Reflecting on Good Practices via VTR

Based on a VTR of Mr. Tanaka's lesson 'How many blocks?

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The focus of the Tokyo and Thailand meetings are to share ideas on good practices from participants and to structure, develop and review the product using VTR for teacher education and reform movement in Mathematics Education. The Tokyo meeting focuses on developing a format for sharing good practices. This paper proposes the following special format: a) Short summary of the lesson with emphasis on major problems in the lesson, b) Components of the lesson and main events in the class, and, c) Possible issues for discussion and reflection with teachers observing the lesson. Based on this format, good practices may be identified and explained. This procedure strengthens the proposal that the function of the VTR is more than merely the re-production of good practices.

Key ideas for using VTR in relation to the Lesson Study

Japanese Lesson Study has been developed from 1873 (See Appendix A). There are various kinds of usage but, currently, in narrow meaning, a Lesson Study is divided into three parts: a) planning the lesson, b) the observation part, and, c) the discussion and reflection part. These parts may be summarized by the words: *plan, do* and *see*. The lesson study is usually done through the collaboration of teachers. *Plan, do* and *see* can be done by a teacher but as we know, it is not necessary to begin from *plan* in daily practice. Indeed, many teachers do not write their lesson plan everyday. A teacher's knowledge is usually developed through the order of *do, see, plan*. In any case, the part of reflection or *see* is a key component of the lesson study. In the process, teachers participate in the study lesson and reflection, and learn ideas for their next lesson.

When we use the VTR, we also begin from the lesson observation but the VTR itself already loses many dimensions, parameters and context because the program is prepared (recorded) from the perspective of the recorder's and VTR editor's eyes only. Through the observation of the VTR, we learn things and apply these in the next activity. It is also the process of *do, see* and *plan*, or observation, reflection and planning. From the phrase 'Reflecting on the Good Practice (RGP) via VTR', I would like to propose these processes (*do, see* and *plan*) in teacher education, reform movement in mathematics education and mathematics education research.

The phrase or idea of RGP, rather, focuses on a methodology for innovation in mathematics education. The TIMSS Video Tape Study illustrated this very well. Even if

people do not know the lesson in the US, Germany and Japan, they absorbed some messages from the short VTRs excerpted from the lessons and later discussed. What the mathematics educator does is develop the lesson in the form of a research.

An example of good lesson and a way of description

The VTR used is in the following website:
http://e-archives.criced.tsukuba.ac.jp/en/result_data.php?idx_key=1034
http://www.criced.tsukuba.ac.jp/math/teaching-material.html

Exploring Japanese Mathematics Lesson	.wmv
-For sharing key ideas-	(short ver.)(53.3MB)
	.wmv
	(long ver.)(28.1MB)

The lesson in the VTR is titled ‘How many blocks?’ The longer version contains an 8 minute edited lesson and almost 5 minutes of comments by Max Stephens.
In the context of developing usages of the VTR, Abraham Arcavi (to appear) developed a formatted description as follows:

a) Short summary of the lesson showing the major problem areas of the lesson.
b) Components of the lesson and main events in the class.
c) Possible issues for discussion and reflection with teachers observing the lesson.

The structure of this format is a good way of describing the use of the VTR in the context of teacher education for following reasons:
Viewing lessons via the VTR takes time. A short summary is necessary to grasp the contents quickly. Components of the lesson and events are useful in order to understand the contents quickly. If we do not have this background, we have to observe the VTR again and again to understand its contents clearly. Issues for discussion and reflection may be resorted to when using the VTR for teacher education.
The description of the VTR in this format is the format of RGP. The description does not need to be done by a VTR editor. On the contrary, it may be better that it is done by others because in the case of an editor, the description may not be the issue for discussion and reflection by others but may be fixed on his issues. There is actually a diversity of possible issues depending on the users’ perspective, ideas and context.
The Appendix B is an example by Aida Yap (to appear). Please refer to the VTR and read the document she prepared. She did not have a chance to look at the original lesson and edited original VTR but she described very interesting issues clearly. I compared her description with my ideas after I observed the original lesson and edited the VTR.

Context, De-contextualization and Re-Contextualization

RGP focused on good practices, good lessons or innovative lessons for the reform of mathematics education. It is accepted as a model for innovation of mathematics education by the person who selected it. The word 'reform' is usually defined by the problem and the aim of mathematics education based on personal recognition or by reference to same policy documents. The research based on evidences for making hidden valuables clearer is important. On the other hand, some things are not easy to reform even if we find them. For example, we may find that a teacher's belief is an obstacle to change the lesson but teacher's beliefs are not easy to change. Even if we try to be constructive, there are a number of constructive approaches depending on the number of teachers. On the other hand, RGP does not fix the word or value from the beginning. It tries to share the example as a model of good practice or lesson and we can use it what is good, how it is good, for doing it what is necessary conditions and how it was developed..

In any case, the edited VTR is not the same as the original lesson. It is de-contextualized through the process of recording and re-contextualized through editing. The user and observer of the VTR is not the editor. Through questioning by the users or observer of the VTR for reflection, it is re-contextualized.

Indeed, the interesting questioning by Aida Yap in the Appendix B is not the same as the original context and editor's context. She discovered aims of the lesson but she did not describe some special meanings of the original lesson study done by Hiroshi Tanaka. By reforming the Japanese standard, we lost the context of the study on solids at grade 1 in elementary level. Thus, she introduced solids in exploring the context of counting. When Japanese observed the study lesson at the recorded year, we observed it on the context of curriculum development such as how pupils can explore the solid on the context of counting and calculating problem setting on the curriculum standards. In the original context, this is a most important reason for explaining why this lesson study is a good practice.

Aida Yap discovered most of editors' perspectives but could not question some parts. Editors cut so many interesting parts for focusing on translation among representations of solids, pictures and expressions. She discovered them but she did not ask what part the editor found the most interesting in the lesson.

As the editor of VTR, I would suggest adding the question "Why did a pupil ask 'Did we study mathematics today?' at the end of the lesson?" I would do so because, as explained, the students did not have experience in exploring solids and that they

believed studying a new calculation is the lesson of mathematics. At the same time, it implies that it was an enjoyable activity for them (the students) which they associated as being the same as playing blocks at the beginning of the lesson. The limitation of the lesson, the inability to introduce new contents on solids, will be taught in the upper grade. In Japan, many teachers have a strong belief that we could not teach beyond the standards even if it is permitted to do so.

De-contextualization in the process of the description of the VTR depending on the format is unavoidable. And in the context from other economies, some issues are not significant. From the different ways of questioning we can know the different perspectives in mathematics education as well as commonality of perspectives. Ms. Yap's ways of questioning well imply that the curriculum differences are some issues for RGP via VTR.

How can we develop good teacher's perspective on teachers through the VTR?

Questioning helps us re-contextualize the VTR. In the process of pre-service teacher education, it is important to develop teacher's perspectives. Learning to listen is a key word for this approach. In the case of Japan, lesson study usually begins by developing a lesson plan. At this stage, teachers solve and pose problems from students' perspectives. By analyzing problems, teachers develop good ways of questioning. For writing the description of the VTR, it is very important to ask why? Why did students say this? Behind their words, there must be so many kinds of ideas. Why did the teacher say that? Through these questions, we can better know and understand the hidden features of the lessons being observed through VTR. Then, it is very important to add the format such kinds of descriptions from the view points of original lessons but even if we add descriptions we do not needs to follow because re-contextualization is done by VTR users.

Acknowledgement

In Appendix, I used the paper by Aida Yap (to appear) in the book edited by Masami Isoda and Max Stephens. I would like to express my special thanks for her contribution.

References

Isoda, Masami, Max Stephens et al (in press) Lesson Study Approach in Mathematics.

A Brief History of Mathematics Lesson Study in Japan: "Where did Lesson Study begin, and how far has it come?"

Lesson Study began in the late 19th century with class visits designed to allow the study of group instruction.

1. From Individualized Instruction to Group Instruction: Studying Teaching Methods

Under the seclusion policies and class system that characterized the Edo period for about 260 years prior to the installation of the new Meiji government in 1868, literacy (and numeracy) education was available to commoners through *terakoya*, or temple schools, that had opened up autonomously around the country. Commerce thrived and the class system gradually collapsed during this period of seclusion, and by the late Edo period, individual knowledge and skills were highly regarded in the recruitment of workers. Due to the widespread emergence of temple schools, to which parents could voluntarily send their children, the literacy rate at the end of the Edo period was 43% among males and 10% among females, even then making Japan one of the most educated countries in the world. Individualized instruction was the common teaching method employed.

In 1872, the Meiji government issued the Education Code and at the same time established a teachers' school (normal school) in Tokyo (forebear to University of Tsukuba). With the goal of disseminating Western scholarship, the government invited foreign teachers to teach Western subjects. The foreign teachers introduced

the concept of group teaching, a style then still rare even in the West, into the teachers' school (Fig. 1). The Japanese teachers and students, who were familiar only with the individualized instruction model in which subjects were taught individually based on the academic abilities of the student, learned not only the contents of the subject, but also methods of teaching by observing their teachers' behavior.

Textbooks created by foreign teachers at the teachers' school contained drawings of students raising their hands to answer questions posed by the teacher, as shown in Fig. 2. It contained the question "How many students are raising their hands?" This foreign teacher wrote a textbook that teaches instruction methods as well as mathematics at the same time. The group instruction model implemented at the teachers' school in Tokyo spread to other teachers' schools around the country. Due to financial difficulties, the new government closed down all the teachers' schools except the ones in Tokyo around 1880.

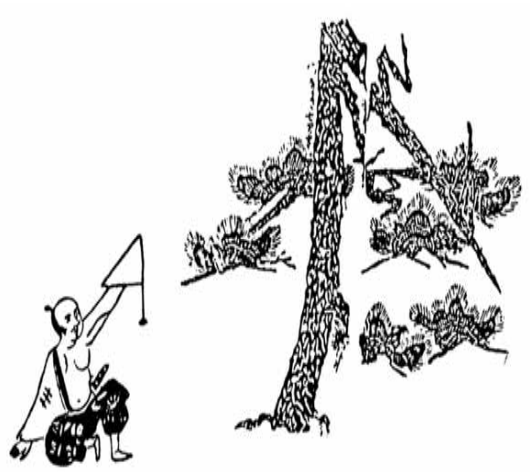
Nonetheless, in the decade while the schools were open, the practice of group instruction was disseminated around the country by graduates of the teachers' schools and by scroll pictures (Fig. 1) and textbooks (Fig. 2).

1868 New Meiji Government
Imperial government, country opening, Westernization policies

1872 Education Code issued, teachers' schools established
How is teaching done in a classroom?
How does group instruction work?

Pestalozzi: Experience-oriented teaching methods

Fig. 1 Shift from the curriculum and teaching methods of the *terakoya* (temple schools) to those of new types of schools.



"How tall is the tree? "

Illustration from *Jinkoki*, a mathematics textbook from the Edo period.

"How many people are raising their hands?"

Illustration from an elementary mathematics textbook in 1873.

Fig. 2 From textbooks that allowed students to study numeracy at their own discretion, depending on their needs, to textbooks designed to allow students to simultaneously study teaching methods.

2. Dissemination of the Lesson Study Practices through the Elementary School Attached to the Tokyo Teachers' School.

In the 1880s, study on group instruction and its dissemination reached new heights as overseas study missions began returning to Japan. Mission delegates, who had been teachers at the teachers' school before their departures, were invited to become teachers at the elementary school attached to the teachers' school after their return, and a book on the Pestalozzi's teaching method was published. Even back then, this book contained comments on teaching materials, as well as instructions for conducting class observation and holding critique sessions. At the instruction of the Ministry of Education, these teaching methods were implemented throughout Japan as a model. Open classes were held to encourage the proposal of new teaching methods and teaching curricula, producing the first interactive Lesson Study study groups initiated by the government.

Fig. 3 shows one of the national teachers' training conferences, which have been held since the Meiji period.

3. Development and Dissemination of Teaching Methods Learned through Lesson Study

As the country grew wealthier, it became possible for anyone to attend and graduate from elementary school. In the 1920s, new teaching methods based on the educational philosophy of scholars like John Dewey launched an era in which non-government-attached-school teachers began proposing their own teaching methods. At this time, a new teaching method was proposed for enhancing peer learning (see Fig. 4). It allowed students to come up with their own study questions,

discuss with one another whose question they wanted to research, and then go about researching the selected question. This set the stage for the emergence of teaching methods that focus on problem-solving, which today are globally recognized as models of constructivist teaching. Teachers' unions were launched after World War II, and Lesson Study by involved teachers led to heated debates. These classes also came to be used for launching futile ideological opposition. Teaching methods focused on problem-solving, which recognized the limitations of what already known and tried to produce new knowledge, were able to achieve success in spite of having to overcome the conflicts and other challenges. This was possible because visiting teachers were exposed to classes conducted for observation, and were impressed by seeing the students learning by themselves through problem solving.

Now, problem-solving approach is well known as a major way of teaching mathematics in Japan.

A class with 100 observing teachers.

A group of 1,200 teachers observe a class and class review session on an auditorium stage.

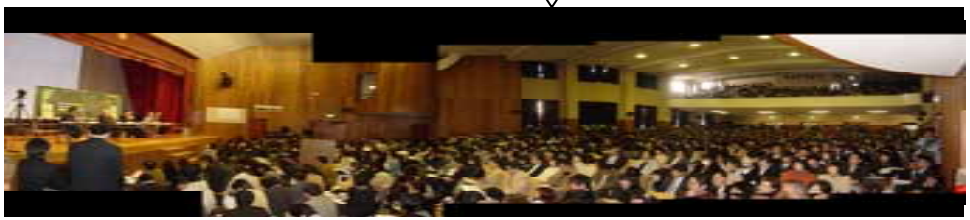


Fig. 3 National Training Conference for Teachers at the Elementary School Attached to the University of Tsukuba, held since the Meiji period.

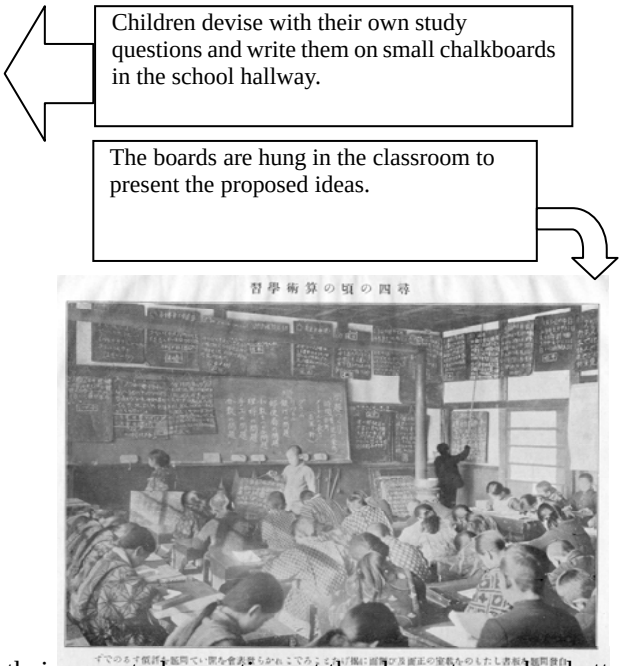


Fig.5 Study is conducted on how to teach students to develop their own study questions at the elementary school attached to Nara Women's higher normal school around 1920.

Appendix B

"How many blocks?"
A first grade mathematics lesson

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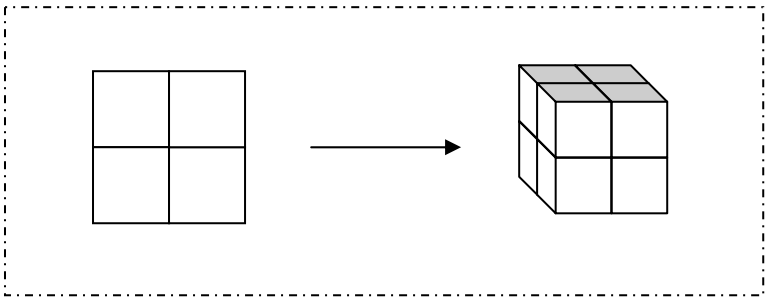
The topic of this first grade lesson is on determining the number of blocks in the pile wherein some of the blocks are hidden from one's view. The main objective of this lesson is to engage students in visualizing the number of blocks in the pile and explaining how they got their answers. In order to determine the number of blocks in the pile, the students have to rely on their visualization skill.



Components of the lesson and main events in the class:

- A pile of blocks and a camera are hidden from the students. The front view of a pile of blocks is shown on the television screen. The teacher then asked the students to determine the number of blocks in the pile. This part of the lesson encourages the students to guess because showing the front view of the pile of blocks is quite deceiving. Most of the students answered 4 blocks, which was not surprising at all.

- The teacher afterwards positioned the camera at a different angle so that another view of the pile of blocks is shown on the television screen. As before, the teacher asks the students to determine the number of blocks they think there are in the pile.

- A drawing of what was shown on the television screen was posted on the board. The teacher distributed a worksheet to each student. The worksheet contains the same drawing as the one posted on the board. The students were then asked to

write their formulation and answer in the worksheet.

- Students came up with different mathematical formulations such as 4 + 4, 3 + 2 + 3, 1 + 3 + 4, 4 + 3 + 1, and 2 + 2 + 2 + 2. Some students were asked to explain their work in front of the class.

- Towards the end of the lesson, the teacher brought out 8 big blocks and arranged them in a pile similar to what was shown in the drawing. The students were asked to come closer to the front so that they could clearly see the pile of blocks. The teacher repeated the explanation of some students using these blocks.

Possible issues for discussion and reflection with teachers observing this lesson:

What may be the goals of this lesson?

By showing the front view of the pile of blocks and writing on the board the question that students need to answer (How many blocks are there in the pile?) the teacher sets the goal of the activity. The teacher is not actually interested on whether the students come up with the correct number of blocks in the pile but rather on the students' way of thinking in getting the number of blocks in the pile.

How can we characterize the mathematics of this lesson?

Visualization skill is a very important skill that any student must possess. Thus, giving problems that help develop the visualization skill of the students is really important even at this very early stage in elementary mathematics. Encouraging students to explain or defend his/her answer is really more important than the answer itself. In this way, the teacher would be able to discover student's mathematical thinking and possible misconceptions that the student may have. Corrections on the erroneous ways of thinking of the student may then be made accordingly.

How does the teacher view his students?

The teacher is always challenging the students all the time to imagine the number of cubes in the pile. Never did the teacher say that the answer given by the student is correct or not. It is evident that the teacher is not after the answers given to him by the students but rather on the thinking or reasoning behind each answer. The teacher feels confident that even at this early age students would be able to show evidence of their visualization skill.

What are the characteristics of the classroom management of this teacher?

The teacher made use of a combination of strategies to get students attention all the time. He writes, explains, poses problems/questions, and process students' answers. The use of television to enhance his instruction was really a good idea to challenge the students to think. During the lesson proper, the teacher showed expertise in handling the discussion. After a student presented his/her work, the teacher always followed-up student's explanation.

It is very evident that the teacher was able to capture students' attention through the activities he presented. Students really enjoyed the hands-on and minds-on activities given to them by the teacher. There was never a lull period during the discussion.

Is there more mathematics stake in this problem of which the teacher should be aware of?

The teacher obviously attained his intended goal for this lesson. It would be interesting to find out the reasoning behind the other mathematical formulations made by the students. It is farfetched to expect these first graders to come up with mathematical formulations involving multiplication.

What may be the learning outcomes and the follow-up for such lesson?

From the video, it is clear that the students were able to come up with different ways of counting the number of blocks in the pile. In all these mathematical formulations, the visualization skill of the students is being challenged. It would be very worthy of note to find out if students can deal with counting the number of blocks in the pile containing more than 10 blocks or when there are more blocks hidden from the students view.