

Qualitative Data Analysis and Systematic Research Method Based on Japanese Cultural Context

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Abstract¹

Japanese schools have been found to develop their school-based curriculum and pedagogy. Based on Japan's social culture and the educational trends of the 1980s, which became the prototype for the school's organizational culture, the school had a consistently complex assessment. Therefore, we focused on their narrative data. However, lesson studies are only methodology and not theorized. Japan is no exception; each school's lesson practice records are individualized, and the knowledge is buried. Therefore, it is necessary to increase the productivity of lesson study by interpreting the data theoretically and raising its level of abstraction. This study aims to establish a methodology for conceptualizing narrative data using qualitative analysis software. Lessons were regarded as a system, which comes from cybernetics to clarify the complex relationship between various factors in the classroom. Coding was conducted based on a frame ("kizuki", "nakama") from the narrative data, which was based on the concept of Japanese cultural context. The accumulation of such approaches will contribute to knowledge management in lesson study.

Keywords: *personal narrative, systems approach, knowledge management, qualitative research method, Japanese cultural context*

1. Introduction

The Japanese education system uses a variety of Lesson Study techniques to improve the quality of teaching and learning. A great deal of research has been conducted in many schools. The scope of Lesson Study research is expanding to include the improvement of teacher qualifications, the improvement of teaching, the

¹ We would like to express our sincere gratitude to Dr. Ian Clark for his advice and review.

development of better teaching materials, and the formation of school communities. There is much work still to be done and some academics have identified theoretical weaknesses in the extant Lesson Study literature (Matoba 2017). Individual (“tacit”) practices are not generalized, and effective systems of knowledge management have not yet been achieved. In response to these critiques, this study proposes a method by which Lesson Study practices can be generalized beyond the uniqueness of the Japanese context.

Horikawa Elementary School in Toyama, Japan has been recording classroom narrative data for several decades. The act of recording this practice leads to effective assessment. However, our understanding of how teachers influence the construction of teacher-student relationships has not been well-researched (Albin, Shirley, Webster, & Woolhouse, 2018). Even if they maintain detailed records of their classroom knowledge and skills, they have not gone as far as to conceptualize them, which means that they do not use these data to improve assessment transactions with students. As already implied, the problem we seek to address here is that “tacit knowledge” - knowledge developed by one’s own individual (internal) practice - is never articulated so that it becomes available to the community as assessment information. A further reason for the difficulty in generalizing classroom research is that teaching is a complex phenomenon. When such complexity is holistic (or “reciprocally-determined”) it is not possible to discover the nature of the ‘teaching phenomenon’ by analyzing its components individually (Kitao 1987). Therefore, the idea of a “systems approach” to thinking and learning is useful (Durdan 2019).

Describing patterns of good assessment is a useful starting point for individualizing instruction and meeting the needs of students. Beyond that, it is argued that “cybernetic principles” that are always based on circular-causality or “assessment feedback” should be employed to create and stimulate reflective-thinking practices among colleagues (Scott, Maclean, & Cong, 2007). In order to explore complex topics on knowledge management and -creation, the authors have employed NVivo - a qualitative data-analysis software that interprets individualized narrative data. When analyzing qualitative data the main task is coding. Careful coding is needed to

classify or categorize complex data: dividing, grouping, recognizing, and linking meanings, and consolidating emerging explanations (Grbich 2013). Coding is not a precise science; it is primarily an interpretive act (Saldana 2015).

2. Research Question

How are knowledge management systems initiated and sustained in schools?

3. Theoretical Background

3.1 Japanese Cultural Context

A paradigm shift in assessment has been advocated worldwide. Education systems outside Japan have integrated an instructional design concept called “formative assessment” into their national policy frameworks. It has been one of the central topics at the policy level (Forgasz et al., 2018). However, even before this movement occurred, several elementary schools in Japan had traditionally observed and documented students' “unquantifiable” (hidden/tacit, etc.) thinking in their classrooms.

Horikawa Elementary school has consistently used complex assessments that make an individual student's thinking visible to all of those present. The research distinguishes between *evaluation*, as a top-down, teacher-driven process and *assessment*, a generative process that begins with the students' ideas (for example, self-assessment or peer-assessments, both of which are “formative assessment” processes). These processes may be integrated into Japanese school culture, particularly because Japanese culture is very receptive to collaboration. It is, then, our proposition that the current practice in Japanese schools can be improved by the integration of formative assessments into school-systems elsewhere in the world.

The specific culture of Lesson Study in Japan is represented in the customary transactions that take place among school staff. In other words, teachers work together to create lessons and improve them by observing and advising each other. It is a very powerful human inter-relationship that is connected directly to school improvements. It is summed-up in the Western literature by Albert Bandura's eponymous "collective efficacy" (Bandura 1997). However, Japan's social theories do not originate in universities; essential social concepts are steeped in thousands of years of cultural practice. In the unique context of Japan, a great deal of social meaning is left unexplained because the 'rules' of society, and the transactions that take place there, are *known* on the tacit level (Mente 2004). Thus, Bandura's "collective efficacy" is practiced by the Japanese from cradle to grave.

3.2 Methods of Qualitative Analysis in Lesson Study

This study analyzes narrative data (or "feedback") in order to learn more about how teachers and students can transact to improve thinking and learning. A codebook based on the data was created. The results of the coding process are put into a concept map that expresses complex relationships among categories (Brightman 2003). In the initial phase, we simply quantified the number of occurrences, the frequency, of a particular code. However, the frequency of occurrence is not necessarily an indicator of its importance (Saldana 2015).

3.3 Knowledge Management

Knowledge management is a critical concept and process over which school-staff should obtain mastery. Without the outcomes of the Lesson Study, teachers, administrators and parents will not be able to accumulate knowledge. Lesson Study 'insists' on the process of eliciting and clarifying individuals' tacit knowledge, which plays a major role in organizational/school learning. It is widely understood that Japanese cultural philosophy places a high implicit value on the socio-emotional aspects of social life and learning (Arimoto & Clark, 2019).

Of course, there is certainly some knowledge that teachers need to understand explicitly - knowledge of laws, regulations, and subject matter. In contrast, the moment-to-moment verbal transaction with students is very much a matter of tacit knowledge (Chichibu 2005). It is thought that many of the rules of experience that each teacher has are tacit knowledge. However, what one hears by ear cannot directly become tacit knowledge, which means that to share tacit knowledge with others, it is necessary to somehow transform it. The critical question is then one of how does the school transform tacit knowledge into explicit knowledge? Lesson Study must go beyond a “record of practice” because that alone does not turn something hidden into something visible (Nonaka, & Konno, 1998).

4. Method

NVivo offers an intuitive qualitative data analysis. The NVivo coding procedure is shown below.

1. Import files in a variety of formats, for example, videos and scripts. It is possible to handle a wide variety of survey data at once. This study used narrative scripts.
2. Coding, categorizing and organizing data. Coding is a way of gathering all the references to a specific topic, theme, person, or other entity (QSR International 2022). We can code all types of sources and bring the references together in a single node. A node is a collection of references about a specific theme, case, or relationship. You gather the references by 'coding' sources to a node. When we open the node, we can see all the references in one place. In other words, extract the parts that are characteristic and put them in the appropriate nodes. This is interpreted in the third person. In this study, coders and teachers are different.
3. Visualize the data by referring to the nodes. For example, there are various forms such as tables, concept maps, mind maps, etc.

In this study, the following approaches were used.

- Collect narrative data on lesson practices and store them in qualitative data analysis software such as NVivo.
- Collect concepts to be used in the code in databases such as Web of Science, ERIC, Ovid, etc., and organize them in reference management software such as Citavi.
- Determine the “research frame” (scope of data collection and relevance). In this study, the frame is *kizuki* (気付き) and *nakama* (仲間) (see later for definitions).
- Create a codebook, and perform the coding. In the coding process, we mainly referred to the categorization suggested by Arimoto (1995), provided below.

All data was compiled from individualized narrative data at Horikawa Elementary School.

5. Result

Mente (2004) devised a hierarchical model to explore the relationships among “cultural code words”. Here, we use NVivo to illustrate this (Figure 1). Presenting in such a “word tree” has the benefit of visualizing the hierarchy of concepts.

5.1 Texts with “*Kizuki*”

Kizuki refers to the capacity of teachers to reveal and interpret an individual student’s tacit thinking and transform it into learning. First, we extracted the items that contained the word *kizuki* from lesson records. In other words, the coder retrieved sentences containing the word *kizuki* as used by the teacher. We then inductively coded for *kizuki* by using the codes to divide the data into specific and abstract forms of *kizuki*. Table 1 shows the codebook we made.

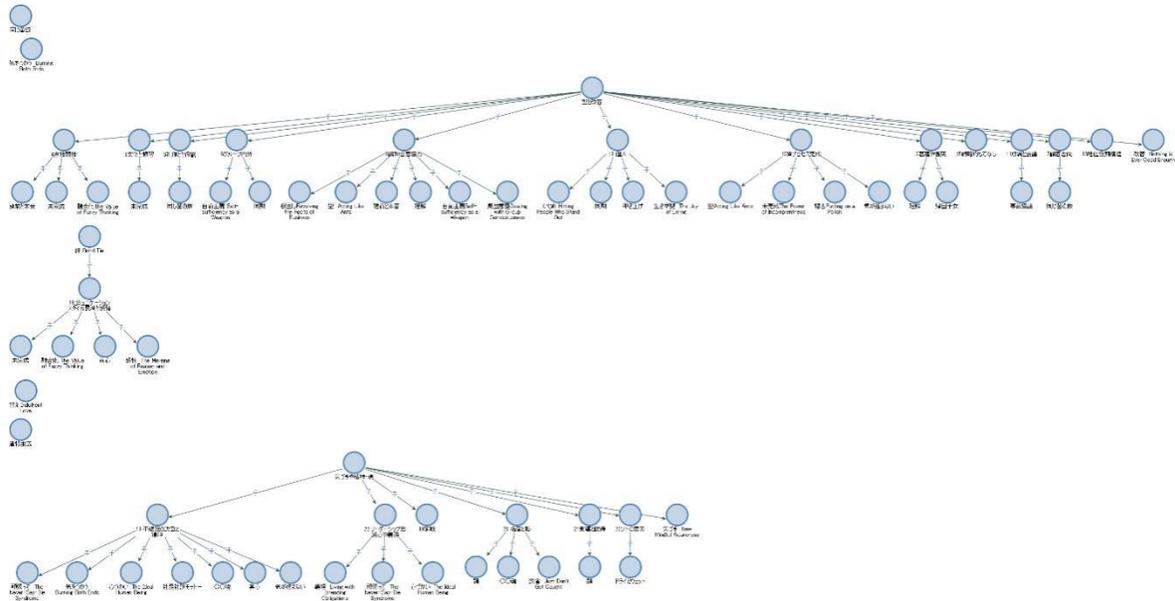


Figure 1: Visualization of cultural code word from Mente (2004).

Table 1: Codebook for text coded “*kizuki*”

Code	Example	File	Reference
Specific “ <i>kizuki</i> ”		0	0
Changes in things	Small changes and growth of the morning glory	1	2
Goodness	Looking back on the process of problem-solving, the results of classifying and organizing data, and the process of using line graphs, taking a multifaceted view and examining it, persistently thinking in search of something better, and the goodness of mathematics	1	2
Wonder	The wonder of the movement of a soap bubble	1	1

Code	Example	File	Reference
Diversity	Diverse shapes and colors of underwater life exist in the same world	1	2
Role	Goodness and role of Horikawa Elementary School's classrooms, facilities, people, etc.	1	1
Enjoyment	Enjoyment using ambiguous expressions	1	2
Rules	Through the activity of walking around Horikawa Elementary School, we learned that the school has facilities and rules for everyone to play and learn together.	1	1
Beauty	The beauty of wood as a material	1	1
Recognition	The current situation is inconsistent with the Constitution's goal of nation-building.	1	2
Issues	Various meanings and issues in the workings of transportation, etc.	1	2
Involvement	Involvement with rhythm and tune / Involvement with and recognition of living things	1	4
Interests	Interests in creating things for play/interests in finding sounds that match images	1	4
Abstract “ <i>kizuki</i> ”		0	0
Diversity of people's ideas	Different ways of seeing - thinking - feeling and doing things	1	1
Relationships with others	Respecting diversity in our daily lives as a member of the world as well as	1	2

Code	Example	File	Reference
	ourselves, and the importance of communicating our thoughts and feelings to each other to understand each other		
Importance	The importance of having a life and the value of life.	1	1
Preciousness	The preciousness of being able to live in this society	1	1
Change of mind	Change in one's feelings before and after starting the activity	1	2
Culture	A culture that is the background of diverse values and ways of thinking	1	1

Based on this, a conceptual relationship diagram can be made when the coding is correlated with the case. We took out the sentences containing the word, *kizuki*. The content of *kizuki* varied depending on the content of the course taught by each teacher and the grade level (Figure 2 and Figure 3). For example, in Class A in 1st grade, we found a change in the direction of *kizuki* from abstract to specific. At the same time, many teachers also expected to make students aware of more than one concept simultaneously.

5.2 Texts with “*Nakama*”

“The Japanese have a small word - *ma* ... The key to making great and growable systems is much more to design how its modules communicate rather than what their internal properties and behaviors should be” (Kay 1998). *Nakama* exists at the intersection of awareness and improvement. It is a kind of nexus in which *nakama* takes place. Historically, this word refers to a trade-association formed by merchants in the Edo period to protect each other's interests. Among them, those who had obtained official permission from the shogunate or clan were called *kabura-mates*.

Since the number of members was limited, the right to join the association was a highly-prized commodity, and sold for shares.

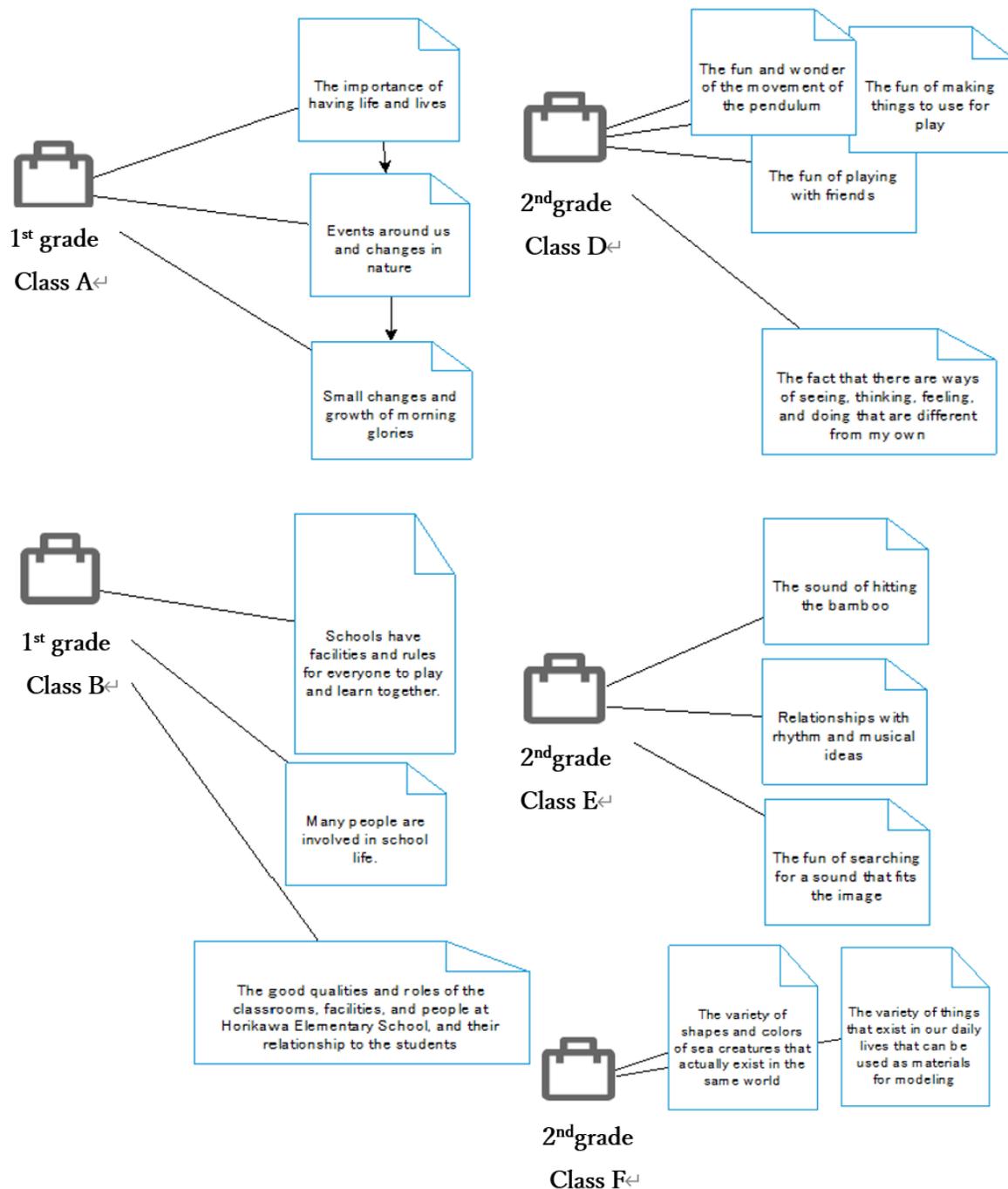


Figure 2: Analysis by the specific case (1st & 2nd grade)

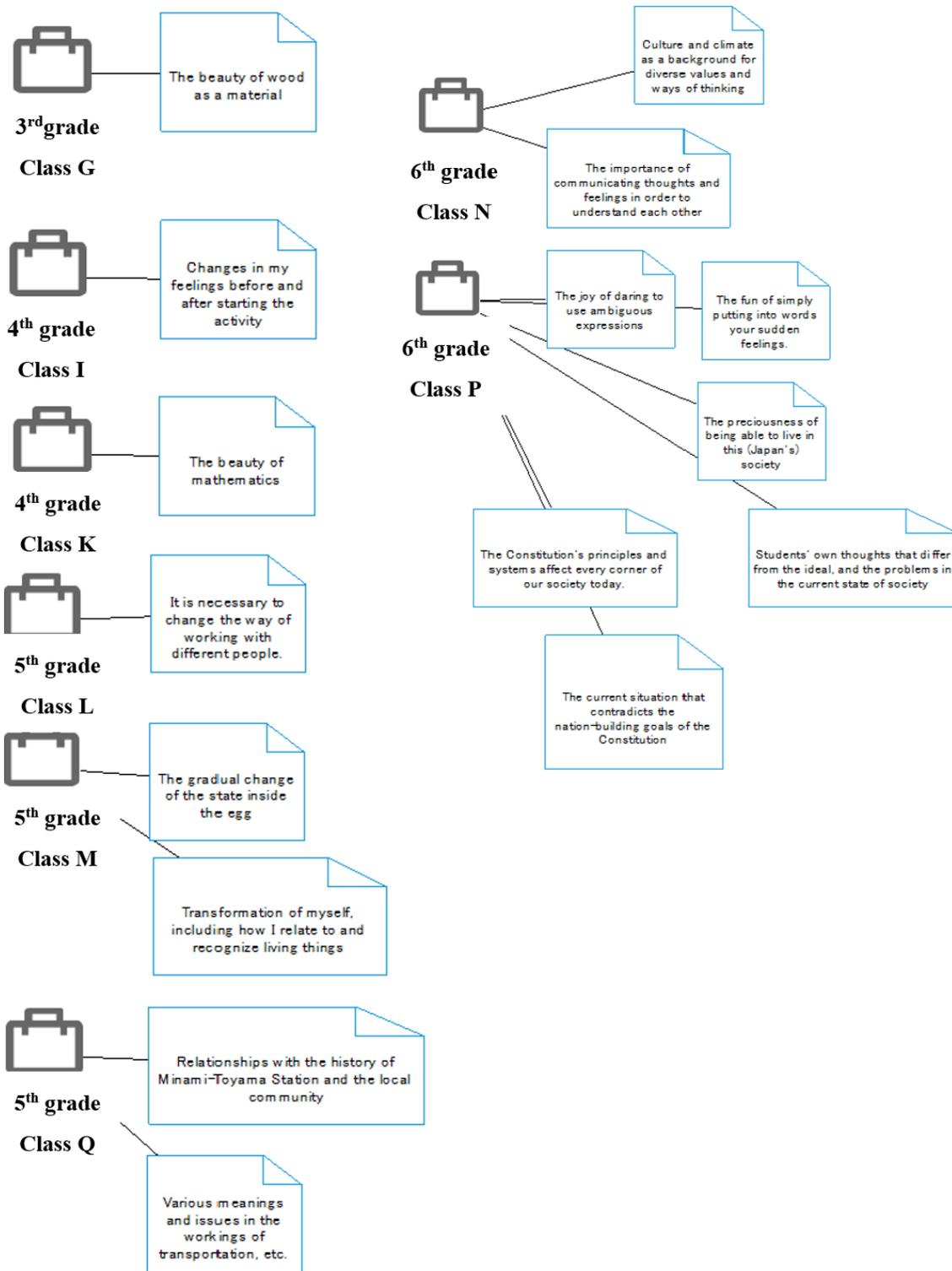


Figure 3: Analysis by the specific case (3rd & 4th grade)

In terms of our research process, each teacher, who participated in our Lesson Study research compiled a “lesson practice text”. From these texts, we extracted the items that contained the word *nakama* and further coded them for analysis. As mentioned earlier in this paper, we referred to the categorization suggested by Arimoto (1995), as follows: *kizuku* (group quest for knowledge), *fukai manabi* (internalize how to improve), and *otagai wo doukizukeru* (what can be improved). The next step in our process was to create the codebook (see, Table 2).

Table 2: Codebook of texts containing “*Nakama*”

Code	Interpretation	File	Reference
“ <i>kizuku</i> ”	group quest for knowledge	1	14
“ <i>fukai manabi</i> ”	internalize how to improve	1	1
consensus		1	5
cooperation		1	12
harmony		1	10
“ <i>otagai wo doukizukeru</i> ”	what can be improved	1	1
perfection		1	2
process		1	4
quality		1	6

The “*kizuku*” category focused on the phenomenon of a group working together to increase stimulation. As Ms. Y, a Class O in 6th grade teacher, said, “Through interaction with family members and other family members, the students will experience the benefits of competitive basketball exercise, build competitive relationships, and will be motivated by the comfort and fun of exercise.” such a course is a good demonstration of the attitude of a group questing for knowledge.

The *fukai manabi* category has a special focus on methods of improvement. This category includes consensus, cooperation, and harmony. The consensus reflects the

Japanese teachers' desire to improve by using a sense of consensus. As a class I in 4th grade teacher, Mr. I said, "More and more students will want their peers in other activities to know about their activities and to further spread them to their schools and communities." Some teachers prefer a collaborative approach to improve actions, as Class G in 3rd grade teacher, Mr. Y said, "Cooperation among fellows will naturally emerge during joining and processing. As they work together and experience a variety of interactions, they will further build good *nakama* relationships and accelerate the creation of the "living things" they have envisioned." Also, as a Class C in 1st grade teacher, Mr. M said, "Another time, I taught a lesson on rhythm beating in the music department. While most of the students enjoyed rhythm playing without worrying about making mistakes, there were a few students who were unable to start the activity. At such times, Ms. M and Mr. S (Class H) intentionally beat the rhythm with great force so that the students would not be bothered by their failure, and casually encouraged them by saying, 'You can do it,' and 'Let's do it.'" Some teachers even realized the importance of "harmony".

The last major category, The *otagai wo doukizukeru* category focuses on what to improve specifically (Figure 4). In the *otagai wo doukizukeru* category, there are three specific codes: (i) perfection; (ii) process, and; (iii) quality. First, "perfection". This means the pursuit of a more 'perfect' performance, while at the same time it is understood that perfection is unobtainable. Teachers create and sustain a learning culture that emphasizes the community's role in 'scaffolding' individual learning. This description appeared in the notes of a 6th grade teacher,

"We believe that students who focus on carrying the ball with their peers to the desired location will begin to focus on basketball manipulation skills, believing that they can carry the ball more efficiently by improving their dribbling, passing, and other skills."

Similarly, "process", also from a 6th grade teacher,

"He had been struggling to choose the right words to accurately convey his thoughts but listening to his peers' comments led him to realize the joy of daring to use

ambiguous expressions in writing poetry, and the fun of simply putting his feelings into words.”

Then, there is the “quality” of assignments; this time from a 2nd grade teacher,

“By feeling the transformation of their work and seeing the work of their peers, the students were able to say things like, “I learned that there are many different creatures in the deep sea, so I still need to make more. The students further increased their motivation for modeling activities and realized that their creations had changed through various realizations.”

Also, looking at the code matrix (Table 3), the 1st and 2nd grade classes seemed to show a higher willingness to form groups with *nakama* to pursue knowledge, while in the 3rd and 4th grade classes there was a greater emphasis on building cooperative relationships for successful improvement. In addition, in 5th and 6th grade there is a high value placed on achieving better or pursuing harmony through *nakama* collaboration.

The concept of *nakama* is an important concept for Lesson Study and knowledge management. *Nakama* makes peer assessment possible. In other words, teachers are conducting lessons while conveying to students the importance of communication between other students. Students realize the pleasure of exploring knowledge in a group through the presence of *nakama* (*kizuku*).

In addition, the collaboration of *nakama* brings about a profound learning experience (*fukai manabi*) that could not be achieved by individual students alone. Furthermore, *nakama* stimulate each other's motivation to learn by discovering the strengths of the other's ideas and accomplishments (*otagai wo doukizukeru*).

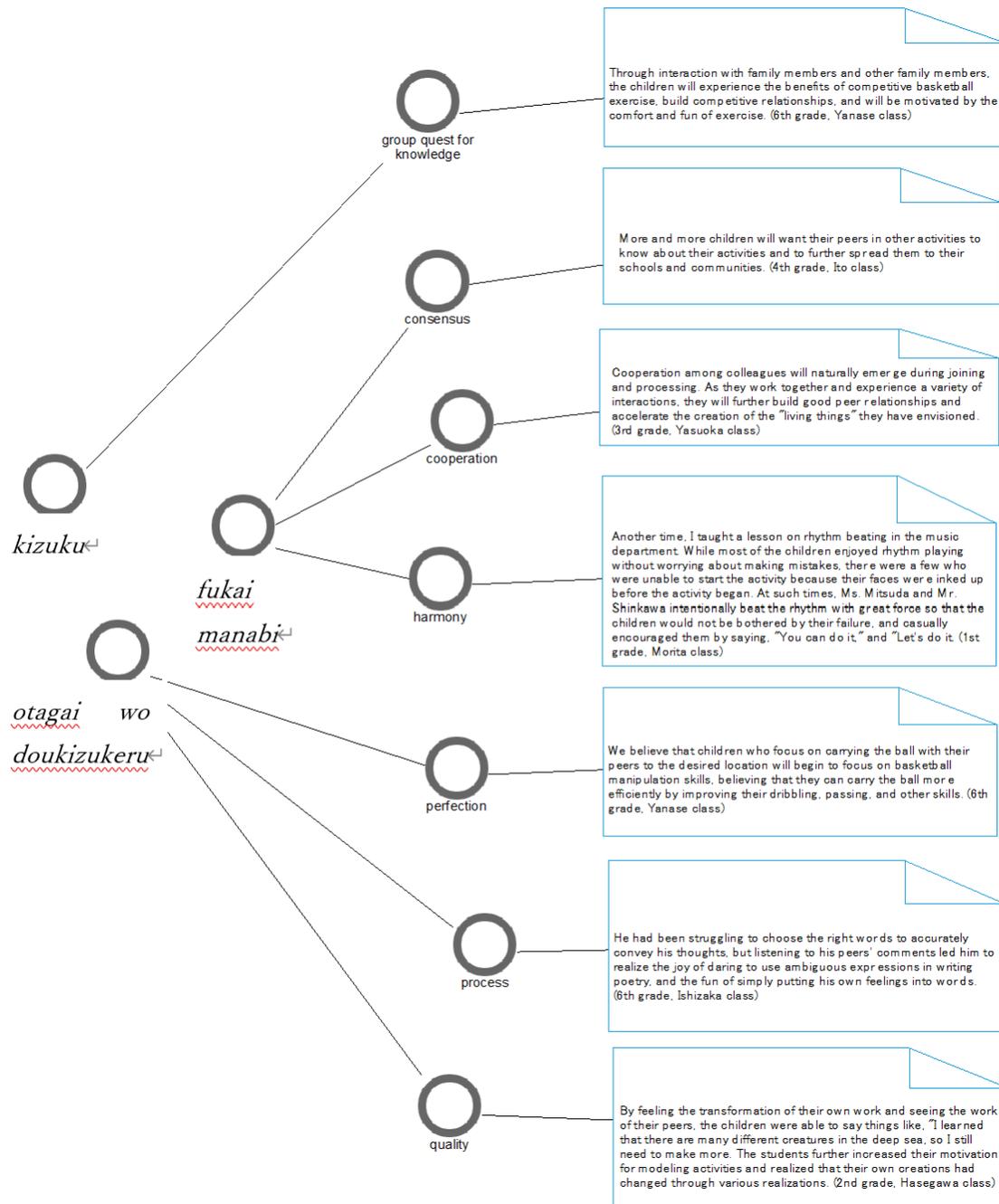


Figure 4: Concept map retrieved from Coding result (*Nakama*)

Table 3: Code Matrix

	1st grade Class A	1st grade Class B	1st grade Class C	2nd grade Class D	2nd grade Class E	2nd grade Class F
1: group quest for knowledge	0	3	5	4	0	0
2: consensus	0	0	0	3	0	0
3: cooperation	1	0	2	0	0	2
4: harmony	0	2	2	1	0	0
5: perfection	0	0	0	0	0	0
6: process	0	0	1	0	0	0
7: quality	0	1	0	1	1	1

	3rd grade Class G	3rd grade Class H	4th grade Class I	4th grade Class J	4th grade Class K
1: group quest for knowledge	0	0	0	1	0
2: consensus	0	0	2	0	0
3: cooperation	1	2	1	1	1
4: harmony	0	0	0	1	1
5: perfection	0	0	0	0	0
6: process	1	0	0	0	0
7: quality	0	0	0	0	0

	5 th grade Class L	5 th grade Class M	6 th grade Class N	6 th grade Class O	6 th grade Class P
1: group quest for knowledge	0	0	0	1	0
2: consensus	0	0	0	0	0
3: cooperation	0	0	0	1	0
4: harmony	2	1	0	0	0
5: perfection	0	0	0	2	0
6: process	1	0	0	0	1
7: quality	2	0	0	0	0

6. Future Challenge

When conducting NVivo research the researcher must originate a coding manual (“codebook”). Japanese culture and language have context that the English-speaking world does not have. It is, therefore, necessary to create a Japanese version of the codebook. In addition, a single word may have diverse meanings depending on the context, for example, the word “*kaizen*” (Arimoto 2022). In other words, Japanese is a context-dependent language. Consequently, narrative analysis is challenging without sufficient tacit knowledge to understand the context.

In addition, a “systems thinking” approach is needed to visualize complex relationships. This is because relationships are dynamic systems that relate to, and influence, each other while operating at different levels (O’Connor & McCartney, 2007). Teachers in Japan observe each student in detail. On the other hand, the overall interaction in the classroom is also distinctive. We define the “collective student” as follows: Teachers observe each student in detail while teaching in a way that captures the interest of the entire classroom. Educational research involves factors at various

levels, including curriculum, content, learner ability, teacher qualifications, and educational environment. These factors are taken as a system and systematized (Figure 5).

Also, research must obtain a better understanding of systemic-dynamics. The system surrounding teachers and students is not limited to the classroom. Relationships outside the classroom are part of this complex system.

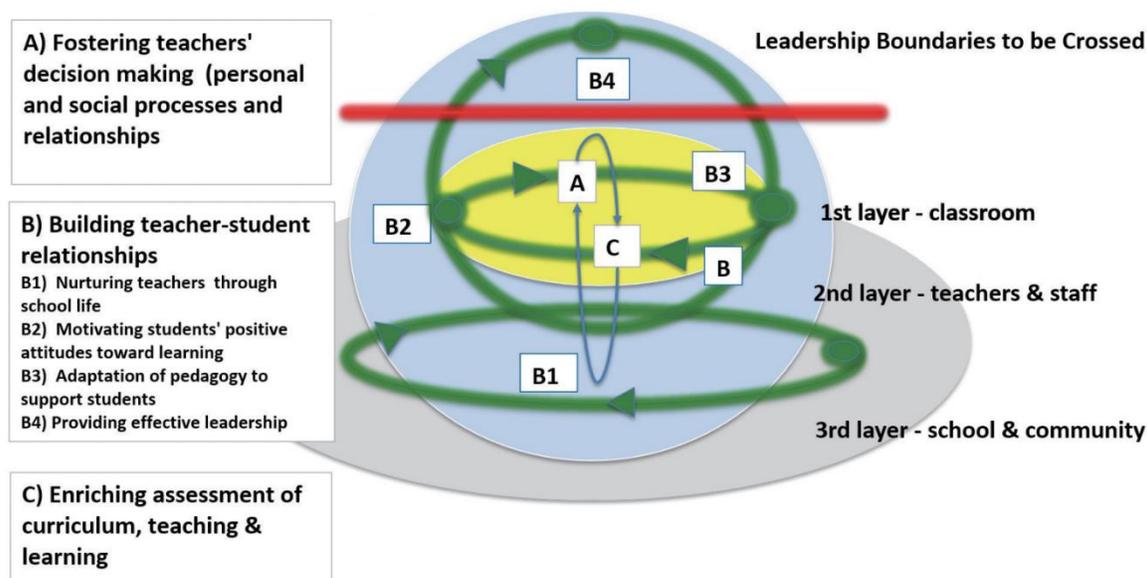


Figure 5: Narrative Teacher Education Pedagogies Based on *Kizuki* (modified from (Howe & Arimoto, 2014))

Especially the part of B1, there is a consciousness of developing teachers in the entire school. For example, staff room culture is a major feature of Japanese school culture. Teachers advise each other about lessons and share information about students. Furthermore, there is a consciousness of developing the school together with the community and parents. Schools have cooperative relationships with the community and parents, rather than conflicts of interest. Also, part of B2 represents Japanese school culture. This is a culture of the controlled collective consciousness of each other's individual learning needs. This is because a single teacher in a Japanese elementary school spends all day with

nearly 40 students, who learn together as the “collective student”. This model has relevance for our work in the future, and exploratory evidence will be collected for substantiating Figure 5.

As part of substantiating, Horikawa Elementary School publicizes the students’ activities on its website (Horikawa Elementary School 2021). A few examples of Japanese words were extracted from “cross-listed entries under themes that are central to Japanese culture” (Mente 2004).

Commenting on the 6th grade students cleaning the swimming pool at the school, the teacher said, “I believe that the 6th graders who were given the responsibility of finishing up and getting it done felt not only the responsibility of working for the school as the highest grade but also the joy and sense of accomplishment that comes with it.”. This is a sign of “*Shudan Ishiki*” (Dealing with Group Consciousness). In other words, they are the oldest students in the elementary school, and they are being educated to have that sense of responsibility. On the other hand, it is also a cause of “*Jibun ga Nai*”(life without a soul). In other words, it is difficult for students to develop their individuality and assertiveness, leading to low self-esteem among Japanese youth.

Students in the 2nd grade explored the area around the elementary school and interviewed shopkeepers and customers.

The teacher said, "The students were able to discover many good things about the town of Horikawa because everyone in the community was courteous and gave them a warm gaze."

This is “*Jimae-Shugi*” (Self-sufficiency). Japanese schools often use their resources for lessons.

Students in the 2nd grade created a book about multiplication for their math class.

The teacher said, "The students are happy to see students from other grades picking up the book and reading it too."

This is “*Wa*” (Harmony). At Horikawa Elementary School, there is a strong organizational harmony that transcends grade levels.

The students in 6th grade had an online conversation with a Polish resident in their foreign language class.

The students said, "I thought it was great that people in Japan and Poland were connected through the common language of English," and "I would like to speak in other's native language as well because I think I will feel closer to people if I greet them in their native language." The teacher reflected, "I could see that the students were very interested in learning about the country and its people through English while valuing the other's culture."

This is a lesson that fosters consciousness of “*Kyosei*” (Getting in Harmony with the World).

The students in 5th grade prepared for the entrance ceremony.

The teacher said, "I could see the students putting their hearts and souls into their work, eager to fulfill their roles."

This is “*Kan Sei*” (The Merging of Reason and Emotion). Students need to have emotions about their activities.

7. Conclusions

Effective Lesson Study is a process where the teacher collects narrative data (feedback) that reveals students’ tacit knowledge. It must be available for collective use as assessment information. This is possible only when the teacher elicits, and makes explicit, evidence of student learning. The process of handling student feedback as evidence of learning is highly dependent on context. This is because each student's individuality emerges within the larger social and cultural system.

Therefore, it is unnecessary to visualize an “objective” or generalized reality that ‘works’ for all Japanese people. The subjectivity required for individuality to exist means that it is necessary to learn about the *essence* of student learning.

In addition, by abstracting the record of practice using frames extracted from the cultural context, the tacit knowledge of lesson study can be made visible. From the results of this study, what the teachers are doing at the 2nd layer in Figure 5 is also being done by students’ peers. In other words, this was a peer assessment.

In recent years, there has been a movement to delve into formative assessment from new development in cybernetics, peer assessment being one such example.

However, the context that formative assessment relies on is the sociocultural context, which has the drawback that it is difficult to obtain concrete evidence. It is even more difficult to articulate in Japan, where daily cultural activities are supported by tacit knowledge through high-context communication, and ongoing practice is improved through reflection. Therefore, based on findings from school and classroom observations, we have proposed an abstract framework of *kizuki* as a feedback loop and a layer focusing on cultural code words from the Japanese jargon. To this *kizuki*, we have now added a new angle, *nakama*, which is similar to peer, and have decided to approach the *kizuki* from the qualitative research methodology of coding from personal narrative data. It has become clear that *nakama* support *kizuki* because we found that the presence of *nakama* makes the students *kizuki*. This approach provides clues that support a vertical approach not found in the West (Barnard 2013), which extends beyond the classroom to a school-wide approach that transcends grade levels and subject areas, and provides a path toward clarifying the collective efficacy. We would like to incorporate cybernetics as a perspective that considers how to assess and design feedback loops between the elements that compose a complex system.

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9. Author Contributions

Conceptualization, T.K., and M.A.; Methodology, T.K., and M.A.; Validation, T.K., and M.A.; Formal Analysis, Z.L.; Original Draft Preparation, T.K.; Visualization, Z.L.; and Supervision, M.A. All authors have read and agreed to the published version of the manuscript.

10. Declarations

The authors declare that they have no competing interests.

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