Building Academic-Oriented Lesson Study

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1. Introduction

Japanese teachers have conducted lesson study in schools for a long time, in particular so as to improve their teaching and move to *efficient teaching*, to change their assumptions about students and move to *professional learning*, to build a culture of learning in their school and move to *pedagogy*, to do research on their classroom with their students and move to *teacher research*, and to create professional knowledge in practice and move to *research method*.

However, after twenty years of expanding lesson study throughout the world, its sustainability has become a matter of deep concern among teacher educators and academic researchers. It seems to me that for lesson analysis, as a part of conducting the lesson study model, there exists an alternative recipe for sustainable lesson study in practice and academic research.

1.1. The Purpose of This Paper

The purpose of this paper is to clarify the Japanese lesson analysis approach and its various procedures, policies, points of view for analysis, function of lesson analysis, and schemes for building academic-oriented lesson study. Emphasis is placed here on the idea that articulated school teachers can research on their classroom practice as researchers with students as well as with other researchers and school staff. They can build theories not from outside or based on the accepted theory, but based on the facts that they produce in their own practice, as they reflect on their assumptions on children, as well as on their understanding of the relationship between child and subject matter etc.

1.2. Methods

The research data collected for this study came from a survey of research, papers, books, practical reports, our projects and annual reports in schools referring to lesson analysis and classroom inquiry.

2. Lesson Study and Lesson Analysis

Many schools in Japan conduct lesson study in which teachers try to make a lesson plan, observe, reflect, and discuss the lesson. Lesson study aimed at assessing the teaching process is then be conducted on the day of the class. Later, the class proceedings, which have been recorded by a tape recorder, are transcribed to create lesson records. Following this, a lesson study is conducted, in which those records are analyzed from various viewpoints. The final step, which is of great importance, is called lesson analysis.

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2.1. Defining Lesson Study in Japan

According to the research of Masami Matoba, currently, lesson study has "enlarged its scope of research from studies on educational subjects, lessons, formation of capabilities of the teachers, to include school management and research about curricula. Lesson study is also now conducted in association with a variety of academic disciplines such as pedagogics, psychology, sociology, and hermeneutics" (Matoba, 2017: 283). Considering such current states of research, Matoba redefined lessons studies as follows (Matoba, 2013b: 290):

> "Lesson study is a field of study and fundamental research, usually carried out by teachers who are cooperatively engaged in the planning for lesson improvement, as well as the formation of practical capabilities of teachers and the creation of school culture, and involving a planning of, and consultations on, lessons, along with implementation, observation, evaluation, and improvement of lessons."

2.2. Origins of Lesson Analysis

Lesson analysis had its origins in Japan, where Takayasu Shigematsu, a professor of Nagoya University began a study in 1954 in which he created a series of written records consisting of transcriptions of audio taped lessons that he then analyzed. This research on lessons was conducted using the school as the base such as, for example, Toyama Municipal Horikawa Elementary School and Tezukayama Elementary School in Nara, which were directed by Shigematsu, as well as at numerous other elementary and middle schools in Aichi, Gifu, Nagano, Shiga, and other prefectures. *Genba no jido kenkyu* (Child Study in School Practice, 1953), a research report on a study of children at the Yokaichi Elementary School in Shiga Prefecture, conducted under the guidance of professor Takayasu Shigematsu, presented a collection of case examples of children's behavior begun in March 1949, and attempted to clarify the children's development process. Toyama Municipal Horikawa Elementary School conducted lesson analyses continuously from 1955 onward in an effort to "transcend subjective and impressionistic criticism by beginning to keep observational records of each hour of lesson time, and create a system of collaborative research that does not rely upon borrowed educational theories and then adopts the stance of learning from the actions of the children in the lessons we ourselves have recorded" (Hatta, 1963: 87). The fruits of this research were made public in the reports entitled *Jugyo no kenkyu* (Lesson Study, 1959) and *Jugyo no kaizo* (Lesson Modification, 1962).

The Nagoya University School have developed the method of lesson analysis, and made it public in books entitled Jugyou Buseki no Houhuo to Kadai (Task and Method of Lesson Analysis) (Hibi & Matoba, 1999) and Jugyou Kenkyu to Jugyou no Souzou (Lesson Study and The Creation of The Lesson) (Matoba & Shibata, 2017).

2.3. Defining Lesson Analysis in Japan

Lesson analysis has been defined as an "activity to create an observation record of lessons which is as detailed and accurate as possible" (Shigematsu, 1993: 75). Today, according to the research of Masami Matoba, "lesson analysis has enlarged its field of study and scope to include child education, university education, behavior analysis, and speech analysis; a variety of methods have been developed on the basis of empirical science, hermeneutics, and ethnography" (Matoba, 2017: 284).

Considering such currents, lesson analysis has been re-defined following works by Shohei Hatta (Hatta, 1990) and Masami Matoba (Matoba, 2002) and is now re-defined as follows (Matoba, 2013a: 6):

"Lesson analysis is a method of lesson study, which engages in discovering the order and meaning behind the phenomena of lessons, such as the mutual relationships between the various factors which constitute lessons, the learners' thinking process, or the decision-making of teachers, based on detailed observation records and documentation of the factual events which take place in the education practice, i.e. the phenomena which constitute the lessons, such as remarks and activities of teachers and pupils in lessons, etc."

Lesson analysis as a part of lesson study and as a research method on teaching has become the foundation for researchers to do both theoretical and practical study. Evidence-based lesson analysis is lesson study for the creation of pedagogical knowledge.

3. The Procedure for Lesson Analysis

The procedure for lesson analysis includes steps such as problems, research planning, observation, follow-up surveys, transcriptions, reading, classification, formation, processing, interpretation, and reporting as in Figure 1.
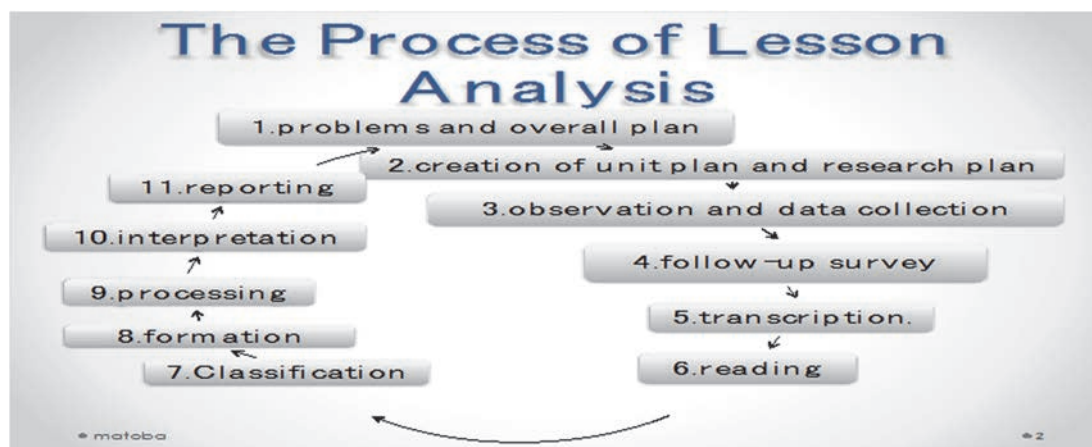

Figure 1 The process of lesson analysis

First Stage: The Problem and Overall Plan

Lesson analysis starts with sharing the problem among schoolteachers and researcher. It is not action research, but a continuation of the problem-solving process. Almost all Japanese schools make an annual plan for lesson study, and select research lessons and which teachers will conduct them at the beginning of the year.

Second Stage: Creation of Unit Plan and Research Plan

The second stage of lesson analysis is the creation of the lesson plan as a research plan by groups of teachers of that particular subject or of that particular grade in the school. The research plan includes a search for major teaching problems, teaching materials and developing a teaching plan. Japanese teachers usually use three types of lesson plans. The research plan can be used to best

effect through the selection of nominated students or case students for research.

At this stage, the most important issues are as follows:

1) Clarification of problem consciousness in the research lesson;

2) Confirmation of the request for students;

3) The contents, methods and approaches concerning what the teacher wishes to realize;

4) Completion of the unit framework, lesson plan and seat table; and,

5) Determination of the nominated or case students for research, which is around three to five students in our research case.

Which kind of lesson plan can be useful and effective depends on the purpose of the lesson study. Japanese methods for improving teaching and developing teaching materials apply more concise and effective teaching plans than are familiar in the rest of the world.

However, a teaching plan for the professional development of teachers and for the purpose of understanding the students' thinking process requires the branch type model in Figure 2 or another type of model named *zasekihyou jugyouan* (Figure 3).
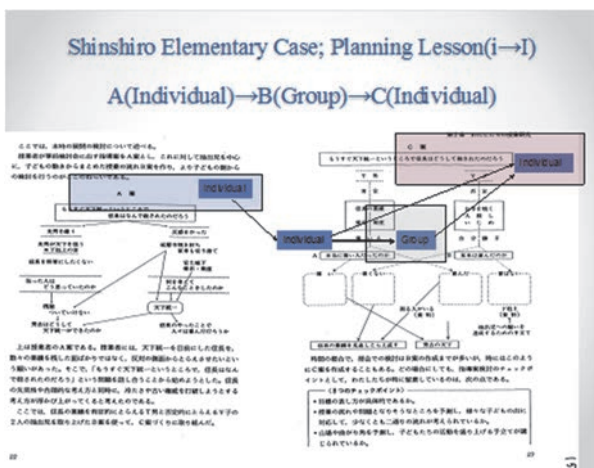

Figure 2 The branch type model

Figure 3 The zasekihyou jugyouan model

To make the third type of lesson plan model, teachers in Ando Elementary School make a database for each student in the school and utilize observation of the mutual relationships of the students in the classroom activities as a means of lesson study which is called *zaseki jugyouan*. This means that the way in which teachers make connections and interact with students over several lessons and different subjects is important. This method has a strong impact in making peer groups of students in each subject matter and helps teachers to understand each student's needs and abilities.

Third Stage: Observation and Data Collection

Before observing the research lesson, the research group decides each person's role in the observation and recording of the research lesson, and explanations.

1) How we share the observation and recording roles for the lesson:

a) Stenographer (2 persons): record the time, speaker and outline of the remark/action in chronological order.

b) Observer of the nominated or case students (1 to 2 persons for each student): describe the attitude and behavior of the student in chronological order.

c) Overall observer: observe and record the contents according to the aim/intention of the teacher, and also observe and record the attitude and behavior of the nominated students.

2) Points to remember during observation:

a) Take down whatever the observer feels are particularly noteworthy.

b) The observer will take down the attitude and behavior of the nominated students being observed on post-its in chronological order. It is okay to make memos during the observation, or to do it afterwards while organizing the records.

3) Recording the actual lesson:

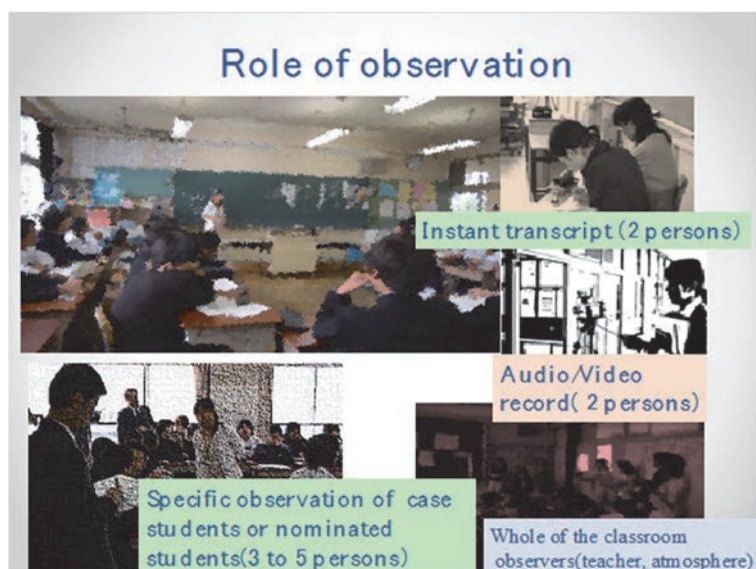a) Video recorders and IC recorders are used for recording the actual lesson.

Figure 4 Role of Observation

Fourth Stage: Follow-up Survey

At the end of, or after, the research lesson, the follow-up survey provides time for collating the data and acquiring more specific data such as taking pictures of the writing on the blackboard and interactions between the teachers and students.

Fifth Stage: Transcription

This is the verbatim record in chronological order based on the recordings made with both the video and IC recorders, which is called the "linguistic record of the class." The transcription includes the names of speakers, the order in which they speak, the contents of their utterances, the actions of the students, pictures of experiments or group activities and so on, as you can see in Figure 5-1, 5-2.
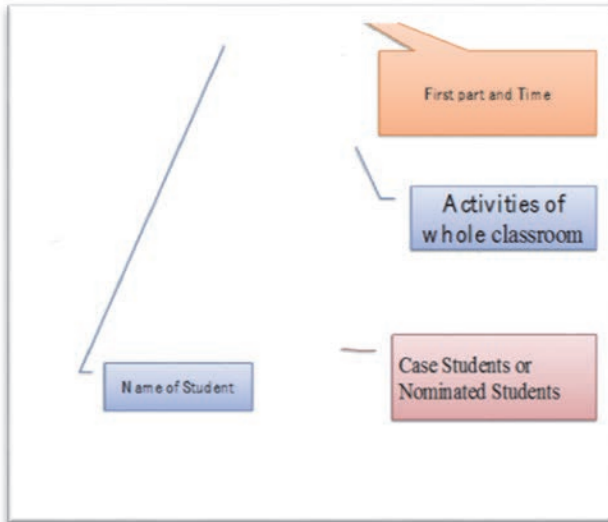
Figure 5-1 An example of transcription

Figure 5-2 An example of transcription

Sixth Stage: Reading

Reading means reading carefully the records in order to understand the teaching process.

Seventh Stage: Classification

The lesson process is divided into several segments or parts for better understanding of the relationships between the segments which are represented graphically in a diagram in Figure 6.

Figure 6 An example of classification
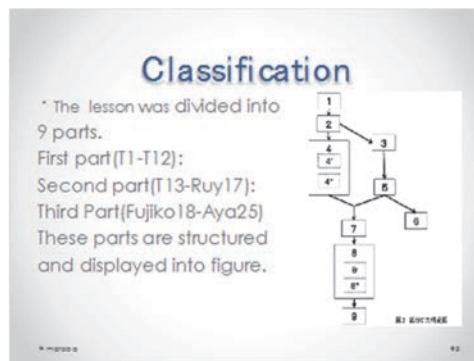
Eighth Stage: Formation

For this stage, teachers as researchers set up the main point of view for analysis based on the research proposal and hypotheses.

Ninth Stage: Processing

The research data is arranged according to points of view for analysis. Standard quantitative methods are used for the arrangement of the data, an example of which is shown in Figure 7-1 and Figure 7-2.
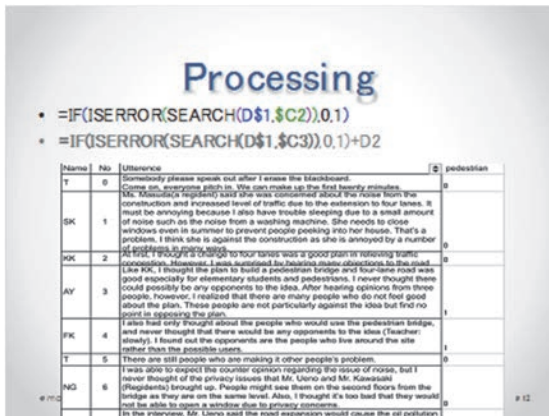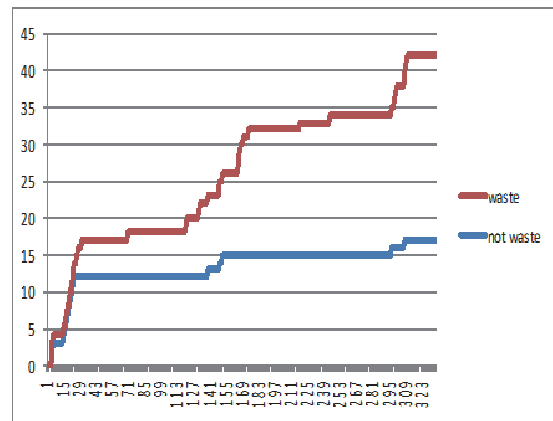
Figure 7-1 An example of processing

Figure 7-2 The cumulative frequency
of the words "waste" and "not waste"

Tenth Stage: Interpretation

The method used for the interpretation record of the lesson is a hermeneutic style that is fruitful for qualitative interpretation.

Eleventh Stage: Reporting

The researchers come to a conclusion about the results of the analysis and provide suggestions for more professional dialog among teachers and researchers on the teaching-learning process.

4. Principles of Lesson Analysis

The form of lesson analysis developed at the Methods of Education group in the Department of Education Sciences at Nagoya University are not a method wherein the analytical viewpoints are expressed objectively, then shared and analyzed for pedagogical diagnosis. This research group aims ultimately to have the teacher, who bears the role of practitioner in the lesson, take an integrated and subjective approach to the lesson in the process of that practice. In the words of the group, the teacher "must approach individual events that are taking place in the midst of movement as one-time-only occurrences in history and attempt to grasp them in his/her capacity as an entity that is itself part of that movement" (Hatta, 1963: 91). Hatta cites the following perspectives as principles of lesson analysis for the analyst or interpreter who is him/herself undergoing changes in pedagogical practice.

4.1. Qualitative Approach

What is important here is not the quantity obtained as a result of being measured by some yardstick; it is whether or not what has been acquired by the children can be put to work in some form in another setting or in the future. The scrutiny of quality is an attempt to pursue something that is a different thing as a basis for eternal difference, and to find in that a new meaning.

In lesson analysis, it is desirable that the content of any and all remarks by any and all speakers, as well as any and all actions, be recorded in detail and interpreted.

4.2. Dynamic Approach

A lesson is a process of generation and development. Things in motion spawn changes in the midst of a progression of events. The changes occurring in the process of the lesson are important, as is finding the nodes of change.

There are no limitations upon the materials used in lesson analysis, nor are there fixed ways of recording or creating materials. All possible materials are collected and their significance is ascertained. A procedure wherein layer upon layer of materials are produced and consistency among them is assembled and superimposed within the interpreter is closer to the correct approach.

4.3. Relational and Integrated Approach

A lesson cannot be contained within a limited framework, nor can it be viewed within a closed system. On the other hand, it is not possible to view all things exhaustively with unlimited time and space. We therefore adopt a method that focuses our attention upon the points that are regarded as forming the core while we search in all directions in relation to them, integrating them into a unified whole as we proceed. The core elements may be positioned as movements in the system of thought, and external factors may engender internal inconsistencies that work through them. The analyst must place all of this somewhere. In this sense, a relational approach has to be an integrated approach. The people who observe and analyze will differ in their sense of values and ability to grasp relationships. A relational and integrated approach is an experiment in positioning the self within a situation and grasping reality as an evolving whole.

4.4. Individualistic and Subjective Approach

Pursuing logic in the process of pedagogical practice means limitlessly seeking consistency. The principle of lesson analysis is to ascertain individual facts in the course of practice and position them within one's own integrated theory so as to make one's own image of the world more abundant and thereby improve one's practice.

5. Analytical Viewpoints

The analytical viewpoint is the scrutiny that the observer or analyst provides towards the lesson. The analytical viewpoint unites the object observed with the standpoint and subjectivity of the one who attempts to grasp the object. It is also the base from which to study facts and theorize about them. Analytical viewpoints can be categorized as follows:

5.1. Viewpoint Group 1: Overall Structural Approach

Viewing the lesson from the perspective of what kind of structure it possesses.

・Viewpoint 1: Inter-segmental structure: a viewpoint that divides the lessons into a number of segments and seeks to elucidate the overall structure constituted by the combination of these units.

・Viewpoint 2: Associative structure of pedagogical factors: a viewpoint that seeks to elucidate the associative structure of the intuition, inference, understanding, and other pedagogical factors inherent in the lesson.

・Viewpoint 3: Study grouping structure: a viewpoint that elucidates the structure of study groupings, including the children's participation in and relationship to such groups.

5.2. Viewpoint Group 2: Relational Approach

Viewpoints that observe the lesson from the outside as a phenomenon.

・Viewpoint 1: The gap between the teacher's intentions and the children's quests: a viewpoint that investigates how the teacher's intentions are fulfilled within the actual lesson and how the problems posed by the children are positioned within the lesson. This viewpoint examines the lesson from the observation point of the gap between the teacher's intentions and the children's quests.

・Viewpoint 2: Differences in thought among the children: a viewpoint that investigates the differences in thought on certain problems that exist among the children, as well as other aspects of the diversity of thought among the children.

・Viewpoint 3: Changes in the thinking of specific children: a viewpoint that investigates how the thinking of certain children develops and is altered through the lesson, along with the causes of those changes.

・Viewpoint 4: Form of participation in the lesson: a viewpoint that investigates how individual children participate in learning and the form that the participation takes.

5.3. Viewpoint Group 3: Qualitative Approach

Viewpoints that include judgments as to the quality of the lesson.

・Viewpoint 1: Future potential of the objectives: a viewpoint that takes up the problems posed to the class by the teacher and considers, judging from the content of the teacher's intentions, whether or not the teacher's objectives contain the potential for diverse development progressing toward the future.

・Viewpoint 2: Flexibility of the objectives: a viewpoint that considers how the teacher positions unexpected remarks on the part of the children within his/her own objectives.

・Viewpoint 3: Evaluation and control of the children's power to pursue knowledge and learning behavior: considers whether or not the content of the understanding that the children have pursued and arrived at is deepened over the course of time. The extent of this deepening of understanding forms the basis for evaluating the children's monthly and weekly performance.

・Viewpoint 4: Learning together (group thinking): takes up conflicts in opinion among the children along with the remarks they approach mutually, and then considers the relationships among these.

・Viewpoint 5: Life experiences: takes up remarks connected with the children's lives and investigates how they function in the lesson.

5.4. Viewpoint Group 4: Paradoxical Approach

Viewpoints that observe the lesson within the context of practice to determine what moves it.

・Viewpoint 1: Children's missteps and evolution in thought: a viewpoint that grasps the nature of the children's thought through investigation of the children's missteps during the lesson and the way in which they overcome them.

・Viewpoint 2: Atmosphere and rhythm of the class: the atmosphere comprises the spatial aspects

of the lesson. The rhythm comprises the temporal aspects of the lesson. This viewpoint considers the interpersonal conflicts that underlie the lesson and move it, as well as conflicts in thinking.

・Viewpoint 3: Class politics: a viewpoint that considers the lesson from the observation point of the power relationship between the teacher and children in the class and the dynamics among the children.

5.5. Viewpoint Group 5: Cultural Approach

Viewpoints that investigate what forms the foundation of the lesson and what moves the space occupied by the class.

・Viewpoint 1: Generation of statements: considers the culture of the classroom from the observation point of how language and phraseology are formed within the classroom.

・Viewpoint 2: Classroom culture (generation of discipline and rules): considers the culture of the classroom from the observation point of how the order and rules at work within the classroom promote or hinder learning.

・Viewpoint 3: Physicality: considers the lesson from the observation point of the looks that the teachers and students direct toward each other, as well as their postures and gestures, etc.

6. Functions of Lesson Analysis

6.1. The Significance and Function of Making Instant Transcripts and Word Protocols

Discussion material in short-term lesson studies consists of instant transcripts recording the remarks of the teacher and the students, and the observation of the nominated students. In participatory lesson study workshops, two teachers make shorthand records of the remarks and actions of the teacher and the students during the lesson as much as possible. The time, speaker and outline of the remark are described.

When comparing the amount of words and the recorded remarks of instant transcripts with the transcript of classroom communication created from video recordings of a certain scene, the characteristics of instant transcripts can be described as follows:

1) In instant transcripts, the contents are combined (remarks with the same content are put together) or summarized (the key points of a long remark are summarized).

2) Remarks that are judged to be important for their content are recorded.

3) The description might be different from what the student meant to say.

4) Even when compared to the transcript of classroom communication, the instant transcript includes 30% of all remarks (7 out of 22 remarks), accounting for around 20% of the amount of remarks (89 out of 400 words).

There are the following strong points, along with the above-mentioned characteristics:

1) Although it is a summarized or selective record of the remarks made during the whole lesson, it has a particular objectivity (time and content of remarks).

2) Since the time and content of the remarks are recorded, the order and content of remarks can be checked.

3) When observations of the nominated students are added to the instant transcript, a more holistic record can be created.

6.2. Improvement of the Teacher's Questioning Through the Creation and Analysis of the Transcript of Classroom Communication

The social studies teacher was aware that he tended to say "um" between his remarks. When he counted up the times he said so looking at the transcript of classroom communication after organizing it, he realized that he used the word "um" frequently when he made instructions or explanations. Although it is not clear how much this word affects the minds of the students, this teacher has researched the remarks made by himself and the chairperson accumulated through debate classes. When looking at the accumulated number of remarks, you can find three scenes where the accumulation curve of the teacher's remarks rises. So, this teacher extracted the scenes corresponding to the remark number, and analyzed the function and significance of his own remarks in the class. The following points were discovered from the records of the research lessons:

1) During the first scene, the teacher kept using the word "question" when questions and answers were repeated monotonously, since he expected active discussion.

2) The teacher said, "Well, I knew that the final argument was going to be a difficult one," which was what he felt inside. From the students' viewpoint, no one is encouraged when the teacher says, "Well, I knew…"

3) During the third scene, the teacher discovers himself not being able to leave things up to the chairperson. Also, he reflects that "If there was an opportunity to ask each student what they felt, the students themselves would have reviewed the lesson in a much more profound manner (Nagoya University/Tokai City, 2004: 16).

6.3. Judgment of the Effect Based on Evidence

A short-term lesson study workshop of "Use of positive/negative numbers" was held in June 2003, and three months later, a medium-term lesson study workshop was held, based on the transcript of classroom communication.

During the lesson, expressions were classified as positive terms and negative terms, and then both terms were summed up separately. The teacher used the story of Harry Potter in making up the lesson plan and carrying it out, calling the positive term a "Gryffindor term" and the negative term a "Slytherin term," thinking that this would make it easier to create a mental image of classifying each term. Initially, the participants in the discussion did not understand his intention. And then discussions concerning the creation of images for classifying positive and negative terms "headed in the direction that, the existence of communication between the teacher and the students, or among the students, might be what is important for the students to create their own images." Also, in the discussion, the participants came to understand the significance of introducing the story of Harry Potter to them, as the following was said "Chair: It means that the students will handle mathematical concepts by using the world of Harry Potter, or other images of their own." Furthermore, the participants came to understand that it is important to create images in order to enhance the ability of mathematical communication, as in "Ogawa: It means that the story can be used to express that the plus sign and the minus sign cancel each other out. Chair: I made an interesting discovery through today's discussion, noticing that there are many factors included within mathematical communication, by reviewing the lesson once more like this." However, the teacher feels that it was too much of a stretch, looking at the fact that the students used neither the word

"Gryffindor" nor the word "Slytherin" when classifying each term. Also, he says, "I thought it was a good idea to use characters that everyone knows in order to help create the image. For example, we use the word 'exchange' when talking about the commutative law of addition, and use the word 'sum up' when having them think about the associative law. It is important to make efforts to examine such words."

6.4 Finding a Concept through Analysis and Interpretation of Word Protocol

Since words are defined by relationships with each other in lesson analysis, it becomes possible to use them in practical contexts. Shibata, considering that the nature of lesson analysis where definitions are made through interactive relationships can be applied not only to the relationships among concepts, but also to the relationships between the fact and the concept constructed by the analyzer, stated as follows（Shibata, 2007）;

> "The analyzer finds the concept of experiment within the worlds of live children, because they include the concept of being an experiment enough to explain the facts. That is to say, the concept highlights the fact that is sufficient to be called an experiment from inside the real world which carries infinite interpretive possibilities." "The concept of experiment is not discovered from inside the world just because it has the power to be discovered itself. The fact that is sufficient to be called an experiment is selected by the power of the analyzer, as something worthy to be discovered."

7. Positioning Lesson Analysis within Lesson Study

The characteristic of lesson analysis is that a certain remark can be analyzed repeatedly, or in relation with other remarks made before or after it. Looking at the detailed record of lesson research, it becomes possible to focus on remarks and facts that could not be made out clearly or were missed during the lesson. Through lesson analysis, profound interpretation of how the teacher's remarks are received and how they affect the recipients, or of the children's remarks, can be made, and the senses can be applied when observing specific lessons. One of the important issues concerning lesson analysis is to develop tools to expose the dynamic factors that are inherent in lesson practice and that set the lesson in motion (in many cases, these factors exist in verbal form instead of nominal form; i.e. intuition, inference, or a look of the eyes).

8. Conclusion

From a pedagogical perspective, lesson study lies somewhere between the discovery of pedagogy and the rediscovery of it. At the same time it lies at the discovery of the true nature of pedagogy (as pedagogy).

For classroom practitioners, lesson study is a way to try to resolve the problems that are directly confronted in classes, and is an opportunity to build a potential for future teaching practices (as teaching practice).

Therefore, lesson study, viewed from the perspective of research into teaching practice, gives

the practitioner an awareness of difficulties in practical situations, and creates the opportunity for reconsidering them with greater clarity (as research on teaching).

Viewed from the perspective of research methods, lesson study is an opportunity to develop and refine tools and research methods that are found in practical research (as research methods).

Acknowledgement

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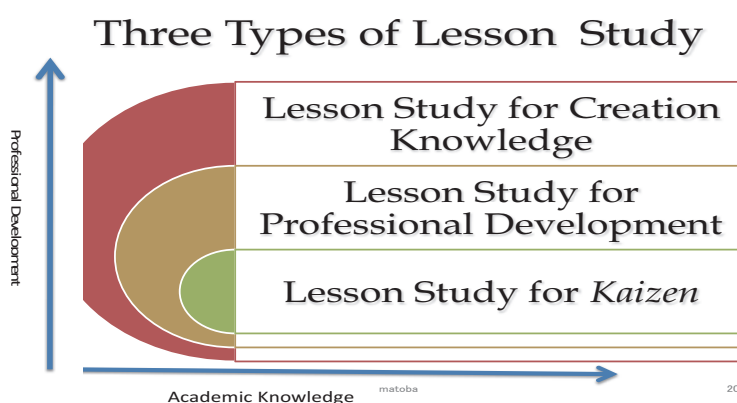
Appendix

Figure 1 Three Types of Lesson Studies (Source: Matoba, WALS2010 in Hong Kong)

Table 1 Three Types of Lesson Studies (Source: Matoba, WALS2010 in Hong Kong)

	Lesson Study for Teaching Improvement	Lesson Study for Teacher Professional　Development	Lesson Study for Creation of Pedagogical Knowledge
Interest	Good practice	Learning community	Creation of Pedagogical knowledge
Planning	Effective lesson plan	Planning Research lesson collaboratively	Research Question
Implementing	Opening his / her lesson	Research lesson Practically	Research lesson Academically
Observation	Observation	Participant Observation	Observation Follow up survey and Interview
Discussion	Sharing experience: Professional discussion	Provide Critically Discussion	Transcript-based Analysis
Reflecting	Self-Reflection	Evidence-based Reflection	Literacy based Reflection and Interpretation
Revising	Classroom-based Research	Teaching Improvement	Conceptualization of Knowledge
Reporting	School-based Personal Knowledge	School-based Knowledge Community	Theory Theorization

<＜要約＞

学的研究を目指した授業研究の構築

的場正美

　日本の授業研究は、効果的な授業方法の改善、教職としての学び、学校文化の構築、教師による研究、実践における研究方法の構築を目指してきた長い伝統がある。しかしながら、世界に授業研究が普及して20年が経過し、世界では実践と研究に置いて授業研究を持続することが課題となってきている。本研究は、学的研究を目指す授業研究を構築するための授業分析のアプローチ、手順、視点、機能を明らかにすることを目的とする。

　本研究では、第2章で授業研究と授業分析の定義とその両者の関係をまず明らかにし、次に第3章で授業分析の手順が7段階に区分できることを明らかにした。第4では、授業分析は質的性格、動的性格、関係的統合的性格、個的主観的性格を原理として有することを述べ、第5章で、分析視点として、構造的視点、関係的視点、質的視点、矛盾的視点、文化的視点とその内容について述べた。第6章で授業分析の実践と方法に対する機能について述べ、第7章で授業研究における授業分析の位置について述べた。

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