

【論文】

Jugyokenkyu (Lesson Study) in America

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要旨

Lesson study (*jugyokenkyu*) is a Japanese form of teacher development. Lesson study is gaining recognition in America because it has two elements lacking in American professional development, teacher collaboration and teacher-led classroom-based research. In lesson study, teachers work together in a research cycle with carefully laid out steps to create a research lesson. The lesson is planned, taught, observed and reflected on for future improvement. Lesson study is officially recognized and supported by teachers and administrators in Japan. However, in America, the support of lesson study is a grassroots' effort. The report outlines the lesson study process and the spread of lesson study in America. Field notes from the author's participation in a lesson study workshop further offer insights into the ways lesson study is being introduced to American teachers. This report will also show that the introduction of lesson study in America has implications for both countries.

Key words : Professional development, Lesson study (*jugyokenkyu*), Collaboration

Introduction

Lesson study is the most common form of professional development for Japanese teachers (Lewis, 2000). It is so ingrained in the Japanese education system as a norm for professional development that explicit steps for carrying out lesson study in Japanese literature on education are hard to locate. On the other hand, because lesson study is a new model of teacher development in America, several researchers have explicitly outlined the framework of lesson study, how it should be introduced, and provided examples of lesson study projects in America (Lewis, Perry & Hurd, 2004; Lewis, Perry, & Murata, 2006; Lewis, Perry, Hurd, & O'Connell, 2006). First, this study will briefly describe lesson study. Second, a practical example of lesson study will be depicted through descriptions of a workshop that was held at an elementary school in the San Francisco region. Descriptions will include an overview of the workshop agenda and data collected from the author's participation in the workshop. Finally, implications for lesson study in regard to its connection to America and what it might mean for Japanese education will be presented.

Background of lesson study: What it is? Why it is needed?

“There is nothing more powerful than an idea whose time has come” --Victor Hugo

Lesson study caught the eye of western educators in *The Teaching Gap* by Stigler and Hiebert (1999), who wrote, “By all indications lesson study is extremely popular and highly valued by Japanese teachers... It is the lynchpin of the improvement process” (p.111). In lesson study, teachers take ownership of their own professional development by going through a structured research process that is grounded in preparing a lesson as a complete unit of instruction to be taught in the classroom. Ideally, teachers form a research study team compiled of 4-6 teachers to work on a lesson. The lesson is referred to as a ‘research lesson’ (Lewis, 2002). During the research process teachers go through several stages as they prepare a research lesson, teach the lesson, observe the lesson, reflect on it, revise it and report on its outcomes (See Figure 1). Stigler and Hiebert saw the merits of lesson study because it meshed with their belief that the improvement of teaching takes place in the context of the classroom (1999). Consequently, they recommended that the time has come for lesson study to be introduced to American teachers (1999).

Why focus on a lesson?

In lesson study, ‘the lesson’ is the centrepiece of teacher development. A lesson underpins vital elements of a teacher’s mode of instruction. Prabhu (1992) suggests a lesson “represents the implementation of a method of teaching” (p. 227). He further adds, “A method is what lies behind a lesson plan—what guides the teacher in deciding what activities are to be undertaken, and in what order in the course of the lesson” (p. 227). Prabhu (1992) also metaphorically describes a lesson plan as part of a journey. “The provision of a curricular sequence enables the teacher to assume...that each unit in the sequence matches a corresponding point in the learner’s progress” (p. 226). Following Prabhu, a lesson is comprehensive; it is at the center of what a teacher does before, during and after a lesson is taught.

The above definitions of a lesson offer reasons why it should be a focal point for teacher development. However, in lesson study, which aims at teacher development, the above descriptions are appropriate as long as what, why, and how a teacher plans and teaches is focused on the learner. Concentrating on the learner needs to be emphasized because there is a tradition of teacher development models that has been built on focusing a lot of attention on teacher behaviors (e.g. see Flanders, 1970). These models reflected a teacher-centered approach and were comprised of a priori lists of teachers’ behaviors that an observer would look for and evaluate. As a result, ‘teachers’ moves’, what the teachers did in the classroom, were given *a priority* over considerations for the learners.

Why Focus on the learner?

In American classrooms, there has been a shift in teacher roles going from teacher-centered to learner—

centered instruction. The transition is not always easy. Chazin and Ball (1995, p.1) write, “Accustomed to being the source of knowledge, and doing most of the talking, teachers now must refashion their role in ways that responsibly and effectively shift more authority and autonomy to students”. This shift in the role of the teacher must be reflected in teacher development. Lesson study focuses on the learner. It provides an organized framework of inquiry for teachers to refashion their teaching roles to “shift from ‘teaching as telling’ to ‘teaching for understanding’” (Lewis, 2002). In planning a lesson teachers are expected to spend more time on anticipating student thinking (see Figure 1). As one teacher who participated in lesson study remarked, “You have to think about things from the student’s point of view and that is a big change” (see Lewis, 2002, p.64). This shift is important to teacher development. In lesson study, observers pay less attention to teaching behaviors and instead provide more feedback on what learners are doing.

So far, we see that lesson study is a teacher development model imported from Japan. It empowers teachers to gain control of teacher research. The teachers focus on preparing a lesson because it is central component of classroom teaching. The process of the lesson study cycle helps teachers to shift their teacher roles from teacher centered to learner centered. Lesson study team teachers change their focus from thinking about teacher moves they are making during the lesson to anticipating what their learners are thinking (see Figure 1).

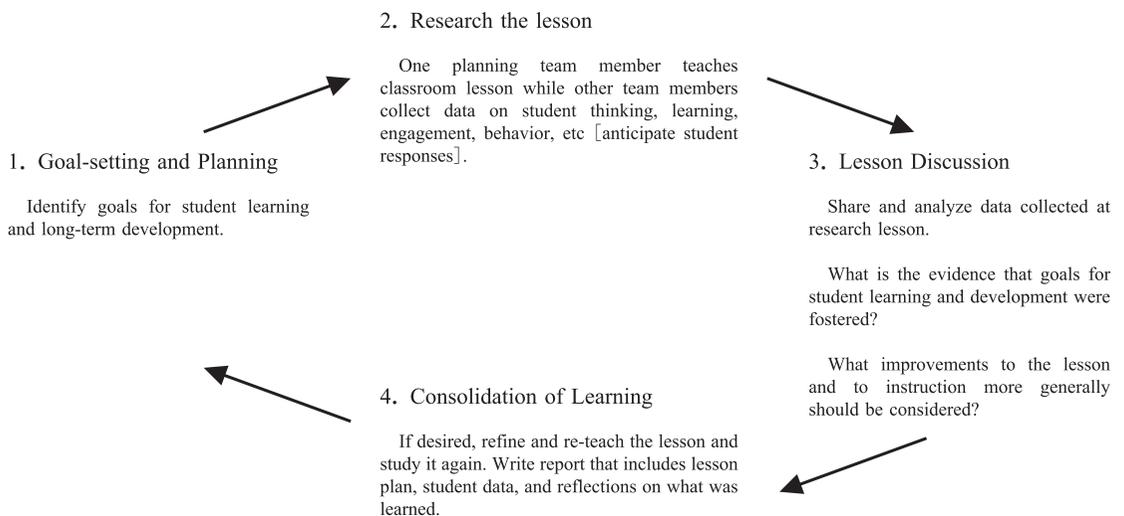


Figure 1. Lesson Study Cycle (Lewis, 2002, p.3)

The above lesson study cycle illustrates a classroom-based research structure for teachers to follow. Although the stages provide a step-by-step structure, the criteria within each step are broadly defined to allow teachers to direct the process to match their own particular concerns. Kumaravadevilu (2001) points out that any type of teaching pedagogy “must be sensitive to a particular group of teachers teaching a particular group of learners pursuing a particular set of goals within a particular institutional context embedded in a particular social milieu” (p.538). Lesson study’s greatest advantage is its adaptability to handle the complexities that surround the

classroom. It provides a pliable framework that allows for situational understanding in which teachers have flexibility to tailor their research to fit the particular contexts surrounding their classrooms. For example when reviewing the parameters within each step, we can see that teachers are given opportunities to address their particular concerns as they set out to 1) attempt to focus on how they can coordinate immediate goals of implementing what they are asked to teach with broader goals of helping their learners in their lifelong development; 2) decide on a lesson to research, focus on their learners' thinking (e.g. How will they respond? How will they understand?), do research on the classroom by planning the lesson and determining how they will collect data; 3) collaborate by assigning each other classroom roles to carefully monitor what goes on during the lesson; and 4) share data and reflect on what happened in the lesson and report on future directions to take.

Figure 1 shows that the lesson study cycle requires collaboration and reflection. Teachers interact with each other to share ideas about teaching as well as thinking about why they are doing what they are doing in their teaching. In addition lesson study is data driven. More will be said about these characteristics in the following.

Lesson study improves teacher cognition through collaboration

Ideally, lesson study works best when it is done collaboratively. Following Vygotsky (1978), learning is social. We communicate our thoughts socially with language. Expressing thoughts and receiving feedback is an iterative process that contributes to the development of our thinking. Teacher learning occurs in the same manner when teachers go through the lesson study cycle working out their thoughts and exchanging ideas with others. Therefore, the cognitive process of lesson study gives teachers the opportunity to exchange their beliefs, assumptions, and knowledge (BAK, see Woods, 1996) about teaching that drive what they do in the classroom (Clark & Peterson, 1986; Burns, 1992; Pajeres, 1992). Interacting and receiving feedback from other members either further confirms their teacher BAK so that they can continue to build on their success, or the interactions challenge them to reflect on their teacher BAK, which leads to teacher change. In either case, teacher improvement occurs.

In addition, going through the lesson study process allows teachers to develop a language to talk about their teaching as they make their intuitive understanding about teaching explicit. Teachers' articulating why they do what they do in a professional development forum is significant to teacher learning. Freeman writes, too often teacher education is ineffective because teacher educators "... do not acknowledge--much less encourage--teacher-learners to construct their own versions of teaching" (1991, p. 19). Bakhtin wrote about cognitive development through *dialogic understanding*. He pointed out the differing effects of monolog and dialog by focusing on monolog's characteristics:

Monologism, at its extreme, denies the existence outside itself of another consciousness with equal rights and equal responsibilities, another I with equal rights (thou). With a monologic approach another person

remains wholly and merely an object of consciousness, and not another consciousness... Monologue pretends to be the ultimate word. It closes down the represented world and represented persons (1981, pp. 292-293).

Kulkosky adds, “Dialogue, on the other hand, is social as it recognizes the existence of another being with equal rights and responsibilities, and opens up the represented world and represented persons” (2002, p.1).

The nature of the lesson study process involves dialogic understanding and avoids the pitfalls of the behavioral based teacher educator led workshops that offer prescriptive, monologic descriptions of what teachers ought to do in their classrooms. Thus, teacher learning occurs in lesson study as teachers dialogically participate in a research process to design, teach, revise and teach again a lesson that will be implemented in their classroom.

Lesson study is grounded in classroom-based data collection

Freeman posits that valuable teacher knowledge too often dissipates in informal situations in private conversations or chats over coffee (1996). Freeman argues for more teacher sensitive research involving teachers to formally report on their teaching. Unfortunately, when teachers get together to discuss their teaching in circles without a research agenda or a framework grounded in data collection and analysis, meetings often dissolve into groundless opportunities for teachers to vent their frustrations. However, in lesson study Lewis (2002) writes teachers are focused because they are involved in data collection and analysis trying to answer questions like (pp. 9-10):

- How did students’ knowledge and understanding of the topic change over the course of a lesson or unit?
- Are students really interested in this topic, or are they just going through the motions?
- Do students possess the basic personal qualities needed for learning? For example, are they well-organized, responsible and able to listen and respond to one another’s ideas?

Lewis further adds, “In a process very similar to the “quality circles” credited for the ascent of the Japanese auto industry, teachers analyze these data and use them as basis to design changes in instruction, classroom procedures, and classroom climate” (p.10).

In short, when teachers go through the process of data collection and analysis as they create a lesson, teach it, and report on its outcomes, they are formally and concretely forming a database of shared knowledge. In Japan, lessons formed by lesson study groups are kept in binders at school sites for reference in addition to published lessons of lesson study groups found in bookstores. Having a database created by teachers is an invaluable element of professional development. In turn, Stigler and Hiebert (1999) assert that lesson study may be the missing element of constructive reform in American education. They believe that when teachers go

through the lesson study process, they are sharing ideas on teaching and learning through classroom-based data collection and analysis and in turn are contributing to a professional shared knowledge base on teaching that is lacking in American teacher development.

Lesson study in an American educational environment

Lesson study is a grassroots movement in America. Since its introduction in the 1990s, there has been a growing number of participating teachers in states throughout America. The spread of lesson study in America is something like the building of America's transcontinental railroad in the 1800s. One movement coming from the East and one from the West, and like this lesson study continues to lay its tracks across America. In doing so, lesson study researchers are encouraging the spread of lesson study through conducting research projects funded by grants, creating materials for lesson study teacher development, and offering expert supervision. Moreover, they are mapping the spread of lesson study by contributing to a rich research literature base that delineates explicitly the lesson study process supported by data and analysis (e.g. Fernandez & Yoshida, 2004; Lewis, Perry & Murata, 2006; Lewis, Perry & Hurd, 2004; Perry & Lewis, 2009; Wang-Iverson & Yoshida 2005).

Eastbound Movement

Early supporters of lesson study that started the eastbound movement are Clea Fernandez, Director of Lesson Study Research Center at Columbia University; Akihiko Takahashi, Associate Professor of Elementary Math at DePaul University, and founder of Chicago Lesson Study Group; Makoto Yoshida founder of Global Education Resources (GER), a lesson study organization dedicated to improving math teaching and learning; Bill Jackson, elementary school teacher and co-founder of GER, and Tad Watanabe Associate Professor of Mathematics Education at Kennesaw State University and Consultant of GER.

Yoshida is reported to have "imported" lesson study to America when he was working on his postgraduate dissertation in the early 1990's at University of Chicago. The subject of Yoshida's dissertation was on lesson study as he focused on math education in Japanese elementary schools and what could be learned from it in response to furthering math education in America. Yoshida's supervisor at University of Chicago, James Stigler became interested in lesson study and eventually with co-researcher James Hiebert went to Japan and observed classrooms, especially looking at math. The results of the research culminated in the previously mentioned book, *The Teaching Gap* that heavily cited Yoshida's work and called for the introduction of lesson study in America. Consequently, lesson study was tried first at Paterson School Two in Paterson, New Jersey (Lewis, 2002). Since then, lesson study has spread to 2300 teachers in 335 schools in 32 states and continues to grow with every passing year.

Westbound Movement

Concurrently, educator Catherine Lewis has been a leading representative of the westbound movement. She became interested in lesson study when she was doing research on Japanese pre-school and elementary school education. The result of the research was an award-winning book titled *Educating Hearts and Minds* (1995). (Since 1993, Lewis has observed more than 70 lesson study research lessons in more than 50 schools in Japan and has interviewed more than 100 Japanese educators.) Lewis went on to establish the Lesson Study Institute at Mills College, Oakland, California. The Lesson Study Institute at Mills College began in 1999 and is a major contributor for the spread of lesson study throughout America. The Institute's mission is to conduct research on lesson study in American classrooms and to provide outside expert support and resources. Presently, the Institute has five members on the research staff including Lewis who is the director, Rebecca Perry, co-director of research projects; Shelley Freidkin, project director; Elizabeth Baker, research associate, and Melissa Crockett, project coordinator of research materials, website and media resources. The staff is involved in producing lesson study teacher development materials (including lesson study guidelines kits, and a library of video tapings of lesson study project teams going through the research lesson process), publishing research findings, offering technological assistance, organizing lesson study projects funded by grants and providing expertise guidance for teacher lesson study groups. An early example of a lesson study research project supported by the institute can be seen in a four-year case study (Perry & Lewis, 2008) of a US K-8 school district in Bay Area south of San Francisco that pioneered the use of lesson study for professional development.

As mentioned lesson study is a grassroots movement in America. There are clusters of lesson study projects that emerge because teachers hear about lesson study or they are introduced to it through grant-sponsored institutes such as east and westbound lesson study institutes and GER. In order to further interest in lesson study for the surrounding teaching community, workshops provide opportunities for lesson project teams to show what they have done in their schools to visiting attendees. One such project inspired by the Lesson Study Institute at Mills held a lesson study orientation workshop to familiarize teachers with lesson study. It is described in the following:

Lesson study orientation workshop: Silicon Valley Mathematics Initiative

I had the opportunity to see how lesson study is actually being implemented in America at a workshop held for elementary school teachers at Encinal Elementary School in the Menlo Park School district, San Mateo County, 35 miles south of San Francisco. The workshop is part of The Silicon Valley Mathematics Initiative (SVMI) organization. Their goals are to raise the level of mathematics education and student learning through ongoing teacher professional development, monitoring student performance and improving math instruction. In regard to ongoing teacher development lesson study is delineated on their website as follows:

The Silicon Valley Mathematics Initiative supports a number of teams of teachers to use the lesson study

model. Teams of teachers will collaborate with a math coach to research, plan, teach and/or observe, and analyze mathematics lessons.

The workshop presented the work of five lesson study team projects and was attended by over 400 teachers from the surrounding school districts in San Mateo County. As printed on their announcement handout (see Appendix), the following show the main aims and agenda of the meeting. Descriptions of each area are excerpted from field notes and presented in chronological order:

- ▶ Introduce the lesson study process
- ▶ Engage participants in observing a public lesson and debriefing
- ▶ Coordinate exchange lessons with other teams in attendance

▼ Introduce the lesson study process (background and panel discussion)

At the start of the meeting participants were welcomed with a packet providing background on ‘What is Lesson Study?’ And ‘Why Lesson Study?’ The opening talk featured a 30-minute slide presentation on the background of lesson study pointing out the merits of lesson study and the procedure (see Figure 1).

Next, a panel discussion on lesson study offering experiences of four teachers who were already participating in lesson study teams was held. Several themes emerged from their experiences that shed light on the value of lesson study and are presented in the following field notes taken by the author.

1. The ‘Dirty Lesson’

When teachers are involved in lesson study for the first time, they can easily fall into a trap of spending too much time and energy sculpting the perfect lesson. In doing so, they could delay implementation of a lesson and lose opportunities to collect valuable data. The panelists advised not to spend too much time early on in the research lesson process on perfecting a lesson. One panel member posited that during the lesson study cycle process it is better to put an even ‘imperfect’ lesson into action. She referred to this lesson as the “dirty lesson—lessons that could be taught without extensive planning in order to generate information about student thinking for use in planning the research lesson” (Lewis & Perry, 2009). The panelist stated,

Although the process is painful, teach the dirty lesson...don’t spend a lot of time or meetings perfecting the lesson. Spend a meeting [planning] and go and do it. You’ll learn more from doing it and watching students [to further improve on the lesson]...and eventually the process will be well worth it.

Learning from doing is very much a part of the constructivist learning approach and is integral to lesson study. In the above statement, implementing a first version of a lesson provides immediate opportunities for teachers to explore outcomes and gather data that can help them better anticipate student responses for the future lesson. Learning from a dirty lesson also shows that lesson study is a data driven teacher development model. Moreover, the panelist’s comments above imply that learning from the process is just as important as

producing the final product.

2. A remedy for being ‘Too Busy’

The biggest obstacle facing Japanese and American teachers across both borders in teacher development is that they are too busy. The entire panel nodded their heads when one panelist spoke from her experience and said that during the process, “Remember to pace yourself”. In Japan, teachers find room in their busy schedule by being frugal and efficient in their approach to lesson study. ‘One does not have to reinvent the wheel’ as the saying goes. Lesson study is an established part of the culture in Japan (Lewis, 2000). Over the years of doing lesson study in Japan, teachers have built up a ‘database’ of lessons whether they are a collection of lessons in a binder on the school site, or in local bookstores where one can find published examples of successful lessons that emerged from lesson study groups. As mentioned previously, Stigler and Hiebert (1999) felt a major contribution of lesson study would be that it could contribute to a database on classroom research in America. Recalling that in Japan teachers have access to a database of well designed lessons devised in lesson projects previously carried out by others, the panelists also mentioned that you don’t need to create a new lesson to answer your research lesson question. Consequently, like their counterparts in Japan, teachers can make their lesson study more efficient by utilizing previously taught lessons (the product) and can spend more quality time thinking about and defining their lesson goals, adapting the lesson, observing learners, reflecting and revising (the process).

3. Teacher Collaboration

Although learner-based cooperative learning (Johnson, Johnson, Holubec & Roy, 1984; Kagen, 1992) is widely accepted in America, surprisingly, cooperative teacher learning or teacher collaborations have not been part of professional development (Stigler & Hiebert, 1999; Yoshida, personal communication, September, 2008). The teacher collaboration component of lesson study is one of the major impetuses for the spread of lesson study in America. In the panel discussion, several panelists remarked on the effectiveness of working together. One teacher said the teamwork experience taught her that one should not underestimate the value of colleagues. She observed,

Perseverance is important. Take time to listen to each member. I thought one teacher’s idea wouldn’t work, but she pulled through. She saved the lesson!

Another spoke about group dynamics, “When you have a team that is willing to work with you, you are more willing to take risks”. An additional comment was made on group dynamics regarding the importance of sharing roles during the lesson study process because it gives equity to the process.

4. Focus on the learner

Often when Japanese teachers observed their American counterparts, they remarked that the latter often focused too much on teachers during classroom observation phase of lesson study. They felt American teachers

were focusing their attention and criticisms on teacher moves and not enough time was given to observing what the learner was doing. (As reported earlier this may be an outcome of a tradition of behavior-based teacher development models in America.) As discussed previously, lesson study focuses on the learner. A panelist stated, “It was nice to sit back, listen and watch even quieter students. I learned I had wrong assumptions”. The panelist had shared a very important observation about which the entire audience needed to be reminded; we need to take the time to focus more attention on our individual learners to avoid misconceptions or incorrect evaluations about a learner’s progress.

The panel discussion came to an end. Now, the audience members became participants. Armed with a brief background of lesson study presented at the start of the workshop, followed by the above panelists’ discussions of their experiences with lesson study, we were now prepared for the next segment of the workshop:

▼ Engage participants in observing a public lesson and debriefing

At this stage, we were given the opportunity to visit one of the public lessons (*Kokkai Jugyo*) that presented an actual research lesson to a class at the school site as participating observers. Engaging workshop attendees as observers was carried out in three stages: Pre-stage, public class observation and debriefing.

Pre-stage

In the pre-lesson study stage, participants could openly select one class from five public lesson classrooms. The lessons targeted grades from 3 to 5 and were taught by lesson project teams from several schools in the area. Only one project team was from Encinal Elementary School. The lesson teams from other schools would be teaching Encinal students for the first time. This is mostly different in Japan where the project teams usually teach students from their own classrooms or schools.

I attended a 5th grade math lesson on ‘relational thinking’. There were a little over 40 participants in the room and two lesson study project team teachers. Other members of the team could not attend because they could not get time off from teaching duties at their respective schools. The fact that some of the members could not get time off from their classes to participate in the public lesson is indicative of the problem American teachers face in fully benefiting from lesson study. In Japan, lesson study is part of the fabric of the Japanese educational culture. Teachers are expected to take time off from their teaching duties to attend public lessons, and their schools support them by making arrangements to cover their classes. In America, lesson study is not yet a large part of the American educational culture. Support for lesson study is inconsistent because it usually comes piecemeal as reported above from grants, and the amount of support and time allotted for lesson study depends on the number and size of the grants.

The lesson study pre-stage discussion began with an introduction and overview of the lesson. One of the teachers was a senior member of the staff and the other younger teacher was selected to teach the class. Both teachers had experience with lesson study.

Lesson Description

The teachers explained that the larger goal of the lesson focused on knowing how students think about the idea of relational thinking and equality. In other words, were they able to see that there are various number relationships that could equal the same amount and can they see these other relationships? The teachers provided the following examples on the board: Is $103 + 70$ $\langle = \rangle$ (greater than, equal to, or less than) $90 + 83$? A multiplication example was also given: Is 3×6 $\langle = \rangle$ 1×18 ?

In addition, another part of the research focus was to develop the students' math communication skills referred to as "number talk". Thus, the overall goal of the lesson was to see if students could work out various solutions to a mathematical problem and to offer verbal explanations of the solutions as well. The goal matched an official curriculum standard of 5th grade math expecting students to "know and use the distributive property in equations and expressions with variables".

Next, the teachers introduced the problem that students would be asked to solve:

Last weekend, I decided to buy some Hershey [chocolate] bars for our staff party. I went to Walgreens (chain store) and Safeway (chain store) to compare prices. At Walgreens for ten dollars, I could buy four bags, each with one hundred Hersey bars. At Safeway, for ten dollars, I could buy 16 bags, each with 25 Hersey bars. Which one was the better deal? 25×16 or 100×4 ?

The teachers were able to anticipate the kinds of errors the students might make based on reflections from previous lessons, such as "16 bags is more than 4 bags of candy" or making an error in mental computation, " $16 \times 25 = 320$ ". Anticipating learner responses through reflections during the lesson study process provides a valuable tool for teachers to help them focus on their learners.

After previewing the lesson with participants, the team teachers went over a list of rules from our workshop packet that participant observers should abide by:

1. Resist the urge to help students or otherwise interfere with the lesson.
2. Collect data as requested by the research lesson planning team.
3. Feel free to observe students while they work as long as it does not interfere with the natural flow of the lesson.
4. Respect the classroom atmosphere by not engaging in side conversations.

The above observation behavior list is included to show that lesson study is still a new and evolving concept to the American educational culture. This is evident in the fact that various elements of lesson study need to be explained in an explicit step-by-step manner. In Japan the above list would not be needed because the guidelines for observation behaviors are so much a part of the educational culture in Japan that there would not be a need

for a list of behaviors to be given to participant observers.

The lesson

We were now ready to observe the actual lesson of 25 5th grade students. The lesson was 45 minutes. Although time does not allow reporting on what occurred in detail, a brief summation of the lesson is presented using notes taken by the author on a Lesson Observation Log rubric given to each participant observer (T=Teacher; Ss= Students; S1, S2, S3, S4= Individual students):

<u>Time</u>	<u>Observation</u>	<u>Significance</u>
00:00	T greeted class explaining in today's class they were going to help her solve a problem. Teacher told Ss that if other Ss give the same solution as yours, then think of another solution.	Telling Ss to think of another solution 'if a student already volunteers the same solution as yours', was a useful way to get the Ss to think of various ways to solve a problem.
07:00	T sets up problem verbally and then places a poster on the board with the problem written out.	Ss become engaged when they notice chocolate is the subject. The use of Hersey bars as a subject provides a meaningful and stimulating topic.
10:00	T: Ok lets do 'Think, Pair, Share'. Ss first work on problem individually, meet in <u>pairs</u> , then <u>share</u> results.	Ss immediately know what they should do when they are told to do a Think, Pair and Share activity.
20:00	T elicits solutions from Ss: S1: Safeway is better. T: Tell me your thinking? S1: We can get more bars in each bag [4X100]. S2: Yeah, at Safeway we use less trash (bags) S3: I think they are the same because 25 X 16 equals 400 too. T: Ok, good. S4: I have another solution. T: Ok, tell me what you think? S4: We can write 25 X16 as 5 ² x 4 ² . T: Oh, I see. Yes. It's another way!	Lesson study team effectively anticipated that some students would qualify solutions based on other variables like thinking 'green' by using fewer bags. Ss are able to see various solutions and lesson study team is able to meet its goal.
25:00	T introduces another problem on board without situation: Is 25 X 24 <u>< = ></u> 100 x 6? T: This time we are not talking about Hersey bars (students moan missing the topic of chocolate).	Although Ss moan when the topic shifts from chocolate to doing 'dry numbers', engaging students with interesting topic at first was useful to motivate Ss.
45:00 End of class	Ss do Think, Pair, Share work solving the above problem.	Many students are able to continue making associations to the use of different numbers to arrive at the same solution.

Post Lesson Debriefing

The participant observers discussed the lesson with the lesson study teachers in a debriefing session. Participants' comments mostly focused on the one or two students they were observing. In many cases they commented on the ability of the students to solve the problem, in other cases they remarked about how this student or that student showed an ability to help the others to solve the problem in pair work. Some observers

wondered how many learners actually understood the solution? They offered some constructive criticism by suggesting the teacher could have slowed down and allowed time for other students to have chances to conceptualize and express the solutions out loud to the teacher in order to check for understanding (i.e. dialogic understanding).

Another observer wanted to know whether the lesson that was just taught could be accessible for others to use. It was a good question because it brings up the issue of lesson study mentioned earlier in this report that as a part of the traditional educational culture in Japan, teachers have a database of lessons from which to choose. Although a database of lessons has been lacking in America, the intention of the SVMII project is to build one. In fact, getting teachers involved in lesson study and building a database of lessons was the aim of the final event of the workshop.

▼ Coordinate exchange lessons with other teams in attendance

At the end of the debriefing sessions of all 5 rooms, the workshop attendees gathered in the main room. Next, attendees were asked to form lesson study teams. The aim of arranging lesson study teams was to have the teacher-participants leave the workshop with being involved in a lesson study team, forming a lesson and sharing the lesson with other teams. The teachers met for 90 minutes, the final time slot of the workshop. At the end of this final session, each team had to fill out a lesson study exchange form with contact information with one of the planners of the induction-meeting workshop. Having participants involved in lesson study teams and sharing information provided a means for SVMII to effectively reach the aim of the workshop, which was to create a database of lessons and spread interest in lesson study.

Discussion

Lesson study continues to attract interest and grow in America because it is a teacher-invested form of professional development. In this section, first implications for lesson study as a growing form of teacher development in America will be addressed. Moreover, teacher development itself is a complex system. Complexity has a spider's web effect. If we touch one part of the web even slightly, other parts will vibrate. In the same way, how might the practice of lesson study in America influence Japanese educational practices? Thus, implications of lesson study in America on Japanese education will also be discussed.

Implications for lesson study in America

The spread of lesson study in America is likely to continue. Both the eastbound and westbound lesson study movements remain vibrant, actively offering support through grants, advising, materials and data driven published research documenting outcomes of school-based projects. Teachers are further encouraged to get involved in lessons study in workshops held throughout America such as the SVMII project. In addition, teacher exchanges between American and Japanese teachers in regard to lesson study continue to be either encouraged

or supported by Mills and Columbia Lesson Study Institutes along with Chicago Lesson Study Group and Global Educational Resources.

When American teachers go to Japan, they will realize that lesson study is for all subjects. In America, a large number of the lesson study projects have focused on math. They will also notice the positive effects of having a national curriculum. The Japanese curriculum is manageable because it is concise. Compared to America and even world standards, Lewis (1998, p.18) writes Japanese teachers share a “frugal curriculum” with leads to less content to cover in textbooks and more time to do it,

Since Japanese teachers have a relatively large number of class periods to help students master a relatively small amount of science content, teachers can devote time to studying the most effective ways to present it, rather than wading through massive textbooks to figure out what’s really important to teach.

This comment is revealing in terms of what it implies about the American curriculum, which is not a national one and somewhat unstable having differing and an ever- changing large number of standards. The effect of having different curriculums with a plethora of changing core standards has created a top-heavy educational system that isolates teachers and places unrealistic demands on them. In Figure 2 below, Lewis’s graphic illustrates the problems American teachers face having to work with a demanding curriculum.

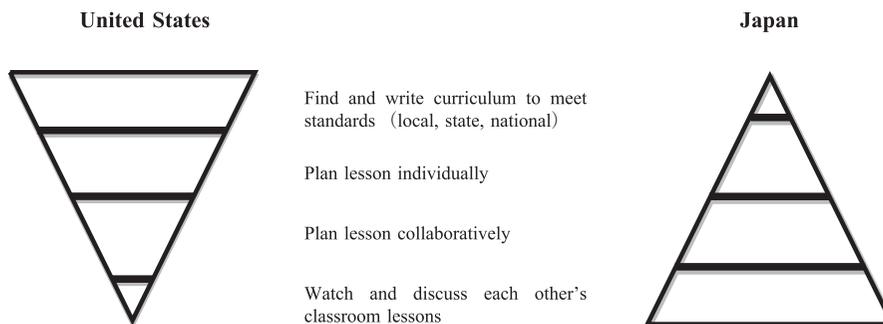


Figure 2 Teacher's Activities to Improve Instruction (Lewis, 2002, p.9)

American teachers spend more time and energy on navigating their instruction toward satisfying the myriad amount of standards they are expected to meet. Compared with Japan, this situation creates an environment where professional development through teacher collaboration is difficult because teachers cannot find enough time to either discuss their teaching with other peers or to observe other classrooms. However, the frugality of the Japanese national curriculum, which gives teachers more opportunities to either collaborate with their peers or see what they are doing, has not gone unnoticed. Recently, there has been a growing movement in America toward forming a national core standard curriculum that all states would follow, called the Common Core State Standards Initiative (2010).

Hopefully, the eventual forming of a unified core curriculum has implications for lesson study. As the curriculum become more 'frugal' teachers will have more time to form lesson study groups to research their classrooms. Moreover, the spread of lesson study will further contribute to a database of research lessons, filling the gap of teacher led classroom-based research data that has been lacking in America (Stigler & Hiebert, 1999).

Implications of lesson study in America for Japan

Lesson Study has played a major role in teacher development for decades in Japan. One might wonder what significance could the recent introduction of lesson study in America be on Japanese professional development? In complexity theory an organism can be induced to change when something new enters its environment, which is a part of its ecological system. In other words, an organism alters its state to adapt so that the system adjusts to new situations to ensure survival. New situations, in complexity theory are outside forces that provide feedback to an existing system. The existing system reacts to the feedback; this initial reaction causes a disturbance, a percolating undercurrent that can emerge and produce change.

Although one might be skeptical on the use of complexity theory to illustrate how lesson study in America can influence Japanese teacher development, its application has some merits. For example, lesson study in Japan is collaborative at the elementary school level. However, in secondary schooling, it is done individually. Teachers plan and teach the lesson on their own. Other members enter the cycle in the observation and reflection stages providing opportunities for feedback. On the other hand, teacher collaboration is considered to be one of the most valued aspects of lesson study by American researchers (Lewis, 2002, Stigler & Hiebert, 1999). Therefore, when lesson study projects are carried out in America, teacher collaboration is aimed at secondary schooling as well. Hopefully, Japanese teachers in secondary schooling will become more engaged in doing collaborative lesson study research lessons.

The view that lesson study is most productive when it is done collaboratively can have implications for improving the assistant language teacher (ALT) program in Japan. ALTs are mostly part of the JET (Japan Exchange and Teaching) program. They are college graduates, under 30 years old, from native English speaking countries with no teaching experience. ALTs are required to come to Japan for a three-year period and team-teach with Japanese teachers of English (JTEs). Their presence at each school varies. Usually, an ALT will come to a school for a one or two week period, once or twice a month. Since ALTs are not part of the every day teaching realities JTEs face, there are criticisms on the effectiveness of the program. When ALTs visit schools they are often used as human tape recorders, reading out loud sentences from the English textbooks. They are very rarely part of the lesson planning. Porcaro (2006) writes that the teacher development of JTEs needs massive support, and ALTs are not at all part of that process. Here, again, we can turn to the value placed on teacher collaboration in lesson study in America. Improvements in English teaching development can occur, if JTEs reassess their approaches to lesson study so that they can include ALTs in participating along side them

when doing research lessons.

An additional implication of lesson study in America for Japan is its contribution to the research literature on the topic. As the citations in this report suggest, there are a number of published papers and books on lesson study written by researchers and teachers in America. Because lesson study is relatively new to the American audience, descriptions of what lesson study is and why it should be implemented are explicitly detailed. On the other hand, there has not been much of a need to describe the procedures and merits of lesson study in Japanese literature on education because it is the most common form of teacher development and therefore implicitly understood. However, now that lesson study is spreading in America and throughout the world (Matoba, Crawford, & Arani, 2006) the literature can be a rich source of descriptive analyses on lesson study that can be used by Japanese researchers when they are writing about lesson study for an international audience.

Conclusion

“A man [person] is worthy of being a teacher who gets to know what is new by keeping fresh in his [her] mind what he [she] is already familiar with.” Confucius (Book II, 11)

As this report has shown, lesson study is not a new concept nor should it fall into category of one of the many flavors of the month teacher development fads that have been highly trumpeted when they emerge, asking teachers to get on board only to quickly disappear leaving behind a trail of America teachers who are exhausted from the experience. Lesson study or *jogyokenkyu* has been around for a long time. Lesson study does not purport to have lofty ideals about the art of teaching nor does it claim to have a specialized teaching method supported by recent scientifically based concepts of learning—although lesson study incorporates the art and science of teaching in its framework as they emerge from teacher input.

On the other hand lesson study is grounded in the particular realities teachers face. It provides a teacher development framework that is practical and meaningful because it is classroom based. It allows teachers to draw out their intuitive understandings of teaching through dialogic understanding by participating in a collaborative and reflective endeavor to form a research lesson. In the process teacher learning occurs (as Confucius would remind us) because teachers either assimilate information reinforcing what they already know about teaching, or accommodate new knowledge of teaching. Moreover, lesson study is data driven, and as lesson study spreads, a rich database forms a reference for other teachers.

Lesson study like other teacher development models faces limitations. In many cases, there is not enough time (teachers feel they are too busy) or adequate support or funding (compared to Japan, lesson study is not largely officially recognized) to carry out the widespread implementation of lesson study. However, there are several reasons why lesson study is spreading in America. The east and westbound research groups continue to actively encourage the spread of lesson study, and their work has been fruitful. Projects like SVMII described in this study indicate the vibrancy of grassroots movements to interest teachers in lesson study. In addition, the

drive to establish Common Core State Standards Initiative suggests that the climate is right for lesson study. As in Japan, a national curriculum will allot more time for teachers in America to become involved in lesson study.

There is interconnectedness between lesson study in America and Japan. Implications stated in this report, such as placing more of an emphasis on teacher collaboration; benefits of a national curriculum; improvement of ALT program; and increasing recognition of lesson study in America and throughout the world suggests positive outcomes of lesson study crossing borders. Lesson study provides a viable and adaptable teacher development model that empowers teachers to research their own classrooms. Hopefully, lesson study continues to grow in America and in the world, and more collaboration will develop between Japanese and international teacher researchers.

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Appendix:SVMI Workshop

Silicon Valley Mathematics Initiative Lesson Study Induction Meeting
Encinal School September 28, 2010

Teaching for Understanding Using the Standards for Mathematical Practice

8:30 a.m. Refreshments (Multi-Use Room)

8:45 a.m. David Foster, Director of the Silicon Valley Mathematics Initiative

- Welcome, Today's Agenda, Special Introductions
 - Overview of the Lesson Study Project
 - Introduction to the Lesson Study Process
- 9:15a.m. Panel Discussion-Facilitator-Tracy Sola
- First Year Lesson Study Experiences-A Retrospective*
- Carol Loflin, Principal, Quail Run Elementary, San Ramon Valley
 - Lynne Bertram, Mathematics Coach, Quail Run Elementary, San Ramon Valley
 - Joan Van Der Linden, Vice Principal, Encinal School, Menlo Park
 - Heidi Yamada, Teacher Facilitator, Encinal School, Menlo Park
- 9:45a.m. Pre-Lesson Discussion (see Public Lesson Schedule)
- 10:25a.m. Break
- 10:40a.m. Travel to the Research Lesson as a Group
(Meet your group in pre-brief location: middle school teachers stay in the Multi Use Room)
- 10:45a.m. Research Lesson Observation (Follow Observation Protocol)
- 11:30a.m. Return to Pre-Brief/Debrief Team-Specific Locations
- 11:40a.m. Lesson Debrief (Follow Debrief Protocol)
- 12:30p.m. Lunch-served in the TERC courtyard; you may dine inside TERC A and B, in the TERC Courtyard at tables or on grass, or in the TERC lunchroom
- 1:15p.m. Introduction to the Standards for Mathematical practice-David Foster
(Multi-Use Room)
- 1:45p.m. Team Planning Time
- With your team, begin to brainstorm:
 - the goals of your lesson study and possible research question (s).
 - how you will address at least one of the Standards for Mathematical Practice in your lesson study.
 - Identify another lesson study team with whom you will exchange lesson.
 - Exchange contact information with your exchange team.
 - Each pair of partner teams is asked to fill out a single Lesson Study Exchange Lesson Form and return to Tracy Sola.
- 3:00 p.m. Adjourn