CONCLUSION OF SPECIALIST SESSION

Overall Purpose of the APEC Project

The project aims to (1) collaboratively develop innovations on teaching and learning mathematics in different cultures of the APEC Member Economies, and (2) develop a collaborative framework involving mathematics education among the APEC Member Economies.

Four Phases of the Project

Phase I A open symposium and closed workshop (specialist session) among key mathematics educators from the cosponsoring APEC Member Economies was hosted in January 2006 by the Center for Research on International Cooperation for Educational Development (CRICED), University of Tsukuba, Japan, in order to develop further a research proposal and collaborative framework for the implementation of innovation in teaching and learning mathematics.

Phase II Each cosponsoring APEC Economy will develop some examples based on the above collaborative framework (February to March 2006).

Phase III An International Symposium will be organized in order to share and reflect on each Economy's research results and best practice. The Symposium will be hosted by Center for Research in Mathematics Education (CRME), Faculty of Education, Khon Kaen University, Thailand (June 2006).

Phase IV, The products for innovation in mathematics education will be developed and adopted in APEC economies (July 2006).

Products of the Project

The Products include Proceedings of the Tokyo Sessions and Proceedings of Khon Khaen Session. After the project, it is planned to develop a book on teacher development for good practice through Lesson Study with a VTR resources based on the products discussed below.

Focus of Tokyo meetings

There are several possibilities for innovation of mathematics education. Lesson Study which originated from Japan is currently a central focus in US and other economies for the professional development of teachers and the improvement of students' learning. The Tokyo meetings came to a consensus about the significance of focusing on Lesson Study as a means to innovation. Participants at the Tokyo meetings agreed that Lesson Study promotes good practices and these good teaching practices are powerful model for changing the quality of education. For enhancing Lesson Study in their economies, the Tokyo participants agreed to develop a VTR of good lessons as a product of Lesson Study and to use it for teacher education.

Product of the Tokyo meetings

At the Tokyo meetings, researchers from different APEC economies presented research papers together with VTRs. In the specialist sessions, the main focuses of discussion were as follows: what is good practice, challenging to improve the quality of education through Lesson Study, and how to use a VTR resource for the aforementioned improvement. Good practice embodied in Lesson Study is based on outcomes of successful students' learning, including students' mathematical thinking, and can be used for further development or challenges. In conclusion, the Tokyo meetings developed a format for the final report which is to be used for teacher education in APEC economies. At the APEC Khon Kaen meeting, it is planned to produce the following components to support teacher education and professional development:

- **Research papers for developing good lesson.**
- **Videos with Lesson Plans**
- **Worksheets (as appendix) to accompany videos for Teacher Development**

Based on the results of APEC Khon Kaen meetings, we will publish a book consisting of reports and VTRs of Lesson Study from participating economies.

Necessary framework for developing products of the project

Through discussion at the Tokyo meetings, participants concluded that the following research topics are necessary for innovation of mathematics education through Lesson Study:

- What is Good Practice
  - Definition of desired mathematical performances by students
- What is Lesson Study
- Overcoming challenges that impede Good Practice
- Possible Themes
  - Lesson Study as professional development
  - Lesson Study as innovation / reform movement
  - Lesson Study to develop content
  - Lesson Study to develop teaching approaches
- Appendix of VTR

Core Ideas of Lesson Study to be used for the APEC Project

Key Principles for Adaptation of Japanese Lesson Study were identified at the Tokyo meetings. These are:

- Teachers helping teachers (teacher-led) to improve mathematics instruction in

the classroom.

- Teachers play a central role in working with other teachers. Professors and researchers play supporting roles especially in providing theoretical framework.
- Decentralizing teacher development.
- Using actual classroom scenarios
- Adopting a Lesson Study cycle comprising planning → implementing and observing → discussing and reflecting (and the cycle repeats itself)
- Developing teacher knowledge through Lesson Study.

In the long run, grounded theories (or practical theories) are developed.

VTR form for good lesson to be used for teacher education.

- 10-minute video clip to illustrate the theme of the paper (e.g. lesson study to develop content)
- Explanation in the paper about how the video illustrates the theme
- VTR (by DVD-rom or CD-rom)
  - Title and others
    - Copyright and product data: including names of related people
    - Title of VTR (It does not need to be the Name of Topic)
    - Name of Topic, Grade, Name of teacher and school
  - Subtitles are necessary even in the case of English language
    - If possible, full translation is best
  - Phases in Lesson and understandable explanation about extract.
- Description (Appendix)
  - Title of VTR
  - Short summary of the lesson showing the aims of the lesson and the major problems or aspects covered in the lesson.
  - Components of the lesson and main events in the class.
  - Possible issues for discussion and reflection with in-service teachers or pre-service teachers observing the lesson.
  - Minimum information about copyright and acknowledgement of contributions of related people.

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