An Action Research of Lesson Study in Japan
— From the Point of View of Student's Achievement and Teacher's Professional Development —

Tetsuo KURAMOTO¹, Huiting SHII²

要  旨

近年、Action Research（AR）は教育実践研究方法論の一環として注目を浴びているが、概してARとは、社会/人間科学分野の実践的課題において、現在進行形の問題解決のプロセスを重視した研究であり、実践者の「固有知」によって提起され、実践者本人の実践の質的向上を意図した研究と整理できよう。また、教育経営学の視点からのARは、研究者の「研究知」と協働化して問題解決の具体的な方法論を構築し、実践フィードバックを通じて発展する動的なPDCA研究活動でもある。

その観点から日本の教師による教育実践を考察すれば、指導案の作成、事前研究、教師の参観による研究授業、そして経験知の共有を通じたLesson Studyによる「学習コミュニティ」（Learning Community）を形成している点が国際的な注目を浴びている。

特に、Lesson Studyに関連する「内部的協働性」（Internal Collaboration）とは、学校文化（School Culture）との関連で把握できるものであり、教職員相互の主流となる価値観や行動規範、学校経理のリーダーシップ、学校組織内職員研修のあり方等を包括的に捉え、これを前提にすれば更にStudentsの学習指導が充実すると言えよう。

よって本研究は、「教師の学び」と「Studentsの変容」との分析視点から、佐賀市立本庄小学校を事例に量的に実証しようと試みたものである。

1. Research Purposes — student achievement through “Lesson Study” —

According to J. Stigler, and J. Hiebert, “Cross-national studies of academic achievement continue to place U.S. students far behind those in the top-performing countries.” (Stigler, and Hiebert, 1997.) It is difficult to prove whether this is true or not, but this report will research a significant educational strategy which originated in Japan called the “Lesson Study” system. It is a professional development process that Japanese teachers engage in to systematically examine their practices. Lesson Study is credited with dramatic success in improving classroom practices for the Japanese school system. The goal of Lesson Study is to improve the effectiveness of the experiences that the teachers provide to their students.

Lesson Study is used very commonly for professional development of teaching and school improvement in Japan. Working in groups, teachers collaborate with one another, meeting to discuss learning goals, to plan actual classroom lessons, to observe how lessons work in practice, and then to revise and report on the results, so that other teachers can learn something new from it. (Stevenson, and Stigler, 1992, Stigler, J.: Hiebert, J. 1999, Lewis 2002. Fernandez, and Yoshida, 2004, Akita, and Lewis, 2008.)

¹ Saga University (文化教育学部)
² PhD graduate student, Saga University (工学系研究科、後期博士課程)
These researches show teachers’ professional development and school improvement, and in a limited way, they discuss students’ achievement of mathematics and science.

![Figure 1 The Structure of Lesson Study](image)

This research not only tries to examine student achievement in Language Arts, but also examines the effectiveness of Lesson Study as a teacher development tool. School improvement and teacher development are not the final goals of Lesson Study. Student development is also an important goal of the strategy.

Kuramoto is the superintendent of Honjiyo Elementary School (HES) which is well-known as a research school for Lesson Study and School Improvement in Southern Japan. The Structure of Lesson Study at HES is shown in Figure 1 above. HES Lesson Studies are structured and conducted based on research and observation. In this way, long-term goals for actual classroom practice in particular academic areas are created. HES has established two main concepts for Lesson Study. One is Independency/Individuality and the other is Collaboration/Harmony.

The objectives of this research are to investigate the effectiveness of Lesson Study from an empirical point of view of student achievement and using detailed data obtained through National Standardized Test scores of Language Arts.

2. Theoretical Framework

According to the theoretical Lesson Study framework of HES, the goals are to teach students the following skills: Problem Solving, Independency/Individuality, and Harmony/Collaboration. The children should have proficient interests and abilities, including positive attitudes, how to solve personal issues independently and how to collaborate with others to build a better democratic society. The most important definitions in this research are shown below.
### Figure 2  whole structure of Lesson Study at School Level Organization

1. **Independency/Individuality**

   For students to be able to solve significant issues by establishing their own goals, and choosing proper methods. Also, for the children to be able to reflect on their own learning process, and understand who they are.

   For instance, “I can recognize my own strengths.” “I have future dreams and visions.” “I have experienced completing something.” “I can try something new without worrying about failing, even in hard situations.”

2. **Collaboration/Harmony**

   For the students to be able to solve common issues among themselves or between themselves. In addition, children should learn to recognize the good points in others and appreciate different ideas, and
develop perceptions, cognitions, and understanding of the situation around them.

For instance, “I can positively cooperate to help someone who faces problems.” “I want to be a better person at understanding others’ feelings well.” “I want to build a sense of human rights: any kind of bullying is wrong.” “I want to contribute to society when I grow up.” “I can keep promises with my friends.”

A final purpose of the Lesson Study of HES is to integrate Independency/Individuality and Collaboration/Harmony to achieve Problem Solving Ability. A connection between school and community is an important factor in reaching educational goals from the point of view of curriculum management.

Developing a core-curriculum which meets national academic standards, “The Course of Study” must also be considered.


1. Purpose:
To discuss the effectiveness of Lesson Study at HES from the points of view of students’ personal achievement, including the main concepts, Independency/Individuality and Collaboration/Harmony.

2. Date:
April 24th 2007.

3. Methods:
There were 91 sixth grade students at HES. The entire Saga school district had 1,480 sixth grade students in 2007 school year. This research used the Principle Component Analysis/Varimax Rotation and the Correlation Coefficient method to analyze Independency/Individuality, Collaboration/Harmony, and Language Arts Test Scores. Saga school district data of 1,480 sixth grade students was compared to the HES student data.

National Standard Testing (NST) scores from 21,952 Elementary schools with 1,171,000 6th grade students (99.64% of all public elementary school students in Japan) were used. The NST included Language Arts, Mathematics, and Attitude toward school. For this research, Language Arts scores were compared to the NST scores which were available to Dr. Kuramoto who was in charge of Saga prefectural data analysis.

4. Questionnaire items:
The NST included 102 items related to students’ attitude toward school. The research undertaken at
HES included 20 items using a Likert scale of strongly agree, agree, disagree, and strongly disagree, response types. Each item was related to the concepts of Independency/Individuality, Collaboration/Harmony, and Problem solving ability.

4. Results –Part 1–

Table 1 shows the Principle Component Analysis and Varimax Rotation.

Four factors were abstracted, including Independency/Individuality, Collaboration/Harmony, Community/Participation, School culture. Four of the original 20 questions were excluded from this table because the data because did not relate significantly to the four factors.

<table>
<thead>
<tr>
<th></th>
<th>F1</th>
<th>F2</th>
<th>F3</th>
<th>F4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independency/Individuality</td>
<td>NO10</td>
<td>0.664959</td>
<td>0.012052</td>
<td>0.413874</td>
</tr>
<tr>
<td></td>
<td>NO11</td>
<td>0.745025</td>
<td>0.250503</td>
<td>0.03492</td>
</tr>
<tr>
<td></td>
<td>NO46</td>
<td>0.620242</td>
<td>0.274163</td>
<td>0.2682</td>
</tr>
<tr>
<td></td>
<td>NO47</td>
<td>0.60387</td>
<td>0.330996</td>
<td>0.353173</td>
</tr>
<tr>
<td></td>
<td>NO48</td>
<td>0.706672</td>
<td>0.466365</td>
<td>0.125414</td>
</tr>
<tr>
<td>Collaboration/Harmony</td>
<td>NO9</td>
<td>0.346136</td>
<td>0.583333</td>
<td>0.386961</td>
</tr>
<tr>
<td></td>
<td>NO36</td>
<td>0.198905</td>
<td>0.832858</td>
<td>-0.02705</td>
</tr>
<tr>
<td></td>
<td>NO37</td>
<td>0.174695</td>
<td>0.671686</td>
<td>0.231798</td>
</tr>
<tr>
<td></td>
<td>NO49</td>
<td>0.237747</td>
<td>0.638711</td>
<td>0.262351</td>
</tr>
<tr>
<td></td>
<td>NO50</td>
<td>0.548999</td>
<td>0.6298</td>
<td>0.169462</td>
</tr>
<tr>
<td>Community/Participation</td>
<td>NO43</td>
<td>0.12901</td>
<td>0.071104</td>
<td>0.829559</td>
</tr>
<tr>
<td></td>
<td>NO55</td>
<td>0.239605</td>
<td>0.321607</td>
<td>0.6144</td>
</tr>
<tr>
<td>School culture</td>
<td>NO6</td>
<td>0.041368</td>
<td>0.079199</td>
<td>-0.02891</td>
</tr>
<tr>
<td></td>
<td>NO32</td>
<td>-0.00923</td>
<td>0.254382</td>
<td>0.322744</td>
</tr>
<tr>
<td></td>
<td>NO44</td>
<td>0.583486</td>
<td>0.093456</td>
<td>-0.02695</td>
</tr>
<tr>
<td></td>
<td>NO45</td>
<td>0.334689</td>
<td>0.340437</td>
<td>0.146988</td>
</tr>
<tr>
<td></td>
<td>NO12</td>
<td>0.427153</td>
<td>0.261883</td>
<td>0.423425</td>
</tr>
</tbody>
</table>

The contributing rate of each factors are 22.5 for F1, 19.1 for F2, 14.3 for F3, 9.9 for F4. The total contributing rate is 65.8. In addition, DI scores of each questionnaire item are as follows.

※DI method : strongly agree = 1.0, agree = 0.5, disagree = -0.5, strongly disagree = -1.0,
total processing for each questionnaire item

HES DI = Honjyo Elementary School DI  ·  SD DI = School District DI  ·  Na DI = National D
<table>
<thead>
<tr>
<th>Questionnaire entries</th>
<th>HES DI</th>
<th>SD DI</th>
<th>Na DI</th>
</tr>
</thead>
<tbody>
<tr>
<td>[F1. Independency/Individuality]</td>
<td>0.50</td>
<td>0.50</td>
<td>0.48</td>
</tr>
<tr>
<td>No10 I can try something new without worrying about failing, even in hard situations.</td>
<td>0.324</td>
<td>0.325</td>
<td>0.321</td>
</tr>
<tr>
<td>No11 I can recognize my own strengths.</td>
<td>0.360</td>
<td>0.344</td>
<td>0.323</td>
</tr>
<tr>
<td>No46 I can cooperate to help someone who faces problems.</td>
<td>0.361</td>
<td>0.367</td>
<td>0.364</td>
</tr>
<tr>
<td>No47 When I meet neighbors, I will greet them.</td>
<td>0.772</td>
<td>0.757</td>
<td>0.683</td>
</tr>
<tr>
<td>No48 I want to be a better person at understanding others’ feelings well.</td>
<td>0.726</td>
<td>0.728</td>
<td>0.725</td>
</tr>
<tr>
<td>[F2. Collaboration/Harmony]</td>
<td>0.80</td>
<td>0.79</td>
<td>0.80</td>
</tr>
<tr>
<td>No9 I have experienced completing something.</td>
<td>0.764</td>
<td>0.760</td>
<td>0.776</td>
</tr>
<tr>
<td>No36 I have enjoy spending time with my friends at school.</td>
<td>0.863</td>
<td>0.860</td>
<td>0.872</td>
</tr>
<tr>
<td>No37 I have some favorite subjects at school.</td>
<td>0.798</td>
<td>0.777</td>
<td>0.799</td>
</tr>
<tr>
<td>No49 I believe in human rights: any kind of bullying is wrong.</td>
<td>0.843</td>
<td>0.831</td>
<td>0.821</td>
</tr>
<tr>
<td>No50 I want to contribute to society when I grow up.</td>
<td>0.748</td>
<td>0.746</td>
<td>0.742</td>
</tr>
<tr>
<td>[F3. Community/Participation]</td>
<td>0.49</td>
<td>0.47</td>
<td>0.37</td>
</tr>
<tr>
<td>No43 I participate in community events, or volunteer work.</td>
<td>0.405</td>
<td>0.399</td>
<td>0.204</td>
</tr>
<tr>
<td>No55 I can take care of little children, or elderly people.</td>
<td>0.571</td>
<td>0.556</td>
<td>0.538</td>
</tr>
<tr>
<td>[F4. School culture]</td>
<td>0.55</td>
<td>0.55</td>
<td>0.54</td>
</tr>
<tr>
<td>No6 I can manage my study time by myself.</td>
<td>0.015</td>
<td>0.028</td>
<td>0.056</td>
</tr>
<tr>
<td>No32 I do homework at home.</td>
<td>0.892</td>
<td>0.888</td>
<td>0.856</td>
</tr>
<tr>
<td>No44 I keep school rules.</td>
<td>0.551</td>
<td>0.550</td>
<td>0.510</td>
</tr>
<tr>
<td>No45 I keep promises with my friends.</td>
<td>0.759</td>
<td>0.754</td>
<td>0.755</td>
</tr>
</tbody>
</table>

Table 2 Data Analysis:

**Independency/Individuality**

The top 5 items measured independency and individuality. They are items 10, 11, 46, 47, and 48.

**Collaboration/Harmony**

The second 5 items measured collaboration and harmony. They are items 9, 36, 37, 49, and 43.

**School Culture**

The last 4 items are related to School culture. They are items 6, 32, 44, and 45.

Note that HES scores (are) higher than the Saga District Standard Deviation and the National DI. The DI average four factors which were found by Principle Component Analysis/ Varimax Rotation, discussed above, are higher scores than the other two comparative categorized DI scores. Even though, the average score of Language Arts of HES is lower than other two.
The average score of Language Arts of HES 6th grade students is 80.7. Saga school district’s average is 81.1. The national average is 81.7. HES is very close to the national average for Language Arts.

Table 3 shows that there was a high rate of correlation coefficient between Independency/Individuality and Collaboration/Harmony. The correlation number between Language Arts Score and Collaboration/harmony is 0.470 and between Language Arts Score and Independent/Individuality is 0.262. This means that the goal of Lesson Study of HES didn’t reach the school goal, however the Validity (Language Arts) which shows students thought that, “the contents and skills I learned from Language Arts are useful for my future,” and the two concepts are shown by very high scores. (The DI score is 0.680 of HES, 0.672 of Saga SD, and 0.666 of National DL.)

This is one of the successful results of the HES Lesson Study.

The dissemination graph shows the comparison to Saga school district in 3 correlation factors. HES had higher results in Independency/Individuality and Collaboration/Harmony in Language Arts.

In figure 3, the correlation between “Language Arts”, “Independency/Individuality” and “Collaboration/Harmony”, shows HES improvement. The red line of transverse axis of each figure shows the average score of “Language Arts” of Saga School District. It is set up as 0.00.

Also, the red vertical axis shows that the 3rd level from the 4 level questionnaires is set as 3.00. (Strongly Disagree=1.00, Disagree=2.00, Agree=3.00, Strongly Agree=4.00) At same time, each “○” shows one student who participated in this survey’s examination. Figure 3 shows the distribution of 3 dimensions. It is necessary to compare with the School District to prove the effective distribution of the 3 dimensions at HES.

Figure 4 shows the comparison between HES and Saga School District. Figure 4 is a special graph to compare the 2 dimensions in order from “Language Arts”, “Independency/Individuality” and “Collaboration/Harmony”.

The distributive results of Figure 3 and Figure 4 show the concepts of “Independency/Individuality” and “Collaboration/Harmony” of HES school goal are more effective than the average of SSD. This result shows that the vision of Lesson Study at HES improved school teachers’ professional culture and student achievements.

But, it is important to mention that the average scores of “Language Arts and Mathematics” are below the average of Saga School District, even though the 2 concept scores which are
“Independency/Individuality” and “Collaboration/Harmony” are above the average.

On “The Check Level” of PDCA cycle of Lesson Study which means “Curriculum Management” of HES, they deeply discussed how to improve the two subject’s scores and the two concepts which are goals of their Lesson Study.

This research discusses the dialogs that took place in March of 2008 and again in March of 2009 at the meetings about the Lesson Study by comparing the dialog records using “Text Mining”. This “follow up research” is used to prove the effectiveness of the Lessen Study over two years.
Figure 4  the comparison of 3 dimensions between HES and Saga School District

5. Summary of Research Methods –Part 2–

1) Purpose:
As shown in Figure 5, the scores of “Language Arts and Mathematics” of HES were slightly lower than
the average of Saga School district, even though HES school goals, “Independency/Individuality” and “Collaboration/Harmony”, had better distributions than SSD. The mission of HES over a two-year period has been to make a balance between subject needs and achievement.

The purpose of this research is to analyze their transformative consciousness to achieve their own goals through the comparison of 2008 and 2009.

3 Date:
First year: 2008/March, Second year: 2009/March

4 Methods:
This research analyzes the teacher’s reflection through “text mining” used to analyze written dialogs. Since the records are from 2008 and 2009, it discusses the comparison between 2 years. The analysis software is “word-miner1.0” and it analyzed a free style questionnaire distributed to all of the HES teachers.

5 Questionnaire items:
The free style questionnaire is fundamentally based on teachers consciences after performing Lesson Study. The letters “A, B, C, D” distributed on the coordinates stand for “Strongly Agree, Agree, Disagree, and Strongly Disagree” respectively regarding school improvement, achievement, and Lesson Study success.

6 Results –Part 2–
Figure 6 (2008) shows high correlations between “Cluster 4” and “A” which means “Strongly Agree” of effective Lesson Study. “Cluster 4” contains keywords that are “study, teachers, much”, it is possible to interpret the data as meaning that some leaders among the school teachers took the initiative and that younger less experienced teachers were following to learn something new from them.
On the other hand, clusters 1, 2, and 3 show strong correlations with “A&B” containing the important keywords “children, class, important, reflection, development, opportunity”, that are related to curriculum development, even though there are some keywords about “study, teachers, much” which mean young teachers follow-ship.
As a result, teachers’ work ethics and motivation in 2009 became higher than in 2008, because they collaborated with each other as Lesson Study colleagues.

7. Conclusions

Lesson Study is becoming a well-known strategy around the world. However, it is not enough to just survey teachers’ subjective impressions or to discuss theoretical teacher development taking place with the use of Lesson Study.
The Lesson Study at HES was somewhat effective in achieving greater problem solving ability and meeting academic standards. School culture and community participation were important factors.

With regards to student achievement the Lesson Study of HES had the school educational goal of "raising student abilities to improve their future," meaning "the ability to solve their own problems, to build a better society."

This research was effective in these areas: Language Arts, Independence/Individuality, and Collaboration/Harmony. In future inquiries, it would increase reliability to investigate the outcomes in all subject areas, rather than just Language Arts. This research is focused on curriculum and instruction. Often Lesson Study is used as a professional development strategy for teachers. However, in this Lesson Study, student improvement was also focused on.

This research additionally proved the teachers professional engagement through Lesson Study at HES. This is important because the concept of Lesson Study has become well known throughout the world.

8. Educational importance of the study

It is important here to mention one important factor involved in education in Japan. Outside of the public school curriculum, many students study at cram schools. One of the questionnaire items asked students if they were attending cram school and found the following results. HES students had a lower DI score for the cram school item as seen below.

<table>
<thead>
<tr>
<th>Questionnaire entries</th>
<th>HES/DI</th>
<th>SD/DI</th>
<th>NA/DI</th>
</tr>
</thead>
<tbody>
<tr>
<td>No24</td>
<td>I am studying at cram school after school, or weekend.</td>
<td>0.546</td>
<td>0.562</td>
</tr>
</tbody>
</table>

It is necessary to analyze the correlation coefficient to examine the effects of Cram Schools in relation to the other 4 factors, including Language Arts Score. The correlation scores between Cram Schools and Language Arts was 0.300. The correlation between Cram Schools and Independent/Individuality was 0.243. The correlation between Cram Schools and Collaboration/Harmony was 0.314. The significance was at the 0.01 level.

Even though, cram school culture is strong in Japan, this means that there is slight validity between Cram Schools and other factors.

In conclusion, the case study of HES shown by this research was somewhat successful in reaching the school educational goals to improve "Student’s Problem Solving Ability" through Lesson Study. Lesson Study in Japan is summarized as effective for Japanese teachers to develop their own teaching skills, and to teach student intellectuality and humanity.

Reference


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Honjiyo Elementary School, 2008. The annual research book, the creation of “Honjiyo Plan” to open the student’s future, Saga, Japan.