

Ambiguous tacit knowledge with a thematic focus based on Japanese social culture: An excellent source of qualitative data analysis and interpretation for systematic search of meaning

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Ambiguous tacit knowledge with a thematic focus based on Japanese social culture:

An excellent source of qualitative data analysis and interpretation for systematic
search of meaning

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Abstract

Lesson studies have not been theorized from the Japanese perspective. Notably, Japanese lesson studies have come under increasing attention from educators in the West and throughout Southeast Asia since it was revealed outside Japan through the release of the Third International Mathematics and Science (TIMSS) video study (Stigler & Hiebert 1999). Western scholars have argued that lesson study is undertheorized despite its long history in Japan (Elliott 2012). They argue that “much of the theory behind lesson study is implicit, and also bound up with wider beliefs about teaching and learning” (Stigler & Hiebert 2016). A chronological analysis of the research literature of the last two decades shows that lesson study has been extended to either assessment or to organization and community. Therefore, I focused on the diagnostic assessment data (1985) with a distinctive school research theme from a nationwide survey, noting that the practice is a school-wide cultural practice supported by qualitative data with a school research theme as well as classroom teaching. This thematic ambiguous tacit knowledge is based on Japanese social culture. More specifically, Lewis (2002, p. 31) remarks that if formative assessment practices—or indeed any innovative practices are to be developed and continuously improved using Lesson Studies—educators need to agree upon a shared goal for improvement. This approach is usually called a “research focus,” “research theme,” or “important aim” and should also involve collecting evidence of student learning. The process of evidence collection is at the core of the formative assessment process and of Japanese lesson study. Presently, the science of improvement within organizations has been proposed (Lewis 2015, 2016); In the process Stigler and Hiebert discovered the extensive use of lesson study in Japanese primary schools as a school based research method for securing consistency between learning goals and teaching methods (Elliott 2019); moreover, it is clear that an important function of the “formative interaction” (Black & Wiliam 2009) is to make the experiential tacit knowledge that is “hidden” within the learner transparent, explicit, and available (cf. Polanyi). Instead, organizations should make tacit knowledge explicit by focusing on the creation of a “knowledge culture” that encourages learning

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and the creation and sharing of knowledge. The second contention, that tacit knowledge is both an outcome of experience-based learning and as a basis for continuous learning, is an important understanding that logically arises from the experiential acquisition of knowledge. The connection between experiential (tacit) knowledge and the internalization of new knowledge is later discussed in this paper and is a central theme in self-regulated learning (SRL), as emphasized in the Japanese literature on organizational innovation (Nonaka 1994; Nonaka & Takeuchi 1995). Therefore, in this study, we show how to make this tacit knowledge explicit and accessible using coding techniques.

Keywords: tacit knowledge with curriculum assessment in classroom, multiple feedback, School-based lesson study initiative, vertical loop within SBPLC (School-Based Professional Learning Community)

1. School-based Lesson Study Initiatives, Curriculum Development, and Assessment

One of the conclusions drawn is that assessment is a matter of culture, as indicated by the following remark: *"I would have liked to learn more about Japanese cultural aspects that, as I sense, could be conducive for successful implementation of AfL" (Israel)*. Another noteworthy comment about the relationship between culture and formative assessment is as follows: *"I think you are right that certain aspects of Japanese culture, such as a belief in kaizen, would be especially supportive of the development of formative assessments. Indeed, many aspects of formative assessment are already incorporated into Japanese lesson study, although they are often not well developed" (United Kingdom)*. Kaizen refers to the Japanese concept of continuous improvement through profound introspection, and it is one of many values deeply rooted in Japanese culture and therefore affects teaching and learning in Japan. (The International Symposium on Classroom Assessment and Assessment for Learning (AfL) held on April 8–12, 2014, in Fredericton, New Brunswick, Canada)

School-based curriculum development (SBCD) in the UK moved toward AfL practice from a school-wide perspective and pedagogy. Elliott says the following: *The idea of action research in the field of education emerged in the United Kingdom (UK) in the context of school-based curriculum development during the 1960s. At the time, curriculum development was perceived to be a solution to a widespread problem in basic education, namely, the alienation of large numbers of students in secondary schools from a form of schooling which emphasized the systematic transmission of bodies of knowledge organized around the 'subjects' taught in the universities. Following the 1944 Education Act, secondary modern schools were created for the 'non-academic'*

student, judged to be of only average or below average academic ability, on the basis of their failure to pass the 11+ IQ tests for entrance into the secondary grammar schools. Students in these schools followed a watered down curriculum modelled on the academic subjects taught in the grammar schools, with the addition of highly gendered practical craft subjects, e.g., metal and woodwork for boys and home economics (cookery and needlework) for girls. Those who passed the 11+ were prepared in the grammar schools for academic examinations at 16 years, and those with the best passes proceeded to specialize in a narrower range of academic subjects for further examinations at 18 years. The latter provided a passport into university.

The researchers of SBCD by action research were involved in the World Association of Lesson Studies (WALS) conferences at the initial stages around 2007 (Elliott 1997; Marsh 1990). Elliott moved his focus toward Lesson Study (Elliott 2001–4, 2019); during these periods, he also continued to show the matter of pedagogy in cultural contexts (Alexander 1999; Zyngier 2016), influenced by Stigler and Hiebert (1999).

Here, I posed a research question: How did Japan transition from mechanical, memorization-based learning to inquiry-based learning? So, I would like to answer this research question. In fact, we can set a working hypothesis that the school has carefully, on its own, conducted in-school research, maintained, created, and transmitted tacit knowledge. The problem is that this has been done unconsciously and practitioners, policymakers, and researchers have taken it for granted.

2. Learning Organization, Organizational Learning, School-based Professional Learning Community (SBPLC), and Assessment

The author noticed the importance of the socialization, externalization, combination, and internalization (SECI) model. It is a widely recognized knowledge-creation model postulated by Ikujiro Nonaka in Knowledge Management (KM) from the Lecture of DH Hargreaves in the Cambridge M.Phil course (1995) and his keynote speech at the International Congress for School Effectiveness and Improvement (ICSEI) held in Sydney (2000). Specifically, research on SECI explains spiral generation, interaction, and transference of tacit and explicit knowledge in organizations (Cheng 2019).

I also noticed Costa and Kallick (1995) when I heard their lecture in 1994. Since then, I have kept in mind the importance of Organizational Learning, Learning of Organization, and Professional Learning Community (Keamy et al. 2012; Kohlbacher et al. 2017; Senge 2001) as well as expansive learning and activity theory (Engestrom 2001, 2008).

I have also observed Lewis's work (1995) in the context of the School Improvement

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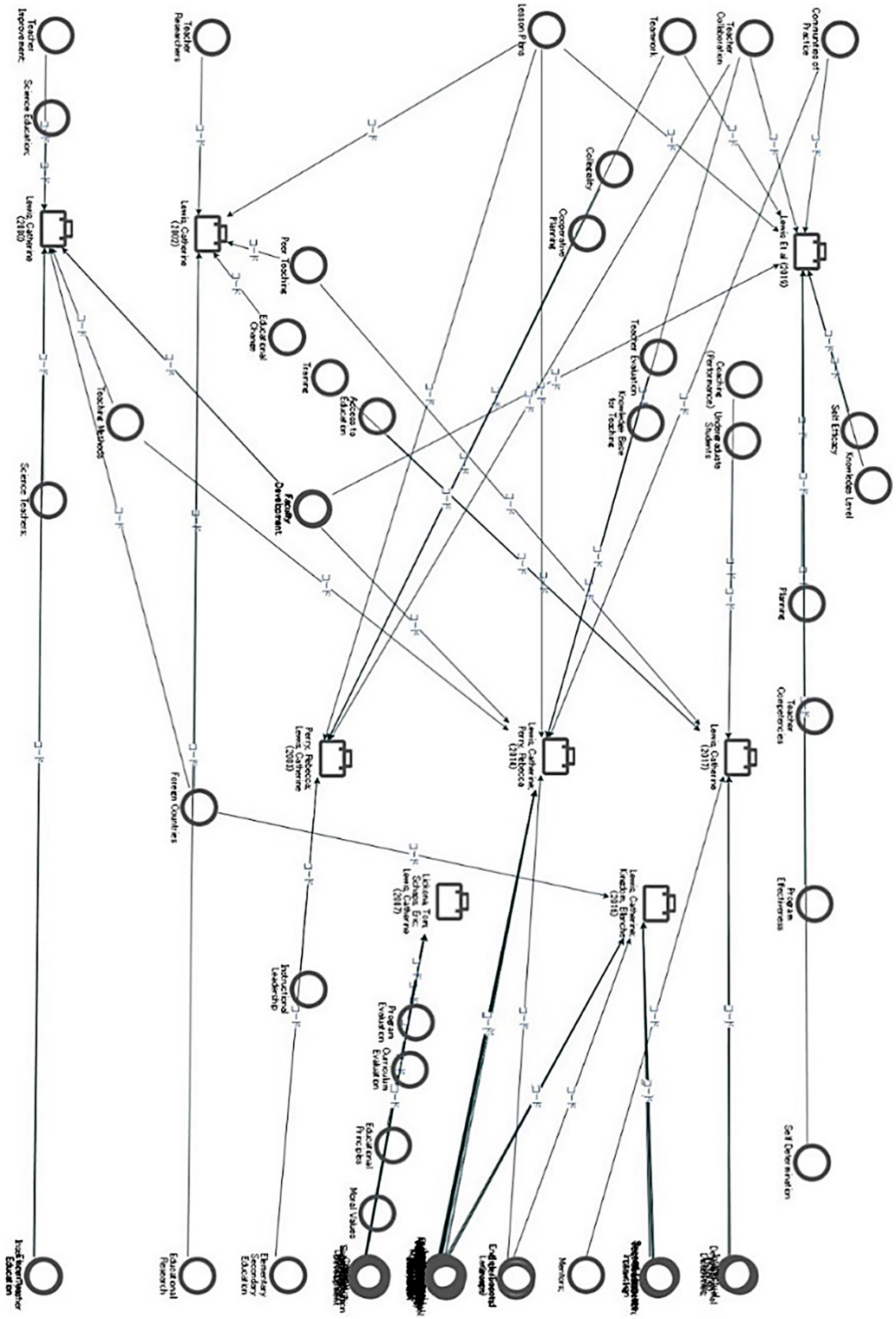


Figure 1 Chronological literature review of Catherine Lewis' articles (sample)

Conference in the 1990s. Therefore, I invited Lewis and her family to Beppu hot springs along with school visits and lesson study in 1999.

Lewis (2002, p. 31) remarks that if formative assessment practices, or indeed any innovative practices are to be developed and continuously improved using Lesson Studies, educators need to agree upon a shared goal for improvement. This is usually called a “research focus,” “research theme,” or “important aim” and also involves collecting evidence of student learning. The process of evidence collection is at the core of the formative assessment process and of Japanese Lesson Study. Therefore, the School Research Theme (SRT) supports the implementation of AfL and quality criteria, which could receive much attention from abroad. The significance of SRT is indicated by the Lesson Study of math education alone (Takahashi 2014).

Literature reviews (Lewis 2000–19) in chronological order are shown in Figure 1. A chronological analysis of the research literature of the last two decades shows that lesson study has been extended to assessment on the one hand and to organization and community on the other.

3. Restoration of ism Data from 1985 and Its Follow-up Study after 36 years of Change: Is It Behavioral Scripts Only?

The transition to the primacy of practice is driven by a behaviorist cultural script that links its particular manifestations in different national contexts to a general trend. This script maps out a process of education, the purpose of which is students’ attainment of pre-specified measurable learning outcomes in the form of “behavioral objectives.” The “objectives model” serves as a basis for assessing both students’ learning and teachers’ teaching (Elliott 2018).

In contrast, the sociocultural aspects of assessment are strengthened (Gipps 1999).

Regarding accountability, the point of departure in Japan is completely different from that of Western countries (OECD 2011, 2012; van Wolferen 1994). In the process Stigler and Hiebert discovered the extensive use of lesson study in Japanese primary schools as a school based research method for securing consistency between learning goals and teaching methods (Elliott 2019)

In Japan, from 1982 to 1988, the author conducted a nationwide “School Research Diagnostic” project based on the “School Research Theme” of “Distinctive Schools.” As a result, data from 286 out of 437 schools (65% recovery rate) were obtained. The author has continued to investigate and

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examine the data as a follow-up study for more than 30 years. The results of the survey have been reported in the case of Akita Prefecture (Arimoto & Lang 2016, 2020, 2021).

The 1980s are important because Japanese teachers were in practice beginning to feel the limitations of behaviorism. Given this, we had a research project of 学校研究 School Based lesson study, curriculum, and assessment 診断評価 evaluation and assessment as school-centered innovation. Therefore, we conducted follow-up research for almost 40 years (Arimoto 2018, 2019; Arimoto & Lang 2021).

Subsequently, I focused on the diagnostic assessment data (1985) with a distinctive school research theme from a nationwide survey, noting that the practice is a school-wide cultural practice supported by qualitative data with a school research theme as well as classroom teaching. This thematic ambiguous tacit knowledge is based on Japanese social culture.

4. Update the Present Methodology of Qualitative Data from Sociocultural Scripts as Tacit Knowledge

The aforementioned philosophical essence determines the value that teachers, administrators, and policymakers place upon discourse, identity, and social power (taken together the term “voice” seems appropriate). The notion of “voice” impacts how teachers structure learning interactions or feedback with and among students. Effective feedback, which forms the core of formative assessment practice and SRL (see Figure 1) occurs when learners are encouraged to articulate their tacit knowledge (existing motives, ideas, opinions, beliefs, and knowledgeable skills). In their Finnish study, Voogt and Kasurien (2005) emphasized the importance of tacit knowledge with the following: *“Formative assessment may consist of hard data, but more often and more importantly of ‘tacit knowledge’, i.e. knowledge that both the teacher and student obtain through discussion, reflection and experience”* (p. 154).

It is clear that an important function of the “formative interaction” (Black & Wiliam 2009, p. 11) is to make the experiential tacit knowledge that is “hidden” within the learner transparent, explicit and available (cf. Polanyi). Matthew and Sternberg (2009) emphasize that tacit knowledge is *“deeply rooted in action and context, and can be acquired without awareness and is typically not articulated or communicated”* (p. 530). In the formative classroom, tacit knowledge is made explicit and accessible through active participation and mutual discourse. McInerney (2002) suggests that the process of making learners’ knowledge visible should not be one of *“extract[ing] knowledge from within...to create new explicit knowledge artifacts”* Instead, organizations should make tacit knowledge explicit by focusing on the creation of a “knowledge culture” that

encourages learning and the creation and sharing of knowledge (p. 1014; cf. Black & Wiliam). The second contention—tacit knowledge is both an outcome of experience-based learning and as a basis for continuous learning—is an important understanding that logically arises from the experiential acquisition of knowledge. The connection between experiential (tacit) knowledge and the internalization of new knowledge is discussed in detail later in this paper and is a central theme in SRL, as emphasized in the Japanese literature on organizational innovation (Nonaka 1994; Nonaka & Takeuchi 1995), applied to US military and university settings (Matthew & Sternberg 2009) and as a key feature of global professional practice (Sternberg & Horvath 1999). While the literature on tacit knowledge typically arises from adult vocational settings, the theory of formative assessment applies the notion of a “knowledge culture” to schools and younger learners. This approach decreases the external risks and increases the intrinsic benefits learners associate with their learning environment, the circumstances required for learners to move toward mastery of SRL strategies. There are three aspects of feedback, which when taken account of have the potential to impact meta-cognitive and affective (self-efficacy) functioning, revealing otherwise recondite knowledge among learners, which facilitates the acquisition of SRL strategies.

The theory of formative assessment expresses the need for sustained peer engagement phases. Although the learning activity that mediates the collaboration is the same for each participant, each one possesses unique tacit knowledge (cf. Polanyi) as a result of their different life trajectories. During open and spontaneous discussions, which make their thinking visible students more readily integrate ‘formal’ knowledge gained through direct instruction into existing tacit knowledge (Bartlett 1932; Yin et al. 2008). The Hungarian born scientist and philosopher Michael Polanyi (1891–1976) and Donald Schön (1930–1997), wrote on the personally empowering nature of tacit knowledge, “it is personal, in the sense of involving the personality of him who holds it···but there is no trace in it of self-indulgence···His act of knowing exercises a personal judgment in relating evidence to an external reality, an aspect of which he is seeking to apprehend’ (Polanyi 1967, pp. 24–25). The personal nature of tacit knowledge motivates students because in a formative assessment classroom, their personal beliefs, opinions, and even their guesses are valued. This creates a strong sense of self-efficacy, one of the two main requirements for SRL among students (Bandura 1986; Zimmerman 2000, 2002). The social context edifies and personalizes the learning experience of each student. Schön (1987) expressed the same idea slightly differently, noting that learners relate to academia when they are guided to realize that they too, hold opinions and theories on similar themes, “*they tend to think differently about the theories offered by researchers when they realize that they hold comparable tacit theories of their own*” (p. 324). Polanyi (1967) and Schön (1987) emphasize the formative and reflective purpose of discourse in a social context characterized by an open community where ideas and opinions are

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exchanged, and differences are seen as opportunities to co-construct shared meanings. It is the variability in their experience that makes it possible for students to scaffold each other's understanding in at least some aspects of the activity. Viewed in this light, it is clear why Vygotsky emphasized the role of joint activity in development and wrote of its potential to enable learners "to go beyond themselves" with the assistance of more expert others (Clark 2012).

To access this tacit knowledge, I would like to establish a methodology for case studies and coding methods for cultural activities in Japan. Here, I would return to Jackson et al. (2021) and Saldaña (2009) on coding such as Nvivo.

A code is an abstract representation of an object or phenomenon (Corbin & Strauss 2008, p. 66), and it is most often a word or a short phrase that symbolically assigns a summative, salient, essence-capturing, and/or evocative attribute for a portion of language-based or visual data (Saldaña 2013, p. 3, 2016, p. 4).

Coding in qualitative research, in its simplest sense, is a way of indexing the data to facilitate later retrieval as singular concepts (e.g., cultural stereotyping) or constellations of concepts (e.g., cultural stereotyping, employee guidelines, and retention).

This is because the codes we create are inextricably connected to our worldviews, *"implicitly or explicitly, they embody the assumptions underlying the analysis."*

Use questions of the text to generate codes: Who, what, when, why, how, how much, what for, what if, or with what consequences? Asking these kinds of questions will help ensure the thoroughness of coding.

The Organisation for Economic Co-operation and Development (OECD) seminar of curriculum development (1974) proposed the Rashomon Approach by James Atkins. Notably, like the characters in director Akira Kurosawa's classic film *Rashōmon*, multiple realities exist because we perceive and interpret social life from different points of view.

Documents are "social products" that must be critically examined because they reflect the interests and perspectives of their authors (Hammersley & Atkinson 2019, p. 125) and carry "values and ideologies, either intended or not" (Hitchcock & Hughes 1995, p. 231). Official documents in particular "make claims to power, legitimacy, and reality" (Lindlof & Taylor 2019, p. 299) and should be analyzed not only for the information they provide but also for the cultural representations they suggest and the embedded action they imply (Holliday 2016, p. 78).

Dey (1999) critically posits the following: *"With categories we impute meanings, with coding we compute them" (p. 95). To some, code is a 'dirty four-letter word'.* A few research methodologists perceive a code as mere shorthand or an abbreviation for the more important category yet to be discovered. Unfortunately, some use the terms code and interchangeably when

Category	Cultural code	Cultural script
Family script	<ul style="list-style-type: none"> The teacher calls students "sons" The teacher accepts errors, saying "It's OK to get it Wrong." 	A feeling of unity and family atmosphere is formed, and individual students are regarded by the teacher as human beings of equal status
Institutional script	<ul style="list-style-type: none"> The teacher is segmenting the lesson time and giving direction to students' actions, as asked The whole class group, and individual tasks are given as per the teacher's lesson plan 	The teacher and learner acknowledge each other, and within the structured time and space, they each follow their own specific roles. The students' learning unfolds based on the teacher's directions
Behaviorism script	<ul style="list-style-type: none"> The teacher gives students tasks, and evaluates students by giving individual scores The winner receives chocolate 	Exercises are conducted and students compete individually. The teacher announces the results and praises the winner
Constructivism script	<ul style="list-style-type: none"> The teacher utilizes ICT tools to link symbolic descriptions and graphic representations on a screen When explaining the solution method, the teacher focuses on the image of the graph 	Providing and explaining information encourages individual student thinking and places emphasis on the understanding of both concepts and procedures
Social constructivism script	<ul style="list-style-type: none"> The teacher incorporates group work and each group is given a task By giving each group one worksheet to share, the teacher encourages cooperation between group members 	The group collaborative learning style incorporates different questions for each group. Students work collaboratively to find answers to questions

Figure 2
The cultural code and cultural script of the mathematics lesson

Figure 2 The extracted cultural code and cultural script of this case study (Arani et al. 2017)

they are, in fact, two separate components of data analysis. I advocate that qualitative codes are essence-capturing and essential elements of the research story that, when clustered together according to similarity and regularity (i.e., a pattern), actively facilitate the development of categories, and thus the analysis of their connections. Ultimately, I like Charmaz's (2014) metaphors for the process when she states that coding "*generates the bones of your analysis. ... [I]ntegration will assemble those bones into a working skeleton*" (p. 113).

Jackson et al. (2021) profiled 29 first-cycle coding methods. (See Appendix 1)

Accordingly, five scripts exist as conglomerates in the lesson. The authors focused not on which scripts had the greatest effect in this conglomerate, but rather the integral nature of the conglomerate—that is, the way in which each script was incorporated into it. In other words, the fact that various views of lessons and teaching materials were historically and culturally embodied by the teacher and existed alongside each other even when partially in contradiction with each other, is a fundamental characteristic of the cultural practice of this lesson. In revealing the cultural script, as we aimed to understand the situations in the lesson as a cultural conglomerate, we did not concern ourselves with a hierarchy between the scripts or with the strength of the effect of each. The fact that the scripts exist alongside each other has already contributed to our understanding of the layered structure of the lesson. However, in the following example, the two scripts do not simply coexist but are actually observed in a symbiotic relationship with each other. This is when one situation (cultural code) is affected by various background factors (cultural scripts). For instance, in the lesson, the teacher has the students work on a learning task individually and awards a prize of chocolate to the best five participants. If we consider the chocolate to be a reward for a successful learning outcome, then a "competition script" is observed. However, if we ask ourselves why the teacher decided to award students in this way and how the students reacted, we can further

understand the decisions adopted by both parties. Perhaps the teacher had predicted the initial reaction of the students to share their awards with their group. This further indicates a homelike “family script” based on the evaluator and assesses the teacher-student relationship. Figure 2 provides further details regarding this point. This may be an unexpected reception for an outside observer to see that the five best students who receive the chocolate normally share it with their friends in their group rather than keeping it to themselves (Arani et al. 2017).

Alternative ideas on cultural scripts can be proposed by the author (see Appendix 2). These efforts are based on jimae-shugi (self-efficiency) culture (Mente 1997), which is becoming more widely understood in Japan as a process that facilitates the reflection on and expression of one’s tacit knowledge at the organizational level.

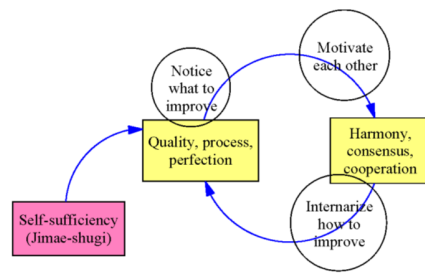


Figure 3 Double-loop multiple feedbacks and thematic tacit knowledge in assessment (Author)

As for the cultural script, the following tentative script can be considered in relation to training:

The recording of the child's appearance as training and the interpretation of the material through reflection will give depth to the interpretation of the material, and the child's STORY will be created by devising a way to present it.

In particular, the authors focus on public schools in Toyama City with a history of holding open research class presentations. They have done so every year for 94 years, since 1915. The schools have maintained and sustained the mechanism of “whole-person” (*zenjin*) education by sharing “explicit knowledge” such as written records. These are essential and bind the school organization of teachers, students, parents, administrators, etc. Of greater interest to the educator is “tacit knowledge” as it delivers particular and unique advantages to a school’s research agenda. It is very difficult to replicate because tacit knowledge resides within people and is a part of a person’s identity. As such, the general challenge for schools and organizations is to construct a “knowledge culture” that reveals individuals’ tacit knowledge and makes that knowledge “explicit”



Figure 4 The teachers' room as a place for knowledge generation (photo courtesy of Masani, Ryosuke)

to the individual, the group, and the organization. When tacit knowledge is made explicit in the classroom, it is evidence of learning and valuable feedback for more discussion, which then creates further evidence of learning. This paper provides a theoretical and empirical analysis of the classroom and school processes associated with the collection and use of learning evidence.

Often, the setting for these connections is the teachers' room (staff room), which has specific features that foster discussions of *kyozai kenkyuu* (study of teaching materials) and *kodomo-kan* (view of the child). The teachers' room is a central gathering place for the efficient exchange and communication of necessary information among all teaching staff. This space fosters the development of collegial relationships as teachers work in the company of colleagues with various years of teaching experience, subjects, assigned responsibilities, and personalities.

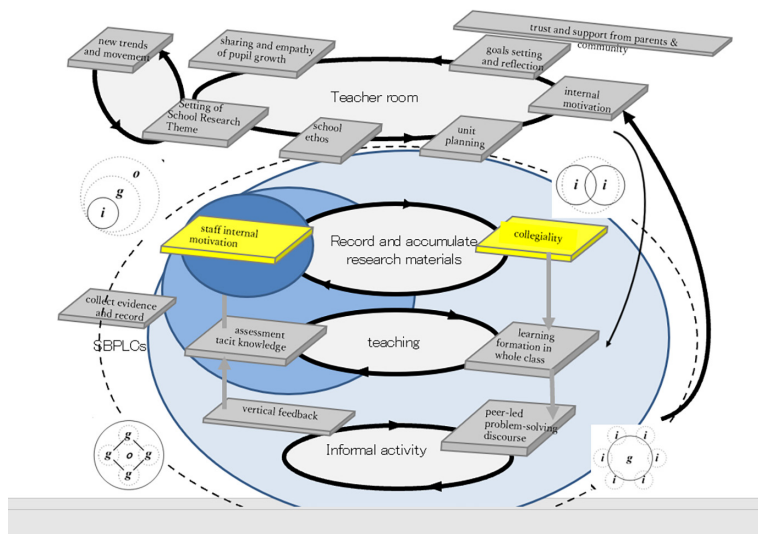


Figure 5 Jimae shugi (self-sufficient) culture (Author)

Ambiguous tacit knowledge with a thematic focus based on Japanese social culture:

1. *It is good not to say to other people all that I think.*
2. *Often, it is good not to say anything to other people.*
3. *When I want to say something to someone, it is good to think before I speak.*
4. *I cannot always say to other people what is on my mind because something bad could happen because of this.*
5. *If I say many things to people, they may think something bad about me and it could then make me feel bad.*
6. *When I want someone to know what I think/feel, I do not have to say it to this person and instead I can do something else*
7. *It is good if I can know what another person feels/thinks/wants because then this person does not have to say anything to me.*

Scripts of this kind are recognizable to all students of Japanese culture, even if they have never seen them stated in this form; notably, they capture, in a simple and concise form, generalizations alluded to in nearly all studies of the Japanese ethnography of communication. For example, Script 7 corresponds (in part) to the fundamental Japanese ideal of *omoiyari*, which Lebra defines as follows:

Omoiyari refers to the ability and willingness to feel what others are feeling, to vicariously experience the pleasure or pain that they are undergoing, and to help them satisfy their wishes. (Lebra 1974: 38)

Like other commentators, Lebra stresses the crucial importance of this empathetic understanding to occur without verbal communication (for a detailed discussion, see Travis 1992). For Lebra, the idea of *omoiyari* is so essential to Japanese culture that she does not hesitate to characterize the culture as a whole as an "omoiyari culture" (Lebra 1974). The importance of this concept is also reflected in educational guidelines, where a key role is played by the slogan (Nakatsugawa 1992).

Omoiyari no kokoro o taisetsuni shimashoo.
"Let's treasure the mind/heart of omoiyari."

It is also significant that in a reader's column in Japanese newspapers, where readers can place a photo of their child and state their wishes and expectations, one of the most common wishes is this (Nakatsugawa 1992):

Omoiyari no aru hitoni nattene.

"Please become a person who has omoiyari."

Since the ideal of "*omoiyari*" is quite alien to Anglo-American culture, scripts such as the seventh one are clearly not included among the shared American norms and expectations.

Conversely, implicit messages (cf. Kitayama & Markus 1992) sent by Anglo-American culture to those who are immersed in it include the following, which are reflected in a wide variety of ethnographic data and can be recognized by any student of American culture:

8. *Everyone can say something like this to other people: "I think this," "I don't think this."*

9. *It is good to say to someone what I think.*

10. *It is good to say to someone what I feel.*

The first of these scripts reflects the cherished Anglo-American assumption that everyone has the right to express their opinions, the second one reflects the value placed on Anglo-American tradition on the free expression of opinions, and the third one, the cultural value of verbalization and an "open," "honest" expression of one's feelings (cf. Carbaugh 1988; Katriel & Philipsen 1981). None of the norms stated in the three scripts above (8, 9, and 10) are present in Japanese culture. On the contrary, evidence suggests that Japanese culture includes norms that are very different from, and in some cases diametrically opposed to those stated in 8, 9, and 10, namely 11, 12, and 13:

11. *I cannot say something like this to other people: "I think this," or "I don't think this."*

12. *It is good not to say to other people what I think.*

13. *I cannot say what I feel. (For a detailed discussion, see Wierzbicka 1991)*

Cultural norms such as 8, 9, 10, 11, 12, and 13 are quite general in nature, and they all require further specifications, provisos, and supplementary statements, which cannot be discussed here for reasons of space. However, the contrast in the cultural emphasis is very striking. The popular American assertiveness training has the goal "to teach people to express their thoughts and feelings explicitly in words, rather than relying upon indirect or nonverbal messages" (Clancy

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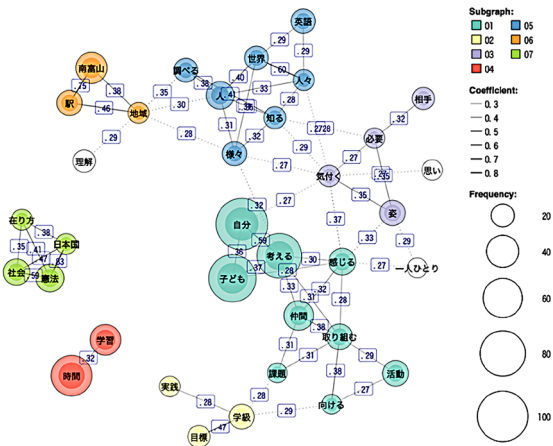
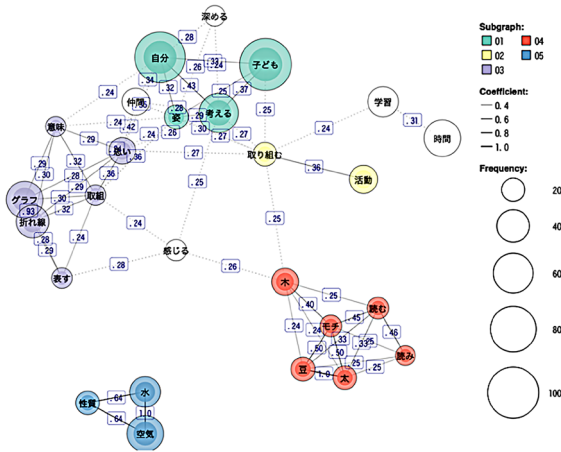
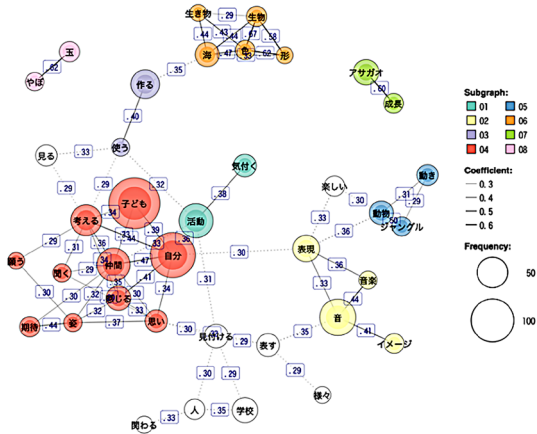


Figure 6 The interpretation from transcription from each classroom teacher

1986, p. 217), whereas the Japanese "empathy training" (*omoiyari* training) teaches participants anticipate and understand each other's feelings, wishes, and needs without verbal communication (Wierzbicka 1994).

In this way, the internalization of the theme is visualized through the organizational "*kata*." In this context, what can be found as an alternative and unique cultural script is as follows.

"As part of teacher training, In this context, what can be found as an alternative and unique cultural script is as follows.

"As part of teacher training, documentation and reflection on the child and peers adds depth to the interpretation of the material, and by devising ways to present the material in the classroom, the child's story is created. From the practical "frame" of the view of the teaching materials and the view of the children, which is commonly included in the teaching plan, I tried to analyze it through the records and discussions that each of us wrote in our own context using the KH coder software.

Each of the teachers who practiced the lessons compiled a lesson practice paper. In order to understand the trends in practice, we used KH Coder's "co-occurrence network" command to draw a network of lines connecting words with similar patterns of occurrence (i.e., words with a high degree of co-occurrence) in the lower grade (grades 1 to 2), middle grades (grades 3 to 4), and upper grades (grades 5 to 6). We drew a network of lines connecting words with similar patterns of occurrence (i.e., words with strong co-occurrence) in each text (Figure 1, Figure 2, and Figure 3). In the analysis, the minimum number of occurrences was set to 15 for the selection of words by the number of occurrences, and the number of drawings was set to 60 to narrow the co-occurrence relations to be drawn.

In Figures 6-1, 6-2, and 6-3, the stronger the co-occurrence relation, the thicker the line, and the larger the circle for words with more occurrences. The color coding of words (nodes) is based on "mediation centrality" (indicating the degree to which each word plays a central role in the network structure), and the order of centrality increases from white to darker colors. For the excerpts, we used KH Coder's KWIC (concordance) command to determine the context in which each word was used.

Findings:

One major finding is that there is a strong correlation between the three words "*Jibun*" ("self"), "*Kangaeru*" ("think"), and "*Kodomo*" ("child") across the grades, indicating that lesson study on the theme of "opening oneself up" tends to emphasize "children's own thinking." The following are texts which feature characteristic expressions:

Ambiguous tacit knowledge with a thematic focus based on Japanese social culture:

- *In this way, children are creating their lives with both expectations and anxiety, thinking about how to improve themselves in their daily lives, and finding the necessity and meaning of learning at school. (Grade 1. Miyake Class)*
- *As they proceed with the activities, making paper lanterns, and playing with their peers, they realize that there are different ways of seeing, thinking, feeling, and doing things, and they search for their own ways of doing things. (Grade 2. Oki Class)*
- *They will read and savor the true courage and kindness that grows in the hearts of people who do the best they can while mobilizing their own values and lives. (Grade 3. Sawai Class)*
- *We hope that the students will take a closer look at what is important in their current lives and try to put it into practice in their own way. (Grade 6. Ishino Class)*

In addition, the relationship of searching for one's own way of life through connections with peers also seems to exist in lesson studies. For example:

- Children who have both expectations and anxiety about living in a school for the first time, but who are increasing the number of things they can do every day with the courage and stimulation of their peers. (Grade 1. Morimoto Class)
- While appreciating the work of their peers and working together, the students try to seriously confront the works that are created by working positively in their own way. (Grade 1. Oka Class)
- They try to think of ways to express themselves, for example, by comparing themselves and their peers on a single graph. (Grade 4. Umakoshi Class)
- Reflect on the notebooks in which they have written down their knowledge and the feelings they have developed, summarize the progress of their study in their own way, and share it with their peers. They will notice their own changes in the way they relate to and perceive living things and will become more interested in natural phenomena. (Grade 5. Ono Class)

Furthermore, as students move up through the grades, the range of "Nakama (peer)" seems to expand from classmates to people in the community and people from other countries. This expansion of the range of peers may indicate a certain kind of sociocultural cognitive development. Some specific examples are as follows:

- By overlapping the growth of the morning glory with the growth of their own peers, they can confirm their response to learning. (Grade 1. Akai Class)
- By listening to each other's perceptions and thoughts about plastic arts activities, they will broaden their own views and warmly accept their peers. (Grade 2. Nagai Class)
- They are starting to become aware of the broader connection from the self-centered point of

view. (Grade 5. Hara Class)

- Through encounters with local organizations and learning about the efforts of the local government, they begin to put into practice what they can do for a sustainable Minami-Toyama Station. (Grade 5. Tanaka Class)
- As they improve their communication skills as a tool to learn about the world, they realize the importance of respecting and understanding each other. (Grade 6. Sugita Class)

5. Conclusion

It could be possible for people to learn together to co-create transformative activities oriented toward sustainability and the common good in lesson study (Appendix 3). This can be accomplished by using fourth generation activity theory, which is about alternatives to capitalism, claiming that the contradictions of capitalism threaten the very possibility of life on our planet (Engeström 2015).

Toyama is famous for its medicines, especially with regard to first use and later benefit (*senyou kouri* = use first, pay later). Yet, it still has a sociocultural tradition of being an irreplaceable customer, supported by the bonds of commerce. We would like to take a sociocultural and historical approach to this matter.

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Appendix 1 (Saldana 2009)

Actions—things that are done at a point in time (e.g., Argue, Cheer, Laugh, Listen).

Activities: ongoing actions (e.g., Aging, Learning, Raising children, Supervision)

Beliefs, ideological positions, frameworks—intellectual positions (or discourses) that are evident in thinking and action (e.g., Honesty, Independence, Reason, Spirituality).

Context—the settings in which actions, events, etc. occur (e.g., Adolescence, Downtown, School, Work).

Culture—social behaviors and norms that are likely to have multiple sub-branches, depending on the type of culture (e.g., Art, Careers, Kinship, Technology).

Emotions—feelings (e.g., Anticipation, Gratitude, Joy, Sorrow).

Events—highly structured actions or rituals (e.g., Birthday parties, Recitals, Weddings, Vacations).

Issues—matters raised about which there might be some debate (e.g., Control, Ownership, Privacy, Transparency).

Narrative—such as the narrative features discussed in Chapter 3 (e.g., Contradictions, Omissions, Pronouns, Repairs).

People (or actors or entities) that are referred to or talked about—the locus or target of a comment, either specifically (e.g., Dr. Almos or My boss) or generally (e.g., Employees, Managers, Nurses, The industry).

Valences (also sometimes called sentiments or attitudes)—the participant's implicit or explicit response to a topic (e.g., a participant says or implies they are Conflicted, Negative, Positive, or Uncertainty about an event or action; or identify it as a Barrier or Facilitator to success).

Strategies—a purposeful activity to achieve a goal or deal with an issue (e.g., Making amends, Negotiating, Planning, Raising money).

Ambiguous tacit knowledge with a thematic focus based on Japanese social culture:

Appendix 2 (Jackson et al 2021)

First cycle and second cycle coding methods

FIRST CYCLE CODING METHODS	SECOND CYCLE CODING METHODS
Grammatical Coding Methods Attribute Coding Magnitude Coding Subcoding Simultaneous Coding	Grounded Theory Coding Methods Focused Coding Axial Coding Theoretical Coding
Elemental Coding Methods Structural Coding Descriptive Coding In Vivo Coding Process Coding Initial Coding Concept Coding	Cumulative Coding Methods Pattern Coding Elaborative Coding Longitudinal Coding
Affective Coding Methods Emotion Coding Values Coding Versus Coding Evaluation Coding	
Literary and Language Coding Methods Dramaturgical Coding Motif Coding Narrative Coding Metaphor Coding Verbal Exchange Coding	
Exploratory Coding Methods Holistic Coding Provisional Coding Hypothesis Coding Eclectic Coding	
Procedural Coding Methods Protocol Coding OCM (Outline of Cultural Materials) Coding Domain and Taxonomic Coding Causation Coding	
Methods of Presenting the Data Categorically Phenomenologically For Metasummary and Metasynthesis	

Appendix 3

Japanese Kaizen Script Example

kaizen 改善, kata 型, knead 練り上げ, notice 気付き, bond 絆, relationship 関係, connection つながり, life and surroundings 暮らしと周辺, participation and learning 参加と学び, confirmation 確かめ

-Kaizen 改善 = strengthen 強化, strengthen 強くする nurture 育てる, bring up to human level 人並みにする, train to be a craftsman 職人に叩き上げる, grow 成長, improve 向上, develop individuality 個性を伸ばす, polish 磨く, train 修練する, change relationship 関係が変わる, stable 安定, firm しっかり

-Kaizen 改善 = developmental progress 発達進歩, start over やり直す, step by step 一歩ずつ, slowly ゆっくりと, gradually だんだん, grow strong たくましく成長.

-Kaizen 改善 = Circumstances 状況 experience is alive 経験が生きる, medicinal 薬効, worth living for 生き甲斐, and value is demonstrated お陰で価値が発揮.

-Kaizen 改善 = Transformation 変革 rebuild 作りなおす, remodel 改造, modify 修正, change consciousness 意識改革

-Kaizen 改善 = Improvement of relationships 関係改善 and soft landing of problems 問題を軟着陸させる

-Kaizen 改善 = System organization 体制組織 review 見直す, redo 出直す, redo and redo やり直す

-Kaizen 改善 = Cracking down 取り締まり, fixing 直す, and modifying 手を加える

-Kaizen 改善 = Improving quality 質を高める