

# DG7: IMPROVING TEACHER PROFESSIONAL DEVELOPMENT THROUGH LESSON STUDY

Co-Chairs:

Toshiakira Fujii, Tokyo Gakugei University, Japan

Akihiko Takahashi, DePaul University, U.S.A.

Team Members:

Susie Groves, Deakin University, Australia

Yo-An Lee, Sogang University, South Korea

## The key questions to be addressed by DG7

- A. What are the key elements of Lesson Study that can help teachers gain mathematical knowledge for teaching?
- B. What are the key elements of Lesson Study that can help teachers develop expertise in teaching mathematics effectively?
- C. How can an established effective professional development model such as Lesson Study be translated for use in different cultures?
- D. How can a professional development model such as Lesson Study be adapted for use in pre-service teacher education?

## Session 2 (Saturday, July 14)

### Key Questions

- C. How can an established effective professional development model such as Lesson Study be translated for use in different cultures?
- D. How can a professional development model such as Lesson Study be adapted for use in pre-service teacher education?
  - Chair: Akihiko Takahashi (Co-Chair)
  - Discussant: Lim Chap Sam, Universiti Sains Malaysia, Malaysia
  - Panel:
    - Anika Dreher, Ludwigsburg University of Education, Germany (C)
    - Thomas Ricks, Louisiana State University, U.S.A. (C)
    - Berinderjeet Kaur, Nanyang Technological University, Singapore (D)
    - Don Gilmore, The Metropolitan State College of Denver, U.S.A. (D)
    - Kouichi Nakamura, Tokyo Gakugei University, Japan (D)
  - Reporter: Yo-An Lee (Team Member)

## Session Schedule

- Introduction –  
Explanation of goals & structure of the sessions (10 min)
- Comments addressing Key Questions by the panel (5 min each, total 25 min)
- Discussion (35 min)
- Summary and proposals for action (10 min)

## Session 1 (Tuesday, July 10)

### Key Questions

- A. What are the key elements of Lesson Study that can help teachers gain mathematical knowledge for teaching?
- B. What are the key elements of Lesson Study that can help teachers develop expertise in teaching mathematics effectively?
  - Chair: Toshiakira Fujii (Co-Chair)
  - Discussant: Susie Groves (Team Member)
  - Panel:
    - Jennifer Lewis, Wayne State University, U.S.A.
    - Yoshinori Shimizu, University of Tsukuba, Japan
    - Akihiko Takahashi, DePaul University, U.S.A.
    - Tad Watanabe, Kennesaw State University, U.S.A.
    - Nobuki Watanabe, Kyoto University of Education, Japan
  - Reporter: Yo-An Lee (Team Member)





PH Ludwigsburg  
University of Education

## **COMMENTS ON KEY QUESTION C:**

**HOW CAN AN ESTABLISHED EFFECTIVE PROFESSIONAL DEVELOPMENT MODEL SUCH AS LESSON STUDY BE TRANSLATED FOR USE IN DIFFERENT CULTURES?**

Anika Dreher, Sebastian Kuntze

# Potential Obstacles in different cultural settings

- Systemic Challenges:
  - ▣ Institutional conditions and resources
  - ▣ Demands on teachers
  - ▣ Unsuitable curricula
- Teachers' views
  - ▣ traditions of professional development
  - ▣ Image of the teacher profession, learning disposition
- Lack of experience and knowledge
  - ▣ Lack of sufficient CK, PCK
  - ▣ Lack of experienced lesson study teachers and researchers
- ...

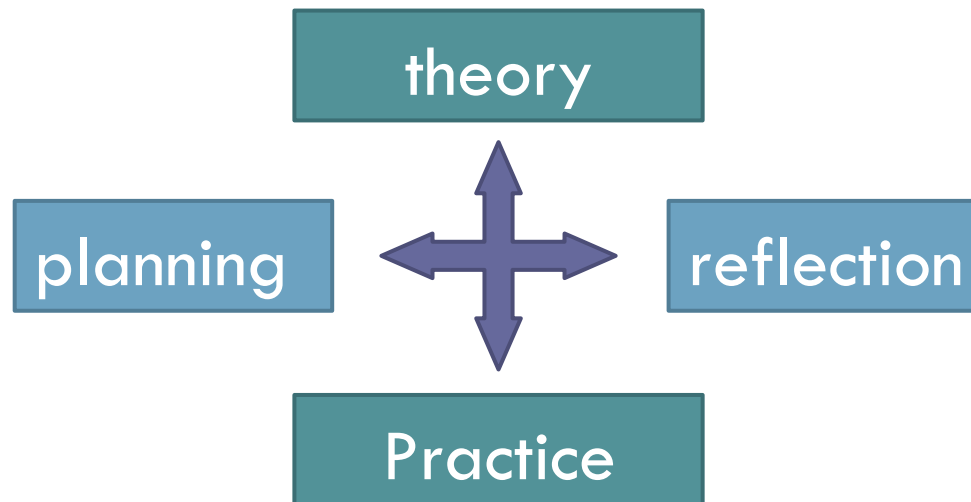
(L.C. Hart et al, 2011)

## Potential obstacles in different cultural settings

**“...lesson study is not an easy jump for those teachers who have never experienced it before.” (Takahashi, 2011)**



## Key strength of the lesson study method



- Collaborative
- Centered around teachers' interests
- Focused on students' learning

## A specific example



Aim: Transferring key elements into the context of a **university course for pre-service teachers in Ludwigsburg (Germany)**

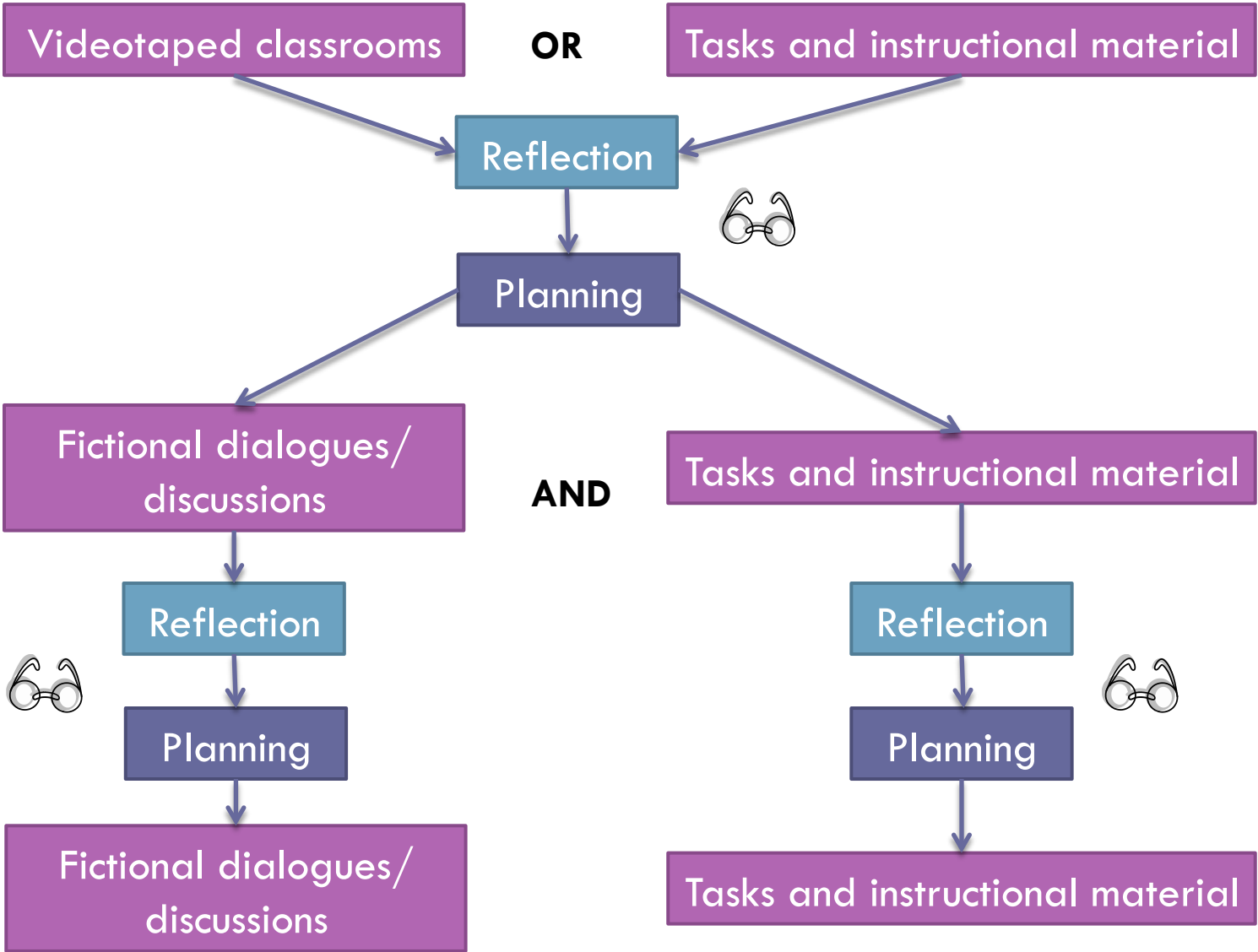
Taking into account:

- ▣ specific cultural environment
- ▣ Structural conditions of the course

Goal setting

Becoming aware of instructional choices regarding representations  
Foster students' competencies in dealing with multiple representations

Theoretical focus 



# References



- ▣ Hart L, Alston A, Murata A (eds). Lesson Study Research and Practice in Mathematics Education. Dordrecht: Springer Science + Business Media; 2011
- ▣ Takahashi, A. 2011, Response to part I: Jumping into lesson study – inservice mathematics teacher education. In: Hart L, Alston A, Murata A (eds). Lesson Study Research and Practice in Mathematics Education. Dordrecht: Springer Science + Business Media; 2011



**QUESTION:** *How can an established effective professional development model such as Lesson Study be translated for use in different cultures?*

Some Thoughts About

# Adapting Japanese Lesson Study For Other Cultures In Ways Harmonious With Its Reflective Principles

Thomas E. Ricks, Ph.D.  
Louisiana State University

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ICME2012 DiscussionGroup7

# JLS is a Reflective\* Activity

\* Process (not incident) reflection

## Process Reflection Framework









INCIDENT Reflection	PROCESS Reflection
Limited in time: Isolated incident / specific episode	Links together reflection incidents: Generate progression of ideas
Only thinking about the past	Using past to inform future action
Focused thought, structured thinking: Pondering, meditating, reconsidering, remembering, journaling, contemplating	Dewey: Process of Reflection Schön: Reflection-in-action
Does not test or refine hypotheses through action	Tests and refines hypotheses through action
Mainly individual activity	Collective reflective activity





# Dewey and Schön

- Both believed *reflection* was a process of developing and testing hypotheses (most successfully done in collaboration)
- Dewey's Scientific Method of Mind:
  - “Testing the hypothesis by overt or imaginative action” (Dewey, 1933, p. 107)
- Schön's Reflection-in-Action:
  - **(Re)Framing**: “Hypothesis to be tested.... a ‘what if’ to be adopted in order to discover its consequences” (p. 149, 93)
  - **Action**: “Experiment [to] test [the success] of the frame” (p. 166)

Step	Dewey	Schön	Process Reflection	JLS	JLS Process Reflection Abstraction
1	Perplexity	Problematic situation	Problematic experience	Lesson Study goal(s) in context of content	Developing, refining, & formalizing hypothesis lesson
2	Withholding judgment to identify problems	Developing a frame (problem setting)	Idea suspension and problem creation	Initial development of lesson plan to address these goal(s)	
3	Developing hypotheses	Developing possible frame solutions	Hypothesis formation	Final development, further refinement, & formalization of lesson	
4	Testing-action with data collection	Problem solving by testing frame solutions	Testing hypothesis with data collection	Teaching lesson	Testing hypothesis lesson
 <b>Beginning a new reflective cycle</b> 					
1	Step 4 experience	Observing 'back-talk' of problem solving	Step 4 experience	Observation of lesson	Observing results of testing hypothesis lesson
2	Identification of new problems	(Re)framing based on observed 'back-talk'	Idea suspension and problem creation	Debriefing session and new lesson study cycle	Further developing hypothesis lesson
	 Cycle continues	 Cycle continues	 Cycle continues	 Cycle continues	 Cycle continues



**QUESTION:** *How can an established effective professional development model such as Lesson Study be translated for use in different cultures?*

To succeed as a powerful form of PD in other cultures, adapted or modified JLS must maintain the reflective\* component

- Chinese Teaching Research Groups (TRGs)
- American Video Study or modified forms of JLS
- Malaysian modified forms of JLS
- Korean forms of lesson study

\* Process (not incident) reflection

A photograph of a classroom with rows of desks and chairs. The walls are decorated with various items, including a large whiteboard, a poster that says "WE ALL USE MATH EVERY DAY", and several small framed pictures or posters. The lighting is somewhat dim, and the overall tone is slightly blue.

Thank You

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# DG 7 - Question D

## How can a professional development model such a Lesson Study be adapted for use in pre-service teacher education

Professor Berinderjeet Kaur  
National Institute of Education, Singapore

## **Some key elements of Lesson Study**

- Study of curriculum.
- Review of related research
- Deliberation on “how best to teach” the lesson
- Voices of other teachers
- Contributions of outside expert





# Adaptation of Lesson Study in pre-service teacher education



# **Infusing key elements of Lesson Study into pre-service teacher education**

- Possible areas where infusion is possible:
  - Lesson planning
  - Micro-teaching
  - Teaching practice



THANK YOU



NIE, SINGAPORE  
Celebrates 60 Years  
of Teacher Education

METROPOLITAN STATE COLLEGE *of* DENVER

# Incorporating “Lesson Analysis” in Secondary Mathematics Student Teaching

Don Gilmore

Metropolitan State University of Denver

12<sup>th</sup> International Congress of Mathematical Education

July 2012



# Conceptual Underpinnings

- Learning, and, in particular, teacher learning, is situated

Learning to teach as participation in the variety of communities of teaching practice through which teachers move during their school experiences (Lave & Wenger, 1998)

- Influence of Lesson Study
  - Teaching practice that is open and collaborative
  - Focus on the lesson as unit of analysis

# Methods Class

- Design, teach and observe, analyze, revise and re-teach two lessons in mathematics for elementary teachers;
- Study lessons captured on videotape;
- Participate as students and observers in lessons taught by the “methods” course instructor;
- Participate—as members of a team that includes the course instructor and their mentor teachers—in planning, teaching and analyzing one lesson in their field experience classroom.



# Student Teaching Model

- Daily work as a teaching team
  - When possible, multiple placements and multiple mentor teachers
  - All are teachers who share responsibility for planning and enacting lessons
  - Consistently high quality instruction
- Two “Research Lessons”

# Research Lessons

- An augmented team, including cooperating teacher, college supervisor and MTL faculty, students teacher, visiting student teacher from another classroom
- several weeks of preparation, including a formal meeting 1 – 2 weeks before the lesson
- Public enactment of the lesson, taught by the student teacher(s) and observed by the augmented team
- Formal de-brief of the lesson
- Revision and re-teaching of the lesson (if possible)
- Written report by each student teacher

# Initial Observations

- Greater involvement of MTL faculty
  - Separates the support and evaluation roles
  - Connects student teaching to rest of program
- Research lessons slow down the whirlwind of practice
  - More detailed discussions of mathematics, teaching and learning
  - The process seems to support student teachers' learning how to reflect on practice

# Some Challenges

- Small pool of strong mentor teachers who use reform-oriented middle- or high-school curricula and are geographically appropriate;
- Aligning the schedules of student teachers and mentors, college supervisors, and MTL faculty who have heavy teaching loads

ICME 2012 DG7: Improving Teacher Professional Development  
Through Lesson Study

**The development of student  
teachers' reality of the  
mathematics lesson:  
The germination of culture of  
lesson study**

Koichi NAKAMURA  
Tokyo Gakugei University, JAPAN

## D. How can a professional development model such as Lesson Study be adapted for use in pre-service teacher education?

- In lesson study, it is important to develop the reality of lesson.
- The lesson is cultural activity and the lesson study is also cultural activity.



# The reality of lesson: lesson study

- In the post-lesson discussion, participants mention about events occurred in the classroom, events written in the lesson plan and relation of them as a reality of lesson.
- The event occurred in the lesson is a real.
  - students' learning process and a teacher's action
  - a problem posed, the way of posing a problem, and students' reaction to a problem
- The event in the lesson plan is imagined.
  - a teacher's action plan, anticipated students' reaction, the item students have already learned, and so on.

# Framework for analysis

- the framework to analyze the reality of lesson that is discussed in the lesson study
  - the event
  - the meaning of event
  - (the background as mathematical and educational (pedagogical) value.)

# Data

	Pre	post
Date	3rd of June	23rd of January
Title of lesson	How many times cuts to open the cube ?	Ratio and its value

- The post-lesson discussions were conducted right after the lesson. Students could ask their questions and give comments freely.

# The reality of lesson for students teachers

	Pre	Post	
The event	Not situated	Situated	Imagined
The meaning of event	teaching skill	mathematical teaching and learning	mathematical teaching process



# Pre: not situated, teaching skill

- ST (Sakata) : Some pupil stood up to see the teacher's writing on the blackboard. Where is the lowest position that you can write on the board in usual lesson? How do you decide the size of a letter on the blackboard?
- ST (Iwata): Some kids who had seats near here, in the individual activity, could not work with the problem. If you teacher find such kids, how do you do?

# Post: Situated, mathematical teaching and learning, naïve imagined

ST (Iwata): Today's topic is "If we throw five, two of them are goal in." Nakayama's (the name of pupil) expression 5:2 seems to me natural.

T: That is right.

ST (Iwata): Another pupil calculated the value of ratio as  $5/2$  that came from proportion of 5:2.

T: Yes.

ST (Iwata): I observed his notebook, he wrote the meaning of ratio as the number of throwing to get a goal on his notebook. He understood the meaning of proportion 5:2. In the lesson the teacher treated the value of ratio  $2/5$  in carefully, but I think it is much better to focus on the value of ratio  $5/2$ . How do you think?

# DG7\_II: Summary and discussion

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School of Educational Studies  
Universiti Sains Malaysia

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# Key questions for today

- ▶ C. How can an established effective professional development model such as Lesson Study be translated for use in **different cultures**?
- ▶ D. How can a professional development model such as Lesson Study be adapted for use in **pre-service teacher education**?



## 5 Panel members

### Addressing Question C:

- Anika Dreher**, Ludwigsburg University of Education, Germany ©
- Thomas E. Ricks**, Louisiana State University, U.S.A. (C)

### Addressing Question D

- Berinderjeet Kaur**, Nanyang Technological University, Singapore (D)
- Don Gilmore**, The Metropolitan State College of Denver, U.S.A. (D)
- Kouichi Nakamura**, Tokyo Gakugei University, Japan (D)





## Key question C

- ▶ How can an established effective professional development model such as Lesson Study be translated for use in different cultures?



# Potential Obstacles in different cultural settings by **Anika Dreher**

- ▶ **Systemic Challenges:**
  - Institutional conditions and resources
  - Demands on teachers
  - Unsuitable curricula
- ▶ **Teachers' views**
  - traditions of professional development
  - Image of the teacher profession, learning disposition
- ▶ **Lack of experience and knowledge**
  - Lack of sufficient CK, PCK
  - Lack of experienced lesson study teachers and researchers
- ▶ ...

(L.C. Hart et al, 2011)



*QUESTION: How can an established effective professional development model such as Lesson Study be translated for use in different cultures?*

Some Thoughts About








# Adapting Japanese Lesson Study For Other Cultures In Ways Harmonious With Its Reflective Principles

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# Implications from Question C

- ▶ Lesson Study can be translated to use in different cultures, but
- ▶ Japanese LS is part of Japanese culture, it is **not possible to adopt** a culture;
- ▶ It is better **to adapt, or integrate** into our local culture and
- ▶ this will take **time and commitment** from the teacher participants





# Tension and challenges of adapting a new culture

- ▶ How to get teachers (and school administrators) to “buy in” the idea of LS?
- ▶ How to resolve the issues of “time for discussion and observation” and full commitment of the teacher participants?
- ▶ An example of resolving the tension in my research project: SK and SJKC



## Key question D



**How can** a professional development model such as Lesson Study be adapted for use in **pre-service teacher education?**

.



Berinderjeet proposed that

Infusing key elements of Lesson Study into pre-service teacher education

- ▶ Possible areas where infusion is possible:
  - Lesson planning
  - Micro-teaching
  - Teaching practice



METROPOLITAN STATE COLLEGE *of* DENVER

# Incorporating “Lesson Analysis” in Secondary Mathematics Student Teaching

Don Gilmore

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# Some Challenges

- ▶ Small pool of strong mentor teachers who use reform-oriented middle- or high-school curricula and are geographically appropriate;
- ▶ Aligning the schedules of student teachers and mentors, college supervisors, and MTL faculty who have heavy teaching loads





ICME 2012 DG7: Improving Teacher Professional Development  
Through Lesson Study

The development of student  
teachers' reality of the  
mathematics lesson:  
The germination of culture of  
lesson study

Koichi NAKAMURA  
Tokyo Gakugei University, JAPAN

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# The reality of lesson for students teachers

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The event	Not situated	Situated	Imagined
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# Implications from Question D

- ▶ Lesson Study can be adapted to use in pres-service teachers

Taking into account: (Anika Dreher)  
specific cultural environment  
Structural conditions of the course

## Key elements of LS (Berinderjeet)

- ▶ *Study of curriculum.*
- ▶ *Review of related research*
- ▶ *Deliberation on “how best to teach” the lesson*
- ▶ *Voices of other teachers*
- ▶ *Contributions of outside expert*