

## **Evaluation Report of the APEC HRD 03/2006 Project**

### **“A Collaborative Study on Innovations for Teaching and Learning Mathematics in Different Cultures among the APEC Member Economies”**

#### **Background**

At the third APEC Education Ministerial Meeting held on April 29-30, 2004 in Santiago, the ministers defined four priority areas for future network activities, one of which was “*Stimulating Learning in Mathematics and Science*”. Based on this priority, the project “*A collaborative study on innovations for teaching and learning mathematics in different cultures among the APEC Member Economies*” was approved by the APEC Member Economies in August 2005. The following thirteen economies have been participated in this project: Australia, Chile, China, Japan, Hong Kong, Indonesia, Korea, Malaysia, Philippines, Singapore, Thailand, USA, and Vietnam.

#### **Aims of Project**

The project aims: 1) to collaboratively develop innovations on teaching and learning mathematics in different cultures of the APEC Member Economies, and 2) to develop collaborative framework involving mathematics education among the APEC Member Economies. For these aims, the project focuses on the good practices in school classroom produced by Lesson Study and ways of professional development through the Lesson Study in each Member Economies.

#### **Procedure of the project:**

Phase I: An open symposium and closed workshop for key mathematics educators from the APEC Member Economies on “*Innovative Teaching Mathematics through Lesson Study*” were held on January 15-20, 2006 in Tokyo by CRICED. The purpose was to further refine a research proposal and a collaborative framework for the development of innovation and good practices for teaching and learning mathematics. “Lesson Study” was selected as the key innovation.

Phase II: Based on the agreed collaborative framework, each specialist from participating economies conducted the research during February-May, 2006 in a real classroom setting in his/her home country to develop innovations and good practices in teaching and learning mathematics through lesson study.

Phase III: An APEC International Symposium on “*Innovation and Good Practices for Teaching and Learning Mathematics through Lesson Study*” was organized to share and reflect on each economy’s research results and good practices based on the developed framework of the Tokyo meetings. The Symposium was hosted by CRME of Khon Kaen University, Thailand on June 14-17, 2006.

Phase IV: The “*APEC Workshop on: Improving the quality of the mathematics lesson through Lesson Study*” was held in Thailand in August 24-27, 2006. In this workshop, a group of Japanese teachers from Elementary School attached to University of Tsukuba, who has long experiences in Lesson Study did the Demonstration Lesson to show Thai teachers on how Japanese teachers improve their usual lessons.

#### **Results**

In order to achieve the two aims, based on the procedure mentioned earlier, the results from all phases can be described as follows:

## **Developing innovations by focusing on good practices**

### **1) Clarifying the meaning of good practices**

At the beginning of this project, specialists/project overseers tentatively proposed the meanings of good practices in mathematics education with the following conditions.

- 1) They must be visible, recordable in the classroom and can be showed to other people.
- 2) They may be known as good approaches in an economy.
- 3) There is at least one teacher who is well known by that approach.
- 4) They may be known as being useful to reform mathematics education in an economy.
- 5) Many teachers may have their wish to do the same approach.
- 6) They may be known as being useful for teacher education (pre-service or in-service)
- 7) Comparatively, there are different/traditional approaches based on different/traditional values.

In order to collaboratively develop innovations on teaching and learning mathematics, this project focused on gathering good practices using videos from specialists in each economy and discussed ‘what is good’, ‘why it is good’ and ‘how the teacher can develop such a good practice.’ While we as specialists discussed these points through the videos, we have learned that how each good practice has been done on different cultural setting. With recognizing these differences as our mirrors, we could revalue our good practices from different perspectives. We also get the ideas and methods for developing innovations to be implemented in mathematics classrooms in APEC member economies.

### **2) Deciding to use Lesson Study as a method for developing good practices**

Also in phase I, specialists listened lectures of keynote speakers on Lesson Study. They observed four lesson study classes at attached schools. In addition, they also proposed a variety of ideas on good practices through presenting their papers or papers with complementary videos. Japanese Lesson Study is originated in Japanese culture. While specialists in some economies have experienced on adapting it in local school contexts, specialists in other economies did not know it. We then elaborated and shared the significance and meanings of Lesson Study through those experiences and participating in the Lesson Study at attached schools. All specialists have a consensus to decide to use Lesson Study as a method to develop good practices in economies. The responses from the Questionnaires distributed in the meeting are very positive.

## **Process to develop and share good practices**

In Phase II, based on the shared idea on using Lesson Study as a collaborative framework, each specialist developed his/her innovations by emphasizing good practices on teaching mathematics using Lesson Study.

In Phase III, recognizing different cultures as an innovative idea, specialists found various challenges (e.g., the adaptation of Lesson Study) to develop good practices on teaching mathematics. We, specialists, also learned among us how to deal with these challenges.

In Phase II, specialists from each participating economy produced videos of good practices in their research activity for this project and shared in the International Symposium in phase III.

In phase IV, some specialists produced videos of good practices from the workshop in Thailand and gathered some videos of good practices from other Lesson Study projects such as in Chile.

### **Implementing Lesson Study in economies**

#### **1) Experimenting Lesson Study**

In Phase II, specialists get started to use Lesson Study in each economy to exemplify the meaning of good practices. Specialists from thirteen economies engaged in the Lesson Study activities and nine videos of good practices were produced.

#### **2) Sharing the results of Lesson Study by videos**

In Phase III, specialists observed the local mathematics classes and observed classes conducted by a Japanese teacher. They also reported the results of each research conducted in Phase II. They then shared the ways to describe good practices through videos. The responses from the Questionnaires distributed in the meeting related to the research results are very positive.

#### **3) Producing videos of Lesson Study for teacher education**

In Phase III and IV, specialists have tried to expand the Lesson Study for in-service teacher education by organizing Lesson Study workshop for local school teachers in economies, such as Chile and Thailand. Through these activities, six Lesson Study videos were produced as examples of good practices.

### **Lesson Study as applied for Professional development**

Before the project, most of the specialists (researchers) have not necessary to go to real classrooms.

In Phase I, Lesson Study was experienced as methods of professional development by specialists. They then recognized the importance to join with teachers for developing good practices.

In Phase II, specialists engaged in Lesson Study with local teachers. This contributed to professional development of both specialists and teachers, especially, the ways specialists learned how to work with teachers.

In Phase III, based on the Lesson Study experiment in Phase II, specialists discussed on the issues of professional development through using Lesson Study. They have come to realize the significance of Lesson Study.

In all phases, teachers who observed Lesson Study demonstration will have a chance to improve their professional development. They have learned that Lesson Study is the way for showing model lesson approach to other interested teachers. In addition, videos of lesson enable others who could not participate in the project could learn too. The results from questionnaires revealed that participants have convinced the significance of Lesson Study for professional development.

### **Sustainability of Project Benefits**

Sustainability of the benefits from this project can be considered in many ways.

In what follows, sustainability of some benefits will be described.

#### **1) Benefits Specified in Participated Economies**

The number of 235 Japanese participants in phase I shows that these local specialists and teachers have a chance to know world movement through APEC activities. They also have a chance to get involve with 38 international participants participated in the meeting. The number of Japanese organizations related to the meeting is 2 ministries, 2 governmental organizations, 14 universities and 2 academic societies. The numbers of overseas organization related to this meeting are 17 foreign universities,

1 institution, 1 ministry, 1 international institution. The number of papers presented in the meeting is 17 papers.

These numbers illustrate collaboration among the institutions. Similar each economy level benefits can be found in phases II-IV as below.

In Phase II, specialists from 13 economies challenged with teachers in each economies. Specialists conducted researches related to Lesson Study. Normally, at least 10 people get involved in each Lesson Study activity.

In Phase III, Thailand researchers and teachers have a chance to know world movement through APEC related activities. The numbers of participants are 203 Thai participants, 45 international participants. The numbers of Thai organizations related to the meeting are 1 ministry, 3 governmental organizations, 17 universities and 1 academic society. The numbers of overseas organization related to this meeting are 17 foreign universities, 2 institutions, 1 ministry, and 1 international institution. The number of papers presented in the meeting is 14 papers.

In each Phase, local teachers have a chance to participate APEC related or specialists related activities and experienced Lesson Study. For examples, in phase IV, in Chile, 3 universities engaged in the workshops and 1100 teachers and academicians participated in and in Thailand, 2 universities engaged in the workshops and 370 teachers and academicians participated. . The responses from the Questionnaires distributed in the meeting are very positive.

In each phase, not only the support from each economy, some specialists received important financial supports come from various kinds of local, national and overseas organizations. Some specialists engaged in teacher training in Phase IV on the name of local institutions which offered financial support.

## **2) Benefits from producing and using classroom videos**

Specialists in this project developed innovative teaching approaches through Lesson Study. So far, specialists from nine economies produced 14 videos with very good quality as examples of good practices. Many of them are developed in English or Spanish at least with subtitles. They used these videos in many ways, for examples, shared and discussed ideas in the meeting, showed local teachers about good practices in other economies. However, in order to make use of these video for all APEC economies, some of them need to be translated in English and well edited.

## **3) Benefits in other relevant points**

### **Relevant point 1: Shared by APEC Knowledge Bank**

The progressive report of Phase I and III could be seen in following sites:

<http://www.criced.tsukuba.ac.jp/math/apec>

<http://www.crme.net>

Additionally, the progressive report of Phase I (17 papers) now can be accessible at Knowledge Bank website at: <http://www.apecneted.org/portal/index.cfm>

The progressive report of Phase III (14 papers and 9 videos) and final report (all papers and 14 videos) will be appeared on website of Knowledge Bank website.

### **Relevant point 2: Collaborative Network**

The project creates a collaborative network among specialists in economies. In turn, each specialist began to create teachers' network in his /her economy.

### **Relevant point 3: Future projects**

Lesson Study is the study done for improving the quality of teaching on desirable topics and producing innovative teaching approaches for improvements. Even though specialists have a consensus on definition of good practices, the teaching topics are



still wide range. In this project 03/2006, the topics were given by each specialist's interest and the method was fixed to Lesson Study. The good practices were project outcomes. Thus, based on each specialist's interest, the project shared the condition of good practices and shared Lesson Study as the method. Based on this ground, specialists considered necessity and sharable topics in the long-term collaborative framework (2006-2010). For improving the quality of teaching, all specialists decided the topics to be shared in order to improve all APEC economies welfare as follows:

2007 Mathematical Thinking  
2008 Mathematical Communication  
2009 Evaluation in Teaching Process  
2010 Generalizing to other subjects

### **Overall accomplishments of the project**

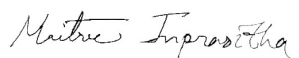
All specialists including project overseers with keeping in mind to contribute to a priority of APEC theme, this project chose to challenge the following theme “*stimulating Learning in Mathematics and Science*” as stated in at the third APEC Education Ministerial Meeting held on 29-30 April 2004 in Santiago. From the above-mentioned results, they have judged that this project achieved its two aims. With recognizing different cultures as an innovative idea, we still find various challenges to develop good teaching and learning mathematics through 14 classroom videos from 9 economies. Through the fruitful discussion in all phases, specialists go beyond various meanings of Lesson Study and come to realize to develop a collaborative framework on Lesson Study as a method for innovations. Lesson Study movement now get started in all economies participating in this project. Major works and a variety of activities done by 20 specialists in all phases of the project have influenced more than 2500 local people in economy level.

Additionally, the project creates a collaborative network among specialists in economies. The network is the foundation of the following projects such as 02/2007. The specialists are now preparing to produce a book of Lesson Study for teacher education.

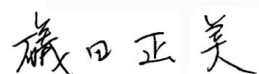
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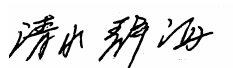
(Associate Professor Dr. Suladda Loipha)



(Assistant Professor Dr. Maitree Inprasitha)

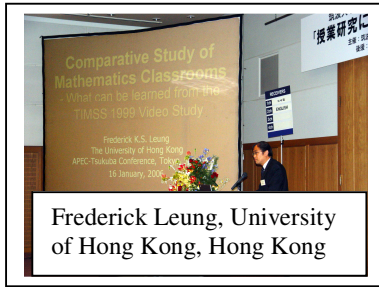


(Associate Professor Masami Isoda)



(Associate Professor Shizumi Shimizu)

## Photographs of Phase I: APEC-TSUKUBA International Conference



Tokyo Conference attracted 38 international and 235 Japanese participants. A number of organizations involved in this conference are as follows: Japanese organizations involved are 2 ministries, 2 governmental organizations, 14 universities and 2 academic societies; overseas organizations includes 17 foreign universities, 1 institution, 1 ministry, 1 international institution.



Specialists from participating economies presented their ideas on "good practices" by clarifying "what is good", "why it is good", and "how it is developed" with supplementary short videos.



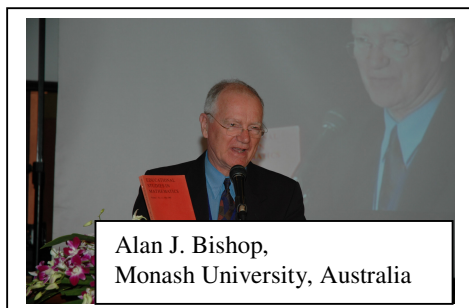
One attracting activity of the Tokyo Conference is Lesson Study meeting at the Elementary school attached to University of Tsukuba in Tokyo.

In order to provide participants, in particular specialists to observe Japanese classroom resulting from using Lesson Study, the Lesson Study meeting was managed as follows:

- Short explanation of the lessons
- Lesson observations
- Discussion about lesson after observation
- Discussion about what Japanese way of the lesson study is



**Photographs of Phase III: International Symposium in Khon Kaen, Thailand during August 14-17, 2006**



Keynote speaker and speakers both with APEC Funded Support and Self-Funded Support from 4 continents addressed the issue on professional development using Lesson Study.



Similar to Tokyo Conference in Phase I, International Symposium in Khon Kaen, Thailand attracted 45 international and 203 Thai participants. A number of both Thai and overseas organizations involved in this meeting: from Thai organizations, 1 ministry, 3 governmental organizations, 17 universities and 1 academic society get involved in the meeting; from overseas organizations, 17 foreign universities, 2 institutions, 1 ministry, 1 international institution get involved in the meeting.



Maitree Inprasitha, Thailand



Kazuyoshi Okubo, Japan



Marsigit, Indonesia



Lim Chap Sam, Malaysia



Grecia Galvaz P., Chile



Soledad A. Ulep, the Philippines



Tran Vui, Vietnam



Sukirman, Indonesia



Takeshi Miyakawa, Japan

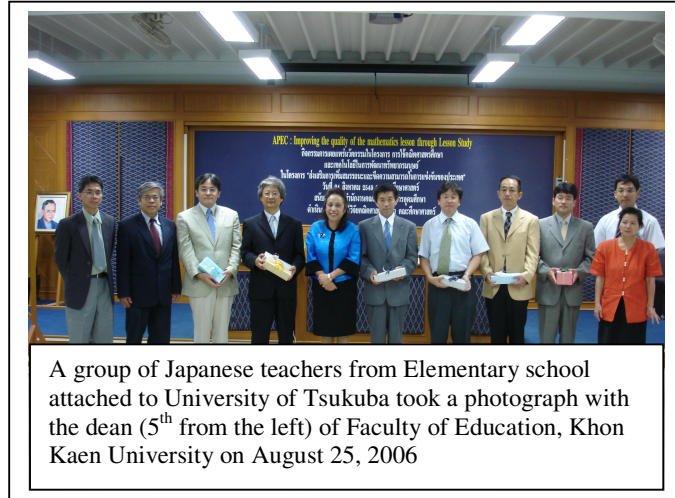


Yeap Ban Har, Singapore



All specialists from participating economies presented an example of good practices using Lesson Study from the local schools they involved in this project.

**Photographs of Phase IV: APEC Workshop on "Improving the Quality of the Mathematics Lesson through Lesson Study" and related workshop in Chile**



Explanation of Lesson Plans before teaching, the activity has never been done in classroom observation in Thailand







Prospective teachers of Mathematics Education Program engaged in this APEC project through observing classroom lesson study via VDO transmission on August 24, 2006



Lesson Discussion with productive critique on lesson after classroom observation opened new eyes for Thai teachers on how to improve their usual lessons.



In similar to Phase IV of APEC HRD 03/2006 in Thailand, an expansion of Lesson Study was conducted at Catholic University of Temuco, Pontifical Catholic University of Valparaiso and University of Santiago with support by Ministry of Education, Chile and University of Tsukuba, Japan