of the piloting activity and several factors influence students’ motivation in learning science and math has been studied through survey to students, parents, teachers at pilot and control schools.

Six principles have been applied in implementing piloting activities, namely collaboration, school empowerment, support school policy, hands on and minds on activities, daily life, and local materials. Procedures of piloting activities include a cyclical scheme of plan, do, and see.

- **Plan.** Piloting teachers and teacher educators conducted several workshops: (1) to identify teaching and learning problems at piloting schools; (2) to design and develop teaching models (lesson plan, student worksheet, teaching materials, and evaluation method); and (3) to try out developed teaching materials

- **Do.** A piloting teacher conducted a lesson by applying the developed teaching model at a class. While teacher educators, other teachers and prospective teachers observed the lesson. Some time, JICA experts attended the lesson. The focus of the observation was student activities, such as interaction of student-student, student-teaching materials, and student-teacher. Observers may take pictures for further analysis.
Right after the lesson, the teacher and observers got together for post-class discussion to reflect the lesson. Observers gave comments and suggestion regarding student activities to improve the next lesson.

Each F(P)MIPA from the three universities and MGMP (Teachers Association) for math and science of junior secondary school collaborated to hold workshops for the following objectives: (1) to share results of piloting, (2) to develop and try out teaching models of junior secondary school science and math in 2004, (3) to introduce lesson study as an alternative strategy for improving learning quality of junior secondary school science and math through improvement of teachers’ professionalism.

In 2005, F(P)MIPAs from the three universities and MGMP for math and science of junior secondary school have conducted lesson study activities at several SMPs in Bandung, Yogyakatra, and Malang. School teachers and teacher educators designed and developed collaboratively teaching models. A school teacher conducted a lesson while other teachers, teacher educators, school principals, supervisors, Local Educational authorities for SLTP, and JICA experts observed the lesson. Following the lesson, the teacher and observers had post-class discussion to reflect and share the lesson. School principal chaired the post-class discussion.

In general, the implementation of lesson study covers the following activities: identifying problems by group of teachers; developing lesson plan by groups of teachers (if necessary, faculty members could give consultation or comments); implementing the lesson plan; observing the teaching and learning processes by MGMP members, faculty members from F(P)MIPAs, School Principals, JICA experts and prospective teachers from F(P)MIPAs; and evaluating the lesson as well as reflecting on its effect by the teacher in charge and the observers. Based on the observations and reflections, teachers in the lesson-study group revise the lesson. They might change the materials, the activities, the problems posed, the questions asked, or all this things.

Based on the lesson study implemented, it seems that the activities could effectively change the schools culture as indicate in the following aspects:

- Through discussion of reflection session, teachers became accustomed to accepting inputs and recommendations from others, expressing the weakness and the
strength of their lessons, sharing ideas for developing better classroom practices, and pointing out the essentials or the important points of classroom activities observed.

- Although many observers came inside the classrooms while implementation of the lessons, the activities are running well as if the observers are not there.
- As an effect of implementation of the lesson, students tend to actively involve in classroom activities such as discussing problems within small group and classroom activities, asking and answering questions, proposing argumentations, and explaining results of group discussion.

Since the effect of the lesson study to the development of schools cultures, it is important that the good practices of the activities need to be disseminated and expanded to other subject areas. The values included in the concepts of ESD are possible to be disseminated through lesson study because it provide an opportunity to share understanding regarding the issues, to enhance commitment of the community, and trying to implement the values of ESD for better community as well as better ways of life.

**An Alternative Strategy to implement the concepts of ESD**

Lesson study activities starting by developing lesson plan collaboratively, implementing an open lesson by inviting some observers and reflecting the lesson observed to find out better quality of the lesson in the future. It is possible that reflection on the lesson touch upon fundamental aspects of ESD. To actualize values of ESD that relate to economical, social, and environmental aspects, it is likely to propose a model of education for sustainable development (ESD) through implementation of school-based lesson study. This program can be carry out in term of piloting at school level implemented collaboratively among school principle, all teachers of one school, supervisor, educational authority, and faculty members from university.

**References**


