



**Asia-Pacific
Economic Cooperation**

2012/SOM1/HRDWG/012rev1

Agenda Item: EDNET 8.2

Completion Report - HRD 02/2011S: Innovation on Problem Solving Based Mathematics Textbooks and e-Textbooks

Purpose: Information

Submitted by: Japan, Thailand



**34th Human Resources Development
Working Group Meeting
Moscow, Russia
5-10 February 2012**

Project Completion Report

SECTION A: Project profile

| | | | |
|--|--|------------------------|--|
| Project number & title : | HRD 02/2011S - Innovation on Problem Solving Based Mathematics Textbooks and E-textbooks | | |
| Time period covered in report: | November 1, 2011-January 31, 2012 | Date submitted: | |
| Committee / WG / Fora: | APEC Human Resources Development Working Group / Education Network | | |
| Project Overseer Name: Organization / Economy | <i>Assistant Professor Dr. Maitree Inprasitha , Director of Center for Research in Mathematics Education (CRME), Faculty of Education, Khon Kaen University, Thailand, Male. (will coordinate with Secretariat)</i> <i>Professor Masami Isoda, Director of Japan Society of Mathematical Education, Chief of Mathematics Education in CRICED, University of Tsukuba, Japan, Male.</i> | | |

SECTION B: Project report and reflection

Briefly answer each of the questions below. Section B should be a maximum of 2-3 pages, inclusive of the questions and tables provided.

1. Project description: In 3-4 sentences, describe the project and its main objectives.

Since the year 2006, Thailand and Japan have been contributing the improvement of education in APEC economies through the movement of Lesson Study for professional development of teachers with good resources and teaching approaches. The project has been progressed as follows:

2006 Good Practice through Lesson Study by the central fund

2007 Mathematical Thinking by the central fund

2008-2009 Mathematical Communication by the central fund

2010 Assessment by Self-fund

2011 Mathematics Textbooks, e-Textbooks and Educational Tools by Self-fund

On these five years, the project achieved the visible approach to improve teacher's capacity and achievement of children. Based on the past five year project, Thailand and Japan propose this self-fund project for the following object.

The project has the meeting for:

- 1) Sharing the problem solving approach with lesson study which is promising the higher achievement in mathematics at elementary school;
- 2) Sharing the knowing how to develop the elementary school textbook which develop children's problem solving ability;
- 3) Sharing the knowing how to use the freeware d-book developed by the University of Tsukuba for developing e-textbook for the classroom with interactive board and internet connection.

2. Meeting your objectives: Describe how the project went, with reference to the objectives laid out in your project proposal. Include any major changes to your project as proposed and any problems or obstacles that you encountered and how you overcame them.

International symposium was held in November 1-5, Thailand. It focused on "Innovation on Problem Solving - Based Mathematics Textbooks and E-Textbooks". Activities in the conference emphasize on 6 sessions as followings; sessions 1: Keynote Speaker; session 2: Open Class (4 classes); session 3: Invited Speaker; session 4: Specialist Presentations; session 5: Panel Discussions; session 6: Exhibition from school teachers.

3. **Project evaluation:** Describe how you evaluated the project and provide some details on the results of the evaluation (e.g. participant evaluation, peer review of publication, measurement of indicators, statistics demonstrating use of outputs etc.).

The project was evaluated through questionnaire *distributing* to speakers, panelists and specialists. Some details on the results of the evaluation were as follows;

On a scale of 1 to 6, please rate how informative each session was for you. A rating of 6 indicates that you found the session highly informative; a rating of 1 that you did not find it informative

| Session | 1 | 2 | 3 | 4 | 5 | 6 |
|--------------------------|---|-------|-------|-------|--------|--------|
| Keynote speaker | | | | 5% | 25% | 70% |
| Open Class | | 4.76% | 9.52% | 4.76% | 28.56% | 52.36% |
| Invited Speaker | | | | 9.52% | 38.08% | 52.36% |
| Specialist Presentations | | | | 23.8% | 42.84% | 33.32% |
| Panel Discussion | | | | 25% | 30% | 45% |

Would you like to see more, the same, or less time devoted to the following topics:

| Session | More | Same | Less |
|--------------------------|--------|--------|-------|
| Keynote speakers | 57.86% | 42.08% | 0.06% |
| Open Class | 52.36% | 42.84% | 4.76% |
| Invited Speakers | 49.99% | 49.99% | 0.02% |
| Specialist Presentations | 42.08% | 57.86% | 0.06% |
| Panel Discussion | 45% | 55% | 0.00% |

4. **Key findings:** Describe one or two examples of important findings arising from the project (e.g. results from surveys or case studies, insights provided by participants or experts, policy recommendations, roadblocks to progress on an issue etc.).

- Specialists who participated the conference know the promised teaching approach to develop problem solving ability, learn the methods to develop the textbook for the approach and use the d-book.
- Government reduces the huge cost to get the license to use ICT because d-book enable all economies to develop their own e-textbook by free.
- Teachers who teach children can use e-textbook with problem solving approach. Children can learn the problem solving using e-textbook.

5. **Next steps:** Describe any follow-up steps or projects that you recommend. Have you already planned or begun these? What role could APEC play in any follow-up?

We are proposing new project on "Emergency Preparedness Education: Learning from Experience, Science of Disasters, and Preparing for the Future"

The project aims to develop the teaching program against disasters such as Tsunami, Earthquake, Typhoon, Flood, Fire, and Volcanic Eruption:

- a) **Saving the school children from disasters:** For the school management, the project summarizes the successful and un-successful cases to save our children during disasters with the use of visual materials and share the essential strategies of evacuations in the disasters.

- b) Sharing scientific materials which should be taught in schools: To prepare teaching programs, the project develops the teaching materials using data which is necessary to scientifically understand the mechanism and influence of disasters.

For the first year the project will focus on Tsunami and Earthquake. The meeting for the knowing and sharing session is scheduled in February, 2012 in Japan. From March to September, 2012, the specialists will develop teaching content through lesson studies. In November, 2012 in Thailand, it finalizes the materials for teaching.

6. **Feedback for the Secretariat: Do you have any suggestions for more effective management of projects in the future? Any assessment of consultants, experts or participants that you would like to share? (The Secretariat collates and examines feedback to identify trends for ongoing evaluation of our project management and/or communications systems.)**

7. **Participant information:** Please provide details, where applicable. Insert rows as needed.

| Economy | # male | # female | Details |
|---------------------------------|--------|----------|--|
| Brunei Darussalam | | 1 | Madihah Khalid, Universiti Brunei Darussalam, |
| Hong Kong, China | 1 | | Cheng Chun Chor Litwin, Hong Kong Institute of Education |
| Indonesia | 1 | 1 | -Marsigit, The State University of Yogyakarta -Darwestri, Vocational Senior High School |
| Japan | 2 | 1 | -Masami Isoda, University of Tsukuba -Shizumi Shimizu, Teikyo University and the President of Japan Society of Mathematics Education -Fumi Ginshima, National Institute for Educational Policy Research |
| The Republic of the Philippines | | 2 | -Soledad Ulep, University of Philippines -Lydia M. Landrito, University of Philippines |
| The Russian Federation | 1 | | Ivan Vysotskiy, Department of Education, Moscow Institute of Open Education |
| Chinese Taipei | 1 | | Fou-Lai Lin, Chinese Taipei Normal University |
| Thailand | 2 | 3 | -Maitree Inprasitha, Khon Kaen University -Auijit Pattanajak, Khon Kaen University -Utith Inprasit, Ubon Ratchathane University -Anchalee Tananone, Chiang Mai University -Tipparat Noparit, Chiang Mai University |
| United States | 1 | 2 | -Catherine Lewis, Mills College -Akihiko Takahashi, DePaul University -Patsy Wang-Iverson, Gabriella and Paul Rosenbaum Foundation |
| Viet Nam | 4 | | -Tran Vui, Hue University -Hoang Nam Hai -Nguyen Dang Minh Phuc -Hoa Anh Tuong |
| Other: | | | |

8. **Outputs:** Please provide details, where applicable.

| | # planned | # actual | Details |
|--|-----------|----------|---------|
|--|-----------|----------|---------|

| | | | |
|-------------------------------|---|---|---|
| # of workshops / events | 1 | 1 | International Symposium in Thailand on November 1-5, 2012 |
| # of publications distributed | 1 | 1 | Proceedings of International Symposium |
| # of CDs distributed | | | |
| # of websites created | 3 | 3 | http://www.criced.tsukuba.ac.jp/math/ http://www.crme.kku.ac.th http://apec-lessonstudy.kku.ac.th |
| Other: | | | |

SECTION C: Budget

Attach a detailed breakdown of the APEC- provided project budget, including:

- **Planned costs** (using most recently approved budget figures)
- **Actual expenditures**
- **Variance notes:** An explanation of any budget line under- or over-spent by 20% or more.

SECTION D: Appendices or additions

Please attach any of the following. This information will help us better understand your project, support overseers of similar projects and plan for future projects.

- ☐ List of **experts or consultants** utilised, with job titles and contact details...18...experts
- ☐ List of **participants**, with job titles and contact details.....490 ...participants
- ☐ Event **agendas**
 - Wednesday 2, November 2011; Registration & Exhibition, Open Class, Keynote Speaker
 - Thursday 3, November 2011; Keynote Speaker, Invited Speaker, Specialists Presentation
 - Friday 4, November 2011; Invited Speaker, Specialists Presentation
 - Saturday 5, November 2011; Specialist presentation, Panel Discussions
- ☐ Links to any relevant **websites or online material** (e.g. reports, resources created)
<http://apec-lessonstudy.kku.ac.th>
- ☐ Results of participant feedback or other **project evaluation** (raw and/or analysed)
- ☐ Any **other relevant information or resources** that would help us learn more about your project
<http://www.criced.tsukuba.ac.jp/math/>
<http://www.crme.kku.ac.th>

FOR APEC SECRETARIAT USE ONLY *APEC comments: Were APEC project guidelines followed? Could the project have been managed more effectively or easily by the PO?*

HRD 02/2011S

Innovation on Problem Solving-based Mathematics Textbooks and E-textbooks

Proposing by :Thailand and Japan

Looking back on Lesson Study since 2006

HRD 03/2006

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

Aims

- To collaboratively develop **innovations on teaching and learning mathematics** in different cultures of the APEC Member Economies.
- To develop **a collaborative framework** involving mathematics education among its members.



Phase I: Symposium and Workshop on “Innovative Teaching Mathematics through Lesson Study”



Participants: **38** international
and **235** Japanese participants

Host: CRICED, University of Tsukuba

Date: 15-20 January 2006



Phase III: International Symposium on “Innovation and Good Practices for Teaching and Learning Mathematics through Lesson Study”



Aim: sharing and reflecting on research results and good practices as discovered by research teams of the economies.

Participants: **45**
international and **203** Thai
participants

Host: CRME , Khon
Kaen University

Date: 14-17 June 2006.

Phase IV: An APEC Workshop on “Improving the Quality of the Mathematics Lesson through Lesson Study”



Host: Thailand

Date: 24 - 27 August 2006

Japanese teaching method was introduced to Thai teachers by Japanese teachers in the manner of a workshop on Lesson Study.

HRD 02/2007: Collaborative Studies on Innovations for Teaching and Learning Mathematics in Different Cultures II

- Lesson Study focusing on Mathematical Thinking-

Aims

- To share the **ideas and ways of mathematical thinking** which are necessary for science, technology, economic growth and development of the APEC member economies.
- To develop the **teaching approaches in mathematical thinking** through Lesson Study among the APEC member economies.

Phase I: APEC - Tsukuba
International Conference on Innovative Teaching Mathematics
through Lesson Study II
- Focusing on Mathematical Thinking -

December 2 – 7, 2006
Tokyo & Sapporo, JAPAN

37 international and 112
Japanese participants







Phase III: APEC – Khon Kaen 2007
International Symposium on Innovative Teaching
Mathematics through Lesson Study II
- Focusing on Mathematical Thinking -

August 16-20, 2007 at Khon Kaen

Aim: To share
teaching approaches
for developing
mathematical
thinking by
economies

30 international and
349 Thai participants

Phase IV: APEC Workshop on: Improving the Quality of the Mathematics Lesson through Lesson Study

15-16 August, 2007 at Khon Kaen



Teachers from the Attached Elementary School of the University of Tsukuba, Japan came to Thailand to demonstrate two phases of Lesson Study – **teaching Thai students** in the real classroom and **reflecting on teaching with Thai teachers**.

HRD 02/2008: Collaborative Studies on Innovations for Teaching and Learning Mathematics in Different Cultures II

- Lesson Study focusing on Mathematical Communication -

Aims:

- To collaboratively share **the ideas and ways of Mathematical Communication** for knowledge-based society which is necessary for science, technology, economical life and development on the APEC member economies.
- To Collaboratively develop the **teaching approaches on Mathematical Communication** through Lesson Study among the APEC member economies.

Live: APEC-Tsukuba International Conference III
Innovation of Classroom Teaching and Learning through Lesson Study

Phase I

Broadcasting Schedule

Go to [Conference page](#)



Conference Organizations;
Organized by: University of Tsukuba, Co-organized by: Ministry of Education, Culture, Sports, Science and Technology (MEXT, Japan), Kanazawa University, Khon Kaen University (Thailand), Supported by: Japan International Cooperation Agency (JICA), Japan Society of Mathematical Education, Japan Society of Science Education.

APEC HRDWG Project;
Collaborative Studies on Innovations for Teaching and Learning Mathematics in Different Cultures (III) - Lesson Study focusing on Mathematical Communication -

Project Overseers;
Masami Isoda, Shizumi Shimizu, Maitree Inprasitha, Suladda Loipha

Project Websites;
<http://www.cnced.tsukuba.ac.jp/math/apec/>
<http://apec.pbwiki.com/Classroom+Innovations+through+Lesson+Study>
<http://math-info.cnced.tsukuba.ac.jp/>
<http://home.kku.ac.th/cme/>

Project References;
<http://www.specknowledgebank.org/>
http://e-archives.cnced.tsukuba.ac.jp/en/result_data.php?idx_key=1436
http://www.worldscibooks.com/mathematics/etextbook/6339/6339_chap01.pdf

Live streaming on Dec. 9 and 10(JST) 2007.
Japan Standard Time 2008年1月11日 7:20:22
Local time 2008年1月11日 7:20:22
UTC 2008年1月10日 22:20:22

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筑波大学
University of Tsukuba

Your comments 1588

Khon Kaen University

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APEC (PACIFIC ECONOMIC COOPERATION)

WELCOME TO ALL PARTICIPANT

International Symposium 2008

Innovative Teaching Mathematics through Lesson Study III
Focusing on Mathematical Communication

Phase III

August 24 - 31, 2008 Faculty of Education, Khon Kaen University




45 International and more than 300 Thai Participants

Faculty of Education KhonKaen University

Phase IV: International Symposium in New South Wales, Australia




Date: 16-18 March, 2009

The lessons were studied by **133** teachers from different schools in the first two days of the conference and 128 teachers in the second two days.

คณะศึกษาศาสตร์ มหาวิทยาลัยขอนแก่น
Faculty of Education KhonKaen University

APEC HRD 01/2010S “Lesson Study for Implementing Curriculum: Developing Innovative Assessment Problem”



APEC-TSUKUBA International Conference IV
Innovation of Mathematics Teaching and Learning through Lesson Study
- Connection between Assessment and Subject Matter -

DATE: February 17-21, 2010
VENUE: Tokyo, Japan

Organized by: University of Tsukuba
 Co-organized by: Ministry of Education, Culture, Sports, Science and Technology, Khon Kaen University (Thailand)
 Supported by: Japan International Cooperation Agency, Japan Society of Mathematical Education, Japan Society for Science Education



■ Open Symposium (February 20-21)
 February 20 (SAT): 9:30 - 17:00 (Reception 9:00 -)
 Elizabeth Rose Conference Hall, United Nations University
"Assessment and Lesson Study"

- ▶ Opening Ceremony
- ▶ Keynote Address: Comparative Study: Mathematical Literacy of the OECD-PISA
 Objective and Achievement: Improvement of Teaching by improving National Assessment in the case of Japan
 Project Evaluation/Professional Development through Lesson Study in the case of Thailand
- ▶ Short Lectures from APEC Economies: Challenges of the improvement of teaching from improvement of assessments test.
- ▶ Panel

■ Specialist Session (February 17-19)
 ▶ Specialists nomination and the deadline for registration (Please contact): January 10: Speakers of Open Symposium supported by the University of Tsukuba
 January 22: Specialists supported by economies or self-funds
 ▶ February 17 (WED): Arrival day
 Reception for Specialist, and Evening Session for Sharing Objective of the APEC Project

■ Organizing Committee
 Masami Iwata (General Chair & APEC Project Overseer): CRICED, University of Tsukuba
 Matsuo Inagaki (Project Overseer): CRICED, Khon Kaen University
 Shizuko Shimizu: Tokyo University
 Takuya Baba: Hiroshima University
 Noboru Saito: Nara University of Education
 Katsunori Hattori: Nara University of Education
 Yutaka Chino: Witsenhausen University
 Minoru Ohtani: Kanazawa University
 Takayuki Matsuzaki: University of Yamanashi
 Hiroyuki Minomura: Saitama University
 Shiori Nishikawa: Goshima University
 Kazuyuki Okubo: Hokkaido University of Education

February 21 (SUN): 9:00 - 17:00
 Elizabeth Rose Conference Hall, United Nations University
"Materials and Lesson Study"

- ▶ Keynote Address: Development of Mathematics Textbooks and Tools in 20th century
 Problem Solving Approach Embedded in Japanese Textbooks
 Plan for Professional Development using Japanese Textbooks in the cases of Mexico and Thailand
- ▶ Short Lectures from APEC Economies: Developing Teacher Education Textbooks for Lesson Study
- ▶ Panel
- ▶ Closing Ceremony
- ▶ February 18 (THU) and 19 (FRI): Morning Session: Attached Elementary School, University of Tsukuba
 Participating Largest Lesson Study Meeting in the world
 Afternoon Session: Tokyo Campus, University of Tsukuba
 Workshop on the Assessment and Materials by CRICED, University of Tsukuba

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 E-mail: criced@tsukuba.ac.jp
 URL: <http://www.criced.tsukuba.ac.jp/apec2010/>
 (English version)
 URL: <http://www.criced.tsukuba.ac.jp/apec2010/english.html>

APEC-Chiang Mai International Symposium IV
Innovation of Teaching and Learning
Mathematics through Lesson Study:
Connection between Assessment and Subject matters



2-6 November, 2010 at Chiang Mai University

คณะศึกษาศาสตร์ มหาวิทยาลัยขอนแก่น
Faculty of Education KhonKaen University

APEC-Tsukuba International Conference V



19-22 February, 2011 at Tokyo and Tsukuba, Japan

HRD 02/2011S

Innovation on Problem Solving-based
Mathematics Textbooks
and E-textbooks

International symposium in Thailand 2011



Activities in the conference emphasize on 6 sessions as followings;
 sessions 1: Keynote Speaker; session 2: Open Class (4 classes); session 3: Invited Speaker; session 4: Specialist Presentations; session 5: Panel Discussions; session 6: Exhibition from school teachers.

International symposium in Thailand



The project has the meeting for:

- 1) Sharing the **problem solving approach** with lesson study which is promising way for higher achievement in mathematics at elementary school;
- 2) Sharing the knowing how to develop the **elementary school textbook** which develop children's problem solving ability;
- 3) Sharing the knowing how to use the freeware d-book developed by the University of Tsukuba for **developing e-textbook for the classroom with interactive board and internet connection**.

Keynote Speakers and Specialists from each Economy

| Economy | # male | # female |
|---------------------------------|--------|----------|
| Brunei Darussalam | | 1 |
| Hong Kong, China | 1 | |
| Indonesia | 1 | 1 |
| Japan | 2 | 1 |
| The Republic of the Philippines | | 2 |
| The Russian Federation | 1 | |
| Chinese Taipei | 1 | |
| Thailand | 2 | 3 |
| United States | 1 | 2 |
| Viet Nam | 4 | |
| Total | 13 | 10 |

23 specialists and 490 Thai participants

Project evaluation

On a scale of 1 to 6, please rate how informative each session was for you. A rating of 6 indicates that you found the session highly informative; a rating of 1 that you did not find it informative

| Session | 1 | 2 | 3 | 4 | 5 | 6 |
|--------------------------|---|------------|------------|------------|------------|------------|
| Keynote speakers | | | | 05.00 % | 25.00 % | 70.00 % |
| Open Class | | 04.76 % | 09.52 % | 04.76 % | 28.56 % | 52.36 % |
| Invited Speakers | | | | 09.52 % | 38.08 % | 52.36 % |
| Specialist Presentations | | | | 23.80 % | 42.84 % | 33.32 % |
| Panel Discussion | | | | 25.00 % | 30.00 % | 45.00 % |

Project evaluation

- *Would you like to **see more, the same, or less** time devoted to the following topics?*

| Session | More | Same | Less |
|--------------------------|--------|--------|--------|
| Keynote speakers | 57.86% | 42.08% | 00.06% |
| Open Class | 52.36% | 42.84% | 04.76% |
| Invited Speakers | 49.99% | 49.99% | 00.02% |
| Specialist Presentations | 42.08% | 57.86% | 00.06% |
| Panel Discussion | 45.00% | 55.00% | 00.00% |

Key findings

- Specialists who participated the conference know the **promising teaching approach** to develop problem solving ability, learn the methods to develop the textbook for the approach and use the d-book.
- Government **reduces huge budget** to get the license to use ICT because **d-book enable all economies to develop their own e-textbook by free.**
- Teachers who teach children **can use e-textbook with problem solving approach.**
- Children **can learn the problem solving using e-textbook.**

Outputs

| | # planned | # actual | Details |
|-------------------------------|-----------|----------|---|
| # of workshops / events | 1 | 1 | International Symposium in Thailand on November 1-5, 2012 |
| # of publications distributed | 1 | 1 | Proceedings of International Symposium |
| # of websites created | 3 | 3 | http://www.criced.tsukuba.ac.jp/math/ http://www.crme.kku.ac.th http://apec-lessonstudy.kku.ac.th |

An exemplar of using Dbook in Thai Classroom

Non-Interactive Version

Thinking about how to calculate

1 There are 4 boxes with 12 caramel candies in each one. All 48 caramel candies are divided equally among 3 children. How many will each child receive?

① Write an equation.

÷

Total number of candies Number of children

② Think about how to calculate the answer by using what you have learned.

Think about how to calculate the answer in different ways and explain your ideas using figures or equations.

Will the answer be larger than 10?

Akira's idea ▼

First, I give 1 box to each of the 3 children. Then I divide the last 12 among the 3 children.

$12 \div 3 = 4$

There are 12 candies in one box, so the amount of candy for one child is

$12 \div 4 = 16$

candy for one child

candy for one child

candy for one child

Yoshiko's idea ▼

First, I looked for a problem in the multiplication table with the answer 48.

$8 \times 6 = 48$

Then I arranged blocks in the shape of 8×6 and separated them into 3 sets.

$6 \div 3 = 2$

so $8 \times 2 =$

Hiroshi's idea ▼

I separated 48 in half to get 24.

48

{

$24 \div 3 = 8$
 $24 \div 3 = 8$

It is two sets of 8.

so $8 \times 2 =$

Haruka's idea ▼

$48 = 30 + 18$

candy for one child

$30 \div 3 = 10$

$18 \div 3 = 6$

$10 + 6 =$

Kenta's idea ▼

$48 \div 6 = 8$

$\div 2$
 $48 \div 3 =$

}

$\times 2$

I used a rule of division. Because the dividends are the same, the answer increases by 2 times if the divisor decreases by half.

2 Calculate $56 \div 4$ using various ways.

35
36

Non-Interactive Version

1 มีลูกอมอยู่ 4 กล่อง แต่ละกล่องมีลูกอมคาราเมล อยู่ 12 เม็ด ลูกอมคาราเมลทั้งหมด 48 เม็ดถูกแบ่งให้เด็ก 3 คน คนละเท่าๆ กัน เด็กแต่ละคนจะได้รับลูกอมคาราเมลคนละเท่าไร

① เขียนประโยคสัญลักษณ์

$\square \div \square = \square$

จำนวนลูกอมทั้งหมด

จำนวนเด็ก

② การคิดเกี่ยวกับ "วิธีการ" (How to) คำถามหาคำตอบ โดยใช้สิ่งที่เคยเรียนมาก่อน

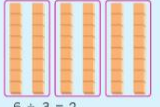
คิดเกี่ยวกับ "วิธีการ" (How to) คำถามหา คำตอบในแนวทางที่แตกต่างกันและอธิบายแนวคิดของคำตอบโดยการใช้อุปกรณ์ที่ประกอบไปด้วยลูกอม

แนวคิดของฮิโกะ▼

อันดับแรก ฉันมองหาปัญหาในตารางการคูณที่มีคำตอบ 48

$8 \times 6 = 48$

จากนั้นฉันกับลูกอมให้อยู่ในรูป 8×6 และแบ่งออกเป็น 3 กลุ่ม

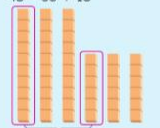


$6 \div 3 = 2$

ดังนั้น $8 \times 2 = \square$

แนวคิดของฮิโกะ▼

$48 = 30 + 18$



จำนวนสำหรับนักเรียนหนึ่งคน

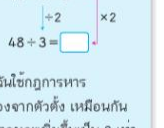
$30 \div 3 = 10$

$18 \div 3 = 6$

$10 + 6 = \square$

แนวคิดของฮิโกะ▼

$48 \div 6 = 8$



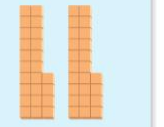
$\div 2$

$8 \times 2 = \square$

ฉันใช้กฎการหารเนื่องจากตัวตั้ง เหมือนกัน คำตอบจะเพิ่มขึ้นเป็น 2 เท่า ถ้าตัวหารลดลงครึ่งหนึ่ง

แนวคิดของฮิโกะ▼

อันดับแรก ฉันแบ่ง 48 ได้ 24



$48 \div 2 = 24$

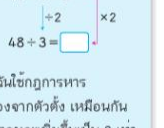
$24 \div 3 = 8$

มี 8 อยู่ 2 กลุ่ม

ดังนั้น $8 \times 2 = \square$

แนวคิดของฮิโกะ▼

$48 \div 6 = 8$



$\div 2$

$8 \times 2 = \square$

ฉันใช้กฎการหารเนื่องจากตัวตั้ง เหมือนกัน คำตอบจะเพิ่มขึ้นเป็น 2 เท่า ถ้าตัวหารลดลงครึ่งหนึ่ง

35

2 คำถาม 56 \div 4 โดยใช้วิธีที่หลากหลาย

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Bullet Point

- Aim of this lesson: Students using what they have learned to calculate $48 \div 3$.
- Teacher needed her students to compare their ideas with the ideas in textbook in order to extend their own ideas.
- Interactive function is required to:
 - stimulates students' attention.
 - supports teacher to pose problem situation in easy way.
 - using hiding function of Dbook to supports students' learning by comparing with the ideas in textbook.
 - provides tools for teacher and students to illustrate their thinking.

Interactive Version: Dbook

การพิจารณาการคำนวณ

1 มีกล่องอยู่ 4 กล่อง ในแต่ละกล่อง มีลูกอมคาราเมล อยู่ 12 เม็ด ลูกอมคาราเมล 48 เม็ดถูกแบ่งให้เด็ก 3 คน เท่าๆ กัน เด็กแต่ละคน จะได้รับลูกอมเท่าไร

① เขียนประโยคสัญลักษณ์

$\square \div \square = \square$

จำนวนลูกอมทั้งหมด จำนวนคน

② พิจารณากว่าจะคำนวณการใช้สิ่งที่เคยเรียนมาได้

พิจารณาว่าจะคำนวณหาเศษส่วนวิธีใดที่แตกต่างกันได้อย่างไร และอธิบายแนวคิดของตนเองโดยการหารูปภาพวิธีอะไรที่สอดคล้องกัน

จะหา 10 หาร 3 ได้กี่ตัว

หัวข้อของใบฝึกหัด

หัวข้อของใบฝึกหัด

หัวข้อของใบฝึกหัด

หัวข้อของใบฝึกหัด

Hiding function

Dbook is compatible with Pen Grand Master

'DbookPro in Thai Classroom'

URL: <http://www.youtube.com/watch?v=iwg4QRD32ao&feature=youtu.be>

Dbook Sample:

- http://math-info.criced.tsukuba.ac.jp/museum/dbook_site/APEC-SampleG5/files/EText.html
- http://math-info.criced.tsukuba.ac.jp/museum/dbook_site/SchootenOnWeb1/Schooten1/index.html

**How to use Dbook for developing
e-textbook**

**Masami Isoda
University of Tsukuba**

What is Lesson Study?

It is a way of challenge for improvement.

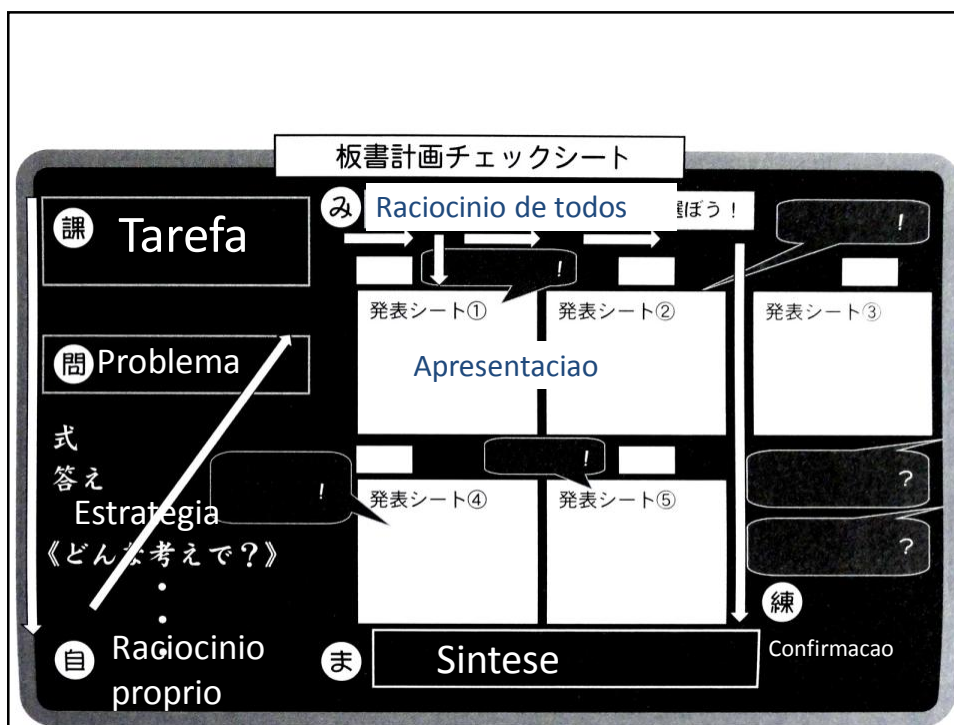
Teachers engage in improvement of their practice within groups through 'Plan, Do and See' processes. It enable teachers to develop students and enable us to improve curriculum and to learn what is professional development, and so on.

A teacher is a challenger.

Extension and Generalization

What you can read from the black board.

Demonstration and
Discussion in Open forum



with textbook
and blackboard



dbook

- dbook, commercial software, is developed by Japanese textbook companies. University of Tsukuba provides English version of dbook by free on the aim of educational cooperation.
- Newest version of dbook will support multimedia such as video files, as well as textbooks, pictures, graphing and computer simulations.



In classroom,
with textbook
and blackboard

