Revisiting Lesson Study (Part 2)

Teh Kim Hong
Training Programme Division
tehkh@recsam.edu.my

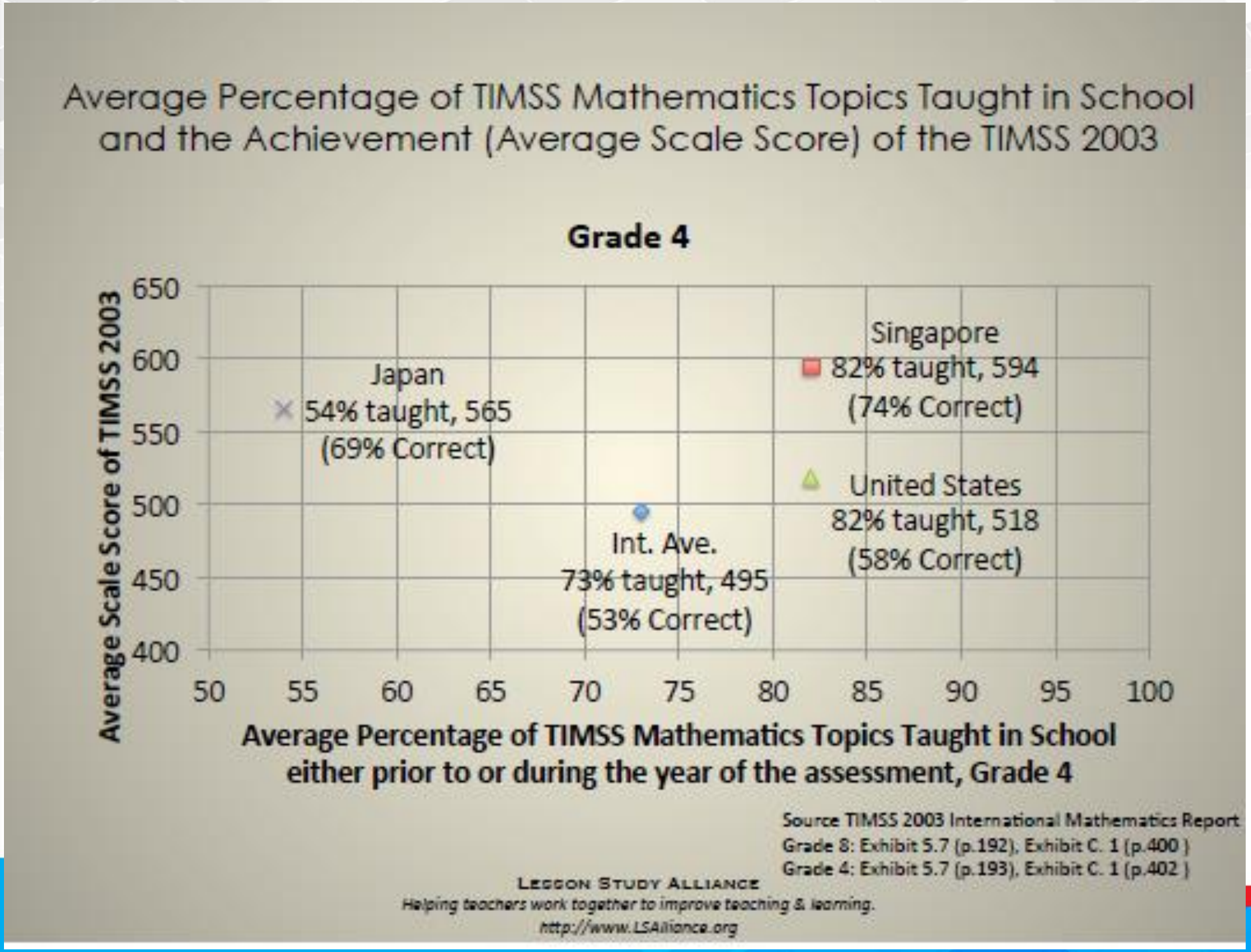
Discussion

- Three levels of teaching mathematics in Japan
- Lesson study for professional development
- Essential elements of effective lesson study
- Outlines of Collaborative Lesson Research model

Problem Solving Is Used As An Approach To Teach Mathematics

The Japanese Mathematics Classroom:

- Most mathematical concepts were introduced through problems based on familiar experiences coming from students' lives or from mathematical contexts.
- Students engaged in solving problem individually and collaboratively.
- Students develop strategies for solving problems, using diagrams, looking for patterns, or trying special values or cases.
- A rich discussion led by teacher, students going through much challenge and struggle in thinking.
- **Stimulate new learning**.
- Structured problem solving approach are typical of math lesson in Japan.



Teaching more does not necessary mean students understand!

A Good Reminder for Practice

Beliefs about teaching and learning mathematics
Reprint from Principles to Actions p.11 (NCTM, 2014)

Productive beliefs
Mathematics learning should focus on developing understanding of concepts and procedures through problem solving, reasoning, and discourse.
All students need to have a range of strategies and approaches from which to choose in solving problems, including, but not limited to, general methods, standard algorithms, and procedures.
Students can learn mathematics through exploring and solving contextual and mathematical problems.
The role of the teacher is to engage students in tasks that promote reasoning and problem solving and facilitate discourse that moves students toward shared understanding of mathematics.
The role of the student is to be actively involved in making sense of mathematics tasks by using varied strategies and representations, justifying solutions, making connections to prior knowledge or familiar contexts and experiences, and considering the reasoning of others.
An effective teacher provides students with appropriate challenge, encourages perseverance in solving problems, and supports productive struggle in learning mathematics.

Three Levels of Teaching Mathematics

- Japanese mathematics educators and teachers identify three levels of expertise of mathematics teaching:

  - **Level 1**: The teacher **can tell students** the important basic ideas of mathematics such as facts, concepts, and procedures.

  - **Level 2**: The teacher **can explain the meanings and reasons** of the important basic ideas of mathematics in order for students to understand them.

  - **Level 3**: The teacher **can provide students with opportunities** to understand basic ideas of math, and support their learning so that the students become independent

For Level 3 Teaching of Mathematics

- Learning by reading, listening, and seeing may **not** be sufficient to develop expertise for Level 3 teaching of mathematics

- How to overcome?

So We Go for Professional Development ??

Phase1	Phase 2
• P D focuses on developing the knowledge for teaching mathematics, - through reading books and resources - listening to lectures and - watching visual resources such as video and demonstration lessons.	• P D focuses on developing expertise for teaching mathematics – teachers should plan the lesson carefully, - teach the lesson based on the lesson plan, and - reflect upon the teaching and learning based on the careful observation. **Japanese teachers and educators usually go through this process using Lesson Study**

Different Forms of Lesson Study

- Depending upon its purpose
- Varies in motivation and interest among the participants
- **School based LS** – to find practical ideas for the effective implementation of the T-L of Japanese national curriculum to students in the school.
- **Distrct- based LS-** concern students of the distrit
- **National level LS -**research theme is usually nationwide view
- LS can be introduced as an open lesson and demonstrated by a veteran teacher

A demonstration lesson

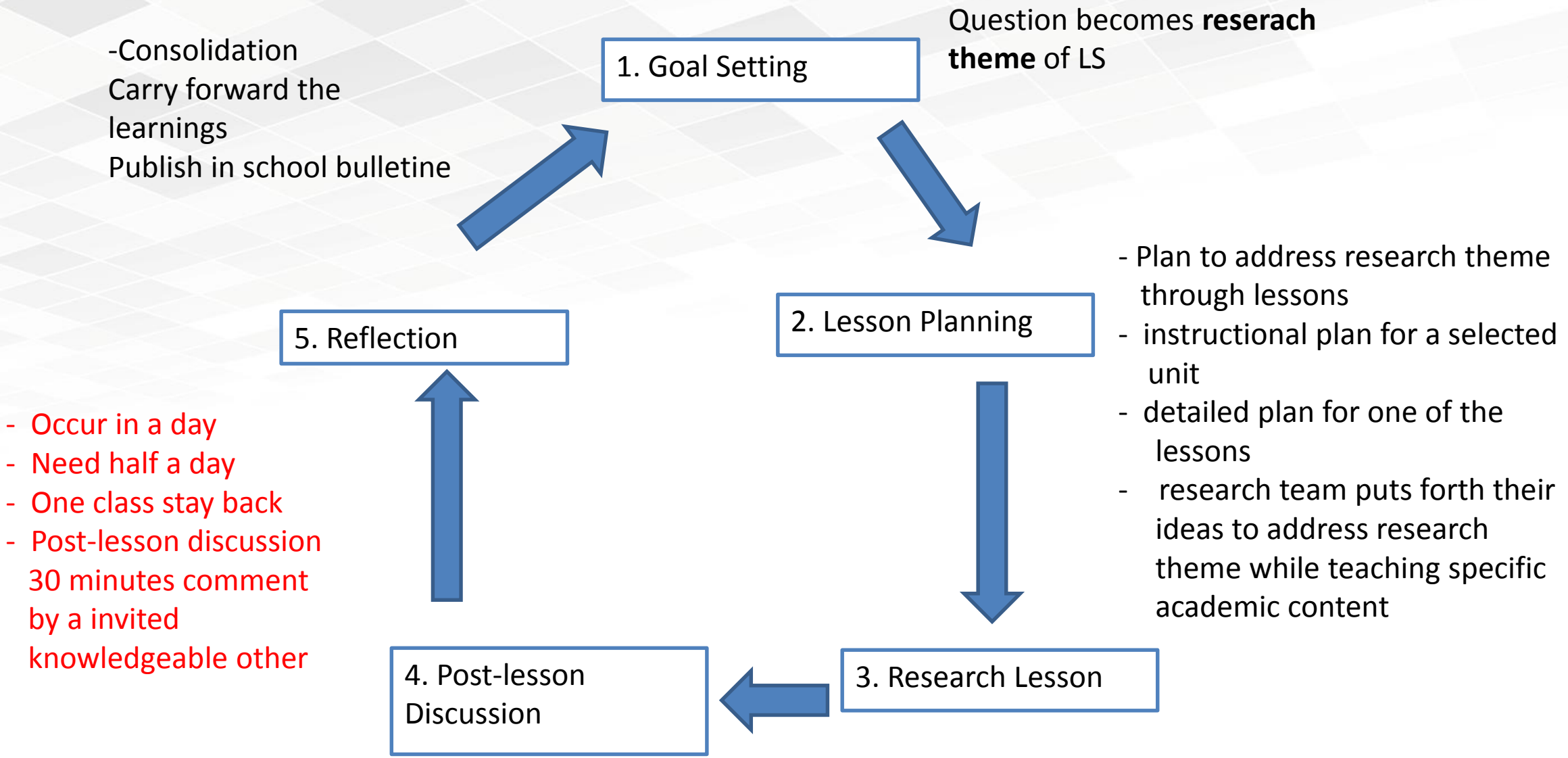
Lesson Study Is An Approach to Teacher Professional Development

Tradisional P D	Lesson study
• Begin with answer • Driven by outside expert • Communication flow:Trainer to teachers • Hirarchical relations between trainer and teacher • Research inform the practice	• Begin with question • Driven by participants • Communication flow: among teachers • Reciprocal relations among learners • Practice is research

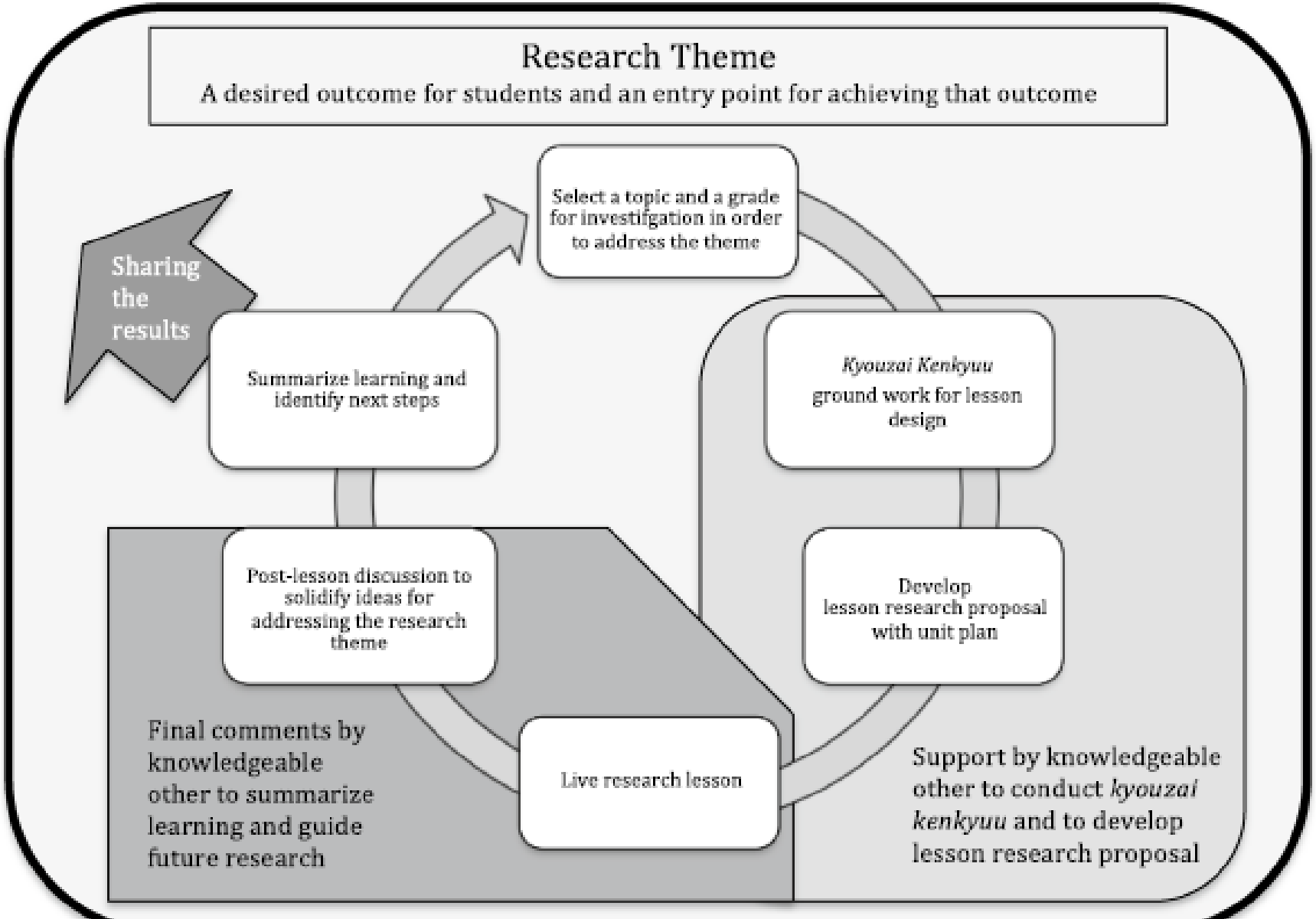
Essential Elements of Effective Lesson Study

- Identify the goals of a particular lesson, unit and subject area.
- Study and improve the best available lessons.
- Deepen the subject-matter knowledge.
- Think deeply about the long-term goals for students.
- Collaboratively plan lessons.
- Carefully study student learning and behavior.
- Develop powerful instructional knowledge.
- See one's own teaching through the eyes of students and colleagues.

The Process of Lesson Study (Fujii, 2014)



Collaborative Lesson Research(CLR) – A Powerful Form of Lesson Study (Takahashi & Mcdougal, 2016)



Componnets of Collaborative Lesson Research (CLR)

- Investigation undertaken by a group of teachers
- Using live lesson to answer shared questions about teaching and learning
- Components of CLR:
  - a clear research purpose
  - kyouzai kenkyuu (教材研究)
  - A written research proposal
  - A live research lesson and discussion
  - knowledgeable others
  - sharing results

1. A Clear Research Purpose

- **CLR is a research, a search for solution to a teaching-learning problem**
- 2 level of research focus

➢ **1st level** :

- involves teaching a specific content
- how to design a lesson so that students learn an identified concept or skill better than they have in the past
- topic of research must pose some challenges for students or teachers

➢ **2nd level**:

- a broad teaching-learning goal that is shared by CLR community
- goes beyond a particular topic or grade level, refer as research theme

Research theme

- No widely shared definition of research theme
- In Takahashi & Mcdougal (2016), describes as

  a) a desired outcome for students and

  b) an entry point for achieving that outcome

Example:

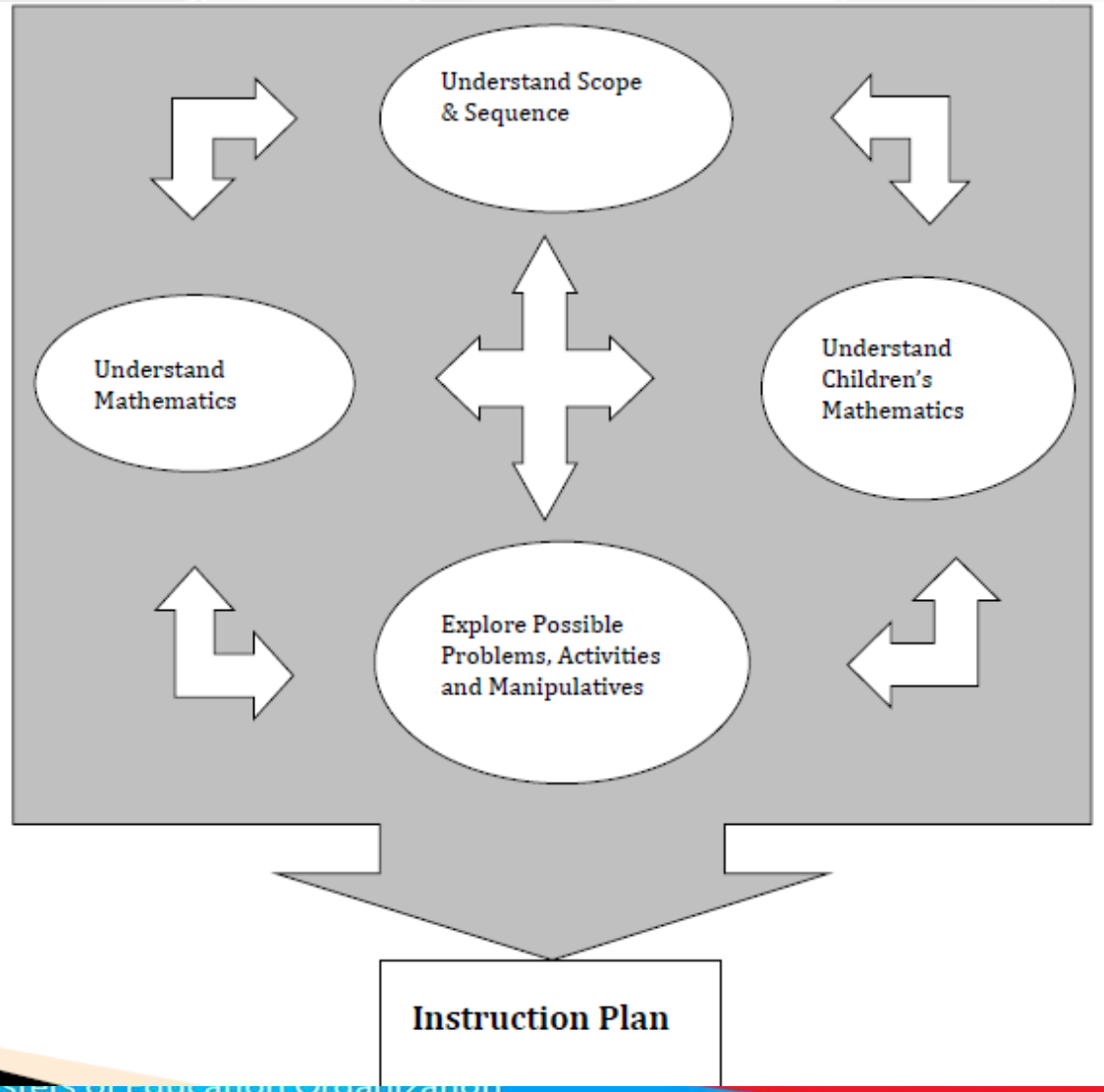
- teacher seek to improve their students' ability to give a viable argument and to critique the reasoning of others,
- Their entry point is teaching students to use journal to record their own ideas and ideas of others

- A research theme : For students to be able to clearly explain their thinking and consider the ideas of others through the support of their own journal.

2. Kyouzai kenkyuu (教材研究)

- Careful study of academic content and teaching materials , is **integral to LS practiced in Japan**.
- Analogous to a literature review
- Investigate the intended learning path related to the topic from lower to higher grade through review of standards and curriculum, research into misconceptions around a topic
- Includes possible tools, manipulatives, materials used, possible tasks to be presented to students
- Avoid repeat of old mistakes, contribute to new knowledge.

教材研究　Kyouzai kenkyuu



3. A Written Research Proposal

- CLR planning team creates a written document, lesson research proposal
- To communicte what the team learned from kyouzai kennkyuu, to explain the instructional thinking
- Includes:

  - learning goal for a unit
  - overview of the unit
  - a detailed teaching learning plan for one particular lesson within a unit (the research lesson)
  - a rationale for the design of the unit and a research lesson
  - a clear statement how the research lesson aims to address the research theme and the learning goals (about 9 pages long)

Knowledgeable Others for Planning

- Persons with extensive knowledge of the topic, extensive experience with CLR
- Familiar with curriculum and students (experienced teacher, content coach, math/science coordinator of other school)
- Invited by the team to
  - help them go beyound what they know
  - support proposal development (identify instrutional examples to review, articles, results from other CLR, feed back on the proposal

4. A live Research Lesson and...

- One member teach
- Observe by other members
  and other CLR community.
- Collect data based on how lesson impact students, relative to research theme and learning goals
- Video, live observation

Post-lesson Discussion (i)

- As soon as lesson is over
- Lead by a moderator, not in the planning team
- Focus on important issues
- Keep conversations grounded based on data collected.
- Discussion- gain insights into T and L and
- Inform the design for future lessons , **NOT** to revise the lesson plan

5. Knowledgeable Others for Live Research Lesson

- Another knowleadgeable other is needed at the live research lesson.
- Expected to highlight important events from research lesson that were not discussed.
- Make connections between the lesson and the new knowledge from research and standards.
- Suggestions to the CLR community of possible steps they could take toward accomplishing their research theme (Takahasi, 2014)

6. Sharing of Results

- CLR is not only for improvement of teaching and learning within a team, but more broadly to a larger community.
- Invite people from outside the team (from other schools) to observe and discuss the research lesson.
- Sharing of written reflection
- Need not repeat CLR even the research theme not accomplish, broader than in a single topic.
- Lessons learned from CLR cycle lead to a revised theories about how to address the research theme or adjustment.
- This leads to another CLR cycle involving a different topic, perhaps at a different grade level.

1st Lesson: Finding Areas of Curved Figures (Sugekari School)

Some snapshots of live lessons


Beginning of lesson


Active participation of students

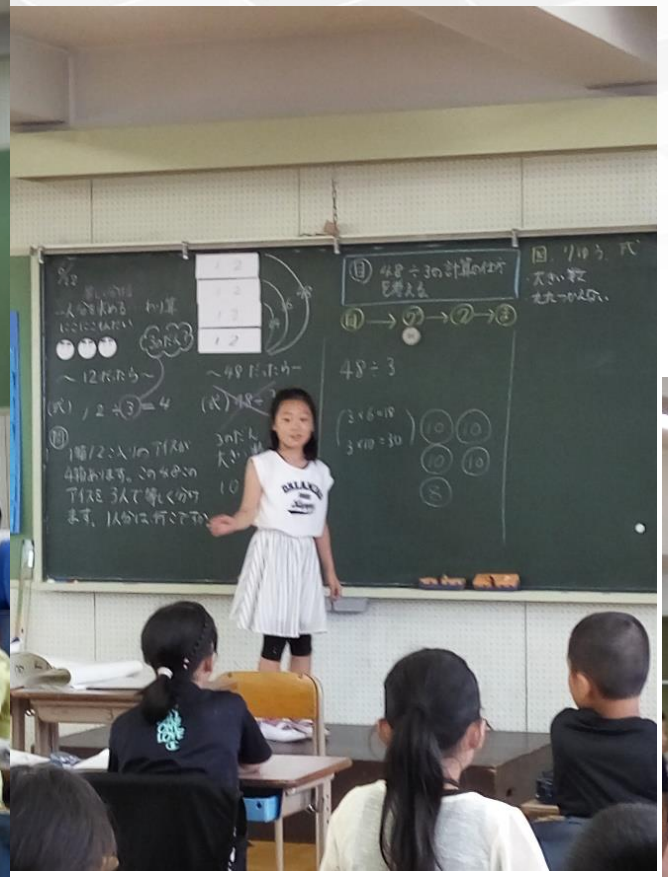

observers


Post-lesson discussion

Organising the Writing Board

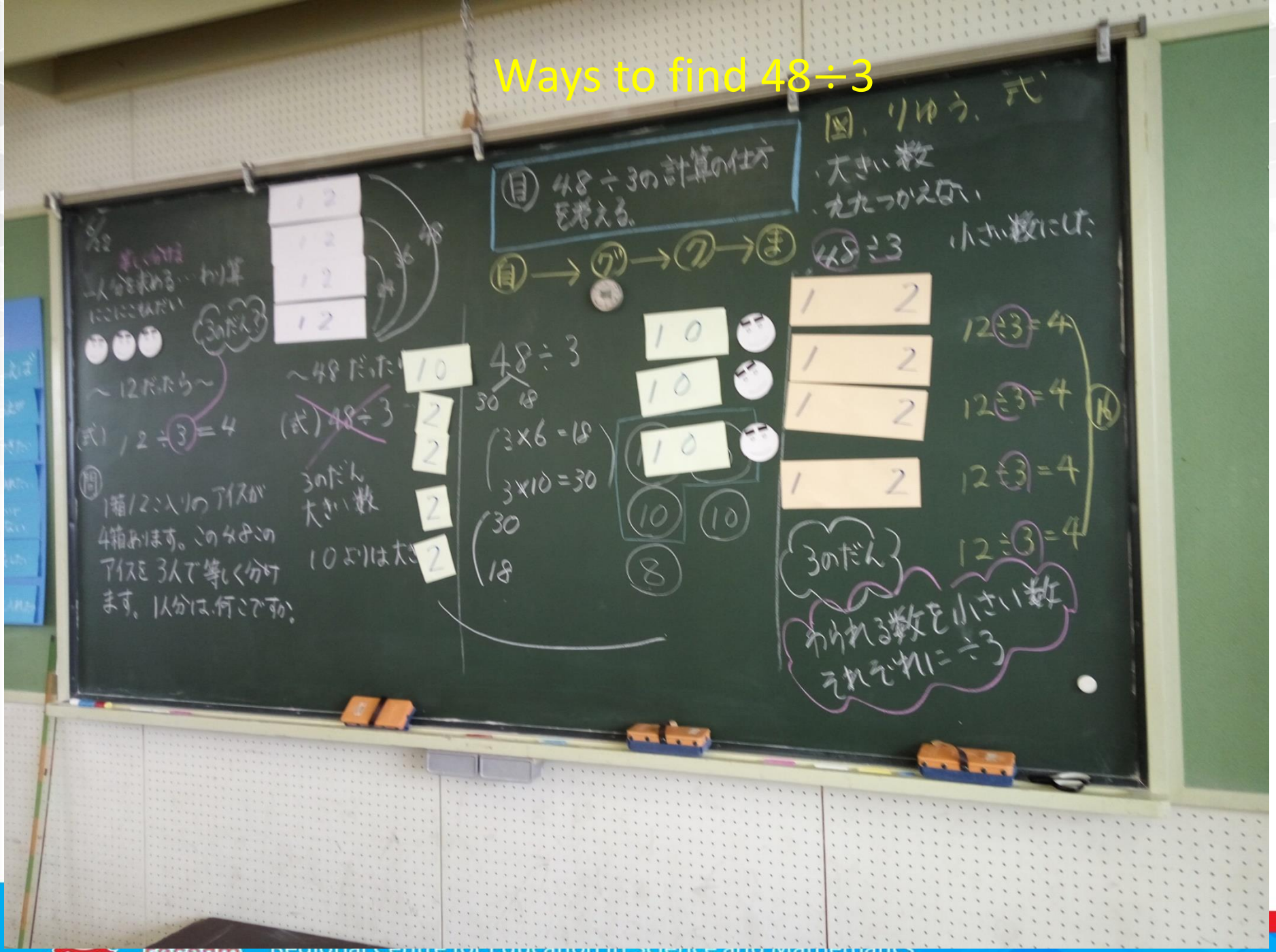
IMPRESSIVE!
All accomplished within an hour

2nd lesson: Some Photos During Lesson Observations (How to find 48÷3)



A lot of interactions between students and teachers

Ways to find 48÷3



You may wonder what is there to teach in 48÷3

It appears too easy.

But there was a discussion in a one-hour lesson

General Observations:

- Teachers usually posed a picture to elaborate the context of the problem.
- Students were allow time to solve problem on their own.
- During the class discussion and sharing session the teacher was able to put the student's ideas and suggestion systematically.
- The layout on the board was very systematic.
- Well planned board writing, class discussion, math journals are strategies to support consolidation of learning

In summarizing the understandings in a lesson

The teacher

- focused discussion around the student generated diagrams on the board.
- based discussion around student words and comments, supplementing with very few ideas of her own.
- artfully chose to capture discussion based on student comments that led to her intended objective but barely if ever “told” the students what they needed to know.
- frequently had students summarize the ideas of others instead of doing it herself.

More Learnings About Lesson Study

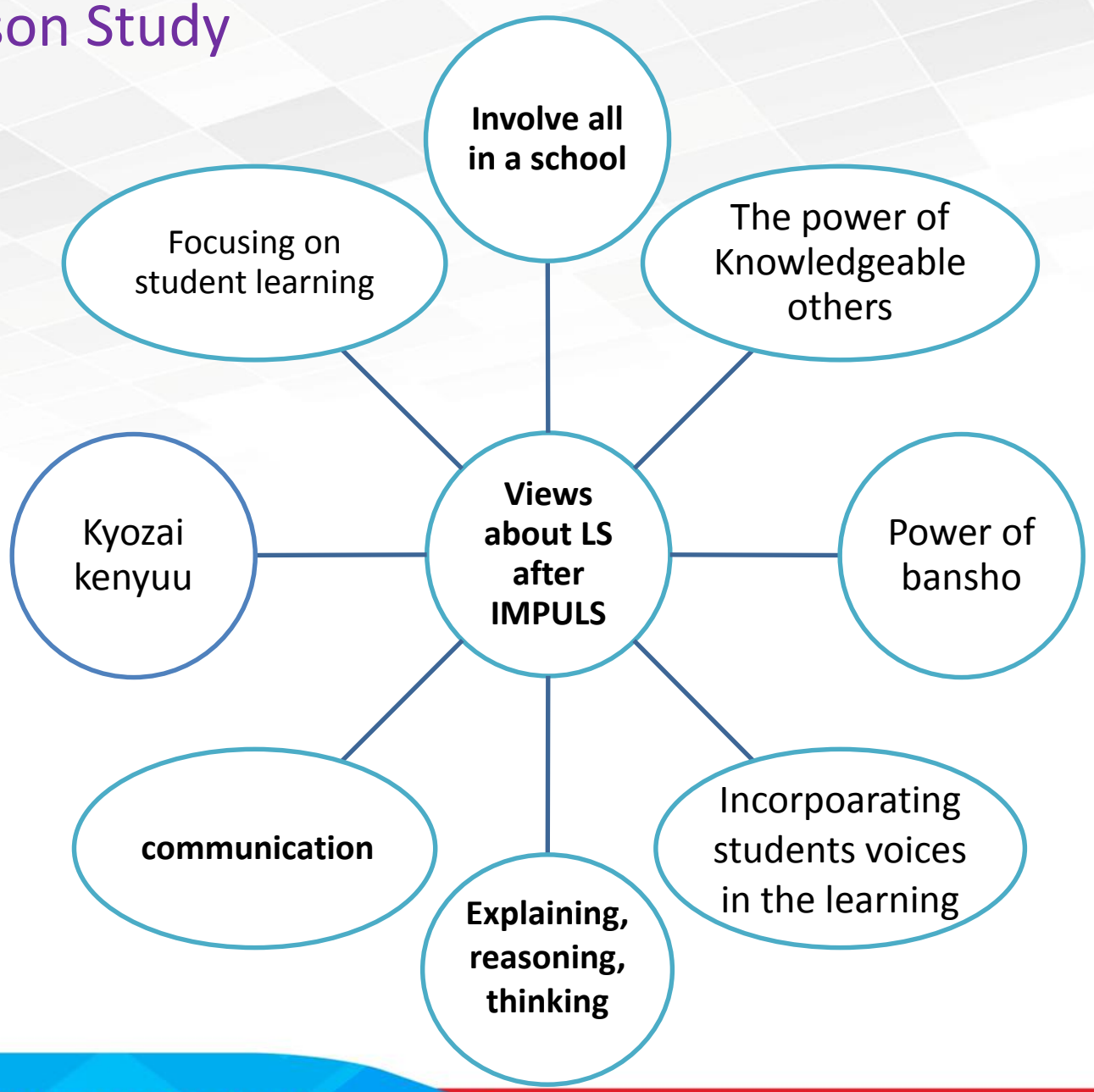
Math text book- develop through LS

Teach closely according to text books

Teacher-led PD

Strong commitment among teachers

Responsibility of teachers to improve teaching practices to support effective learning of students



Conclusion

- LS varies outside of Japan
- CLR was discussed
- CLR may provide a clearer guide for LS
- All observations were done based on research lesson prepared by the Japanese teachers
- Structured problem solving approach were observed in all the lessons. Only one problem is discussed in depth in a lesson

Thank you

These slides (part 2) are part of the presentation in the colloquium shared among teachers and educators 18052020