PREFACE

We are pleased to present this progress report on the APEC project HRD 02/2007 **"**Collaborative Studies on Innovations for Teaching and Learning Mathematics in Different Cultures (II) – Lesson Study focusing on Mathematical Thinking.**"** All documents appeared on this report is the result of activities during the APEC – TSUKUBA International Conference held on December 1-7, 2006 in Tokyo and Sapporo. Only conclusion and program related issues of the meeting appeared in the form of documents. Other activities such as keynote lectures, specialists' papers, and classroom videos are included in attached CD-rom. In addition, all documents and other related materials will be appeared on the website (http://www.criced.tsukuba. ac.jp /math/apec/apec2007/).

Under the theme of stimulating mathematics and sciences in EDNET, the project HRD 03/2006, "A Collaborative Study on Innovations for Teaching and Learning Mathematics in Different Cultures among the APEC Member Economies", shared the approaches of Lesson Study for improving the quality of education in general, a number of videotapes of effective practices in mathematics, and how to develop a collaborative network on Lesson Study among member economies. All documents and other related materials are appeared on the website (http://www.criced.tsukuba.ac.jp/ math/apec2006/). Some of the case studies with video will be made available at the APEC Knowledge Bank web site (http://www.apecknowledgebank.org/) of EDNET.

The specialists shared a deep interest in the use of Lesson Study to improve teaching, but most acknowledged that implementation of Lesson Study in their respective economy is still in its infancy. Thus, they decided to continue the project for developing innovative teaching practice, because they recognized that Lesson Study offers a promising approach to improve teaching practice. To spread widely a movement of improvement of teaching among APEC economies, it is necessary to continue developing good models for teaching using Lesson Study. The specialists then agreed to continue for four more years with the following yearly focus: mathematical thinking (2007), communication (2008), evaluation (2009), and generalization (2010). The first three topics were selected in accordance with three Lesson Study processes: plan (for mathematical thinking), do (for communication) and see (for evaluation). The results from each year will serve as the basis for the following year's project. In the final year, the theme of generalization will extend the implementation of Lesson Study to all subject areas.

The APEC project "Collaborative Studies on Innovations for Teaching and Learning Mathematics in Different Cultures (II) - Lesson Study focusing on Mathematical Thinking" was approved in November, 2006. Mathematical thinking is the foundation for science, technology, economic growth, and sustainable development in a knowledge-based society. The project is managed by the Center for Research on International Cooperation in Educational Development (CRICED) at the University of

Tsukuba and the Center for Research in Mathematics Education (CRME) at Khon Kaen University.

The collaborative project aims to:

1) Share the ideas and ways of mathematical thinking which are necessary for science, technology, economic growth and development of the APEC member economies, and
2) Develop the teaching approaches in mathematical thinking through Lesson Study among the APEC member economies.

To achieve these goals, the "APEC-Tsukuba International Conference on Innovative Teaching Mathematics through Lesson Study (II) – Focusing on Mathematical Thinking" was organized to share ideas and ways of mathematical thinking. The conference in Tokyo and Sapporo was a part of the project. The conference was partially supported by the University of Tsukuba and Hokkaido University of Education. With this support it was possible for the organizing committee to invite Dr. David Tall, the only "Professor of Mathematical Thinking" in the world to participate in the conference and offer invaluable ideas to the project and to benefit APEC economy members.

The specialists from the APEC economies listened to four lectures on mathematical thinking, observed four research lessons in Japanese classrooms, and shared the framework of mathematical thinking in group discussions at the conference.

The conference attracted 149 participants, including 37 foreign scholars and observers from 16 member economies: Australia, Brunei Darussalam, Chile, China, Hong Kong, Indonesia, Japan, Korea, Malaysia, Mexico, Philippines, Chinese Taipei, Singapore, Thailand, U.S., and Vietnam.

Following the conference, specialists were expected to use Lesson Study to introduce mathematical thinking into local classrooms (1^{st} grade to 8^{th} grade) and present their results at the meeting in Thailand in August 2007. During this upcoming meeting, the specialists also will comment on the four research lessons previously recorded during the December, 2006 meeting. Through this process, we will share ideas on the mathematical thinking framework; 1) how we interpret mathematical thinking from research lessons that we observed, and 2) how teachers can "teach" mathematical thinking through Lesson Study. We are looking forward to meeting again in Khon Kaen, Thailand to share the results of teaching approaches on mathematical thinking through Lesson Study. We will also make comments on those video tape recordings (VTRs) again in order to produce VTRs for teacher education to benefit APEC economy members and other countries.

We express our deepest gratitude to the December, 2006 keynote speakers: Fou-Lai Lin, Kaye Stacey, and David Tall and thank the specialists for continuing to contribute to this APEC project.

We are indebted to the Ministry of Education, Culture, Sports, Science and Technology of Japan (MEXT), Japan International Cooperation Agency (JICA), Japan Society of Mathematical Education (JSME), Japan Society for Science Education (JSSE), and the Sapporo City Board of Education for their generous support of this conference. We also express our gratitude to the University of Tsukuba, Hokkaido University of Education, and the organizing committee for their tireless efforts in organizing this conference. More importantly, we would like to thank all members of CRICED for their many contributions to the conference and the completion of this progress report. Finally, we appreciate Patsy Wang-Iverson for her tirelessly made proofread for this progress report and Makoto Yoshida for his continuing contribution in simultaneous translation in all observed lessons.

APEC Project Overseers

Masami Isoda and Shizumi Shimizu (University of Tsukuba, Japan)

Suladda Loipha and Maitree Inprasitha (Khon Kaen University, Thailand)