

**Katsuhiro Yamazumi**  
Kansai University  
kyamazumi@chat.kansai-u.ac.jp

**Learning through knotworking:  
An activity-theoretical study of pedagogical practices concerning the two  
great earthquakes in Postwar Japan**

**Abstract**

Learning for disaster reconstruction carried out by teachers and children in schools faces the fundamental contradiction of how tragic memories leaving deep scars can be told and shared, and the attempts to deal with this problem. In this paper, in order to approach the issue of whether an educational practice which overcomes this contradiction is possible, I carried out case study analysis of learning and education from earthquake experiences, based on the framework of activity theory. As the result of the analysis, it became clear that through learning for disaster reconstruction in school, children encountered various “providers of learning” outside school, and according to the connections they made, came to possess the possibility of creating new, mutually supportive cultures and lives.

**Keywords:** Disaster and school, learning for disaster reconstruction, activity theory, expansive learning, “knotworking”

**Introduction**

At 14:46 on March 11th, 2011, the moment the Great East Japan Earthquake happened, I was at our university in the Kansai area, and did not experience the earthquake directly myself. After that, the stricken area which came to my attention through media reports brought to

mind powerfully the Great Hanshin-Awaji Earthquake which took place at 5:46 on January 17th, 1995. At that time, I was at home with my family in Kobe's Suma Ward. It was in the violently suffered urban area which came to be called the "earthquake belt." Immediately after the earthquake, our house collapsed in a thunderous instant.

Of course, the natures of the Great Hanshin-Awaji Earthquake and the Great East Japan Earthquake were very different. The former was a huge metropolitan inland earthquake caused by an underground active fault, and the latter, as Yoshiaki Kawata (2011) has pointed out, was a "giant composite disaster" made up of an earthquake, a tsunami, and a nuclear disaster. Even so, both events called up similar feelings in me, and the latter gave me a strong sense of double vision. This may have been a sense or image of losing this world. Through the recent earthquake, I felt myself inescapably dragged back to the other earthquake of sixteen years before.

Both earthquakes brought sudden, unimaginable death and loss on every level, beginning with the individual and moving through families, schools, workplaces and other organizational sites, regions, and society as a whole; a whole range of people were left with deep scars. This paper considers the problem of how teachers and children at school can cope with the issues surrounding their experiences of these disasters, share them together, and make connections; it attempts to clarify the role and significance of learning and education from earthquake experiences.

For the survivors who live through the time after the great earthquakes, the experience of one's own suffering and pain is, in a way, "unsayable," "unable to be narrated." This is because words and telling seem impotent to present or re-present the event or past which one truly believes oneself to have experienced. Herein lies the impossibility of transmitting the true and inherent meaning of an experience.

Teachers' and children's learning for disaster reconstruction at schools comes up against the fundamental contradiction of how to tell and mutually share deeply tragic memories, which is a contradiction between "I want to remember" and "I don't want to remember," between "I want to tell" and "I don't want to tell," and presents a challenge. Here, in order to

approach the issue of whether a pedagogical practice that overcomes this contradiction is possible, this paper advances an analysis of three cases of this approach. These are the “Walking the suffered areas” activity at a high school in Kobe, Hyogo Prefecture, and the “Telling earthquake stories” practice at an elementary school in Ashiya City, Hyogo, both from the areas suffered by the Hanshin-Awaji Earthquake, and the “Education for Sustainable Development (ESD)” approach aimed at earthquake disaster reconstruction in Kesenuma City, Miyagi Prefecture, in the area suffered by the Great East Japan Earthquake.

In this paper, I plan to use the framework of *cultural-historical activity theory* (CHAT: here, activity theory) to support the analysis of learning and education from earthquake experiences. Activity theory is a framework which considers people’s social practices as a collaborative *activity system*, and tries to clarify the ideas, tools, and concepts which are used to redesign these innovative practices (see Daniels 2001; Engeström 1987, 2008; Sannino, Daniels, and Gutiérrez 2009; Yamazumi 1998, 2004, 2006; Yamazumi, Engeström, and Daniels 2005).

Below, as I will describe in detail, with analysis based on activity theory, it is possible to consider how the practice of learning for disaster reconstruction in schools can go beyond the systemic boundaries of traditional school learning and give rise to learning for the sake of creating a new life. As well, it is thought that through this kind of learning, it is possible to discuss how children encounter various communities and organizations as the “providers of learning,” or partners, outside of school to make connections and to create new mutually supportive cultures for disaster reconstruction in the region.

## **1. From inexpressible memory to the “Walking the suffered areas” activity**

Just as in the Hanshin-Awaji Earthquake, at the schools suffered by the Great East Japan Earthquake, from immediately after the earthquake and tsunami on, teachers and children worked desperately at urgent tasks which covered rescuing the children and confirming their safety, managing shelters and cooperating with various reconstruction efforts, dealing with mental care for the children through reopening schools and stabilizing daily learning, and so

on. At the moment, in the mid- and long-term aspects of educational activities, the important issues include how to approach the earthquake experiences which have tremendously affected children's mental states, and how to create new learning and education for reconstruction.

Beverley Raphael refers to the meaning possible in this kind of disaster experience thus: "Individuals frequently survive the most horrendous disaster experiences and continue to function as competent and capable human beings, even though the memories of what has happened remain" (Raphael 1986, p. 27). She continues,

All who experience disaster...can never be exactly the same again. But this does not mean their lives are worse. For even when there may be painful emotional scars, there may also be many new strengths and understandings that have resulted from mastery of the challenge. (Raphael 1986, p. 27)

A "survivor" is "someone who lives on afterward." For that reason, the children who were suffered by the earthquake must fold their "lived experiences" into a part of their own life story. To borrow Hisao Nakai's elegant comparison, this resembles "the way a pearl oyster uses its own excretions to turn a bit of its own grit into a pearl within itself," and "the experiencer [spins out again] their own experience as a part of the pattern of their own...historical tapestry" (Nakai and Isozaki 1998, p. 52).

The construction of this new story is done through "narrative." "Narrative" is "the fundamental scheme for linking individual human actions and events into interrelated aspects of an understandable composite" (Polkinghorne 1988, p. 13). Therefore, "narrative" can be seen as "the process of chronologically organizing 'changing' events, by introducing as an intermedium a context which mutually relates 'beginnings' and 'endings'" (Noe 1998, p. 50). For example, Ryuichi Narita (1996), in an analysis of historical narratives of the Great Kanto Earthquake of 1923, presents the narrative formats of "pitiful story" and "model story." However, is it really possible for the memories of disaster which leave behind deep sadness to be told, mutually transmitted, or shared through the fixed, ordered, standardized, typical

narrative format of the news media? (see Yamazumi and Yamazumi 1999). Are there not trouble and doubt, confusion and conflict?

Lisa Yoneyama, in her research on narrating experiences of the atomic bombing of Hiroshima, discusses the issue of “incommunicability.” When survivors try to re-present their experiences of the atomic bomb through speeches, they express a common feeling of “*Munashisa*” in Japanese or “the sense of hollowness and pointlessness” (Yoneyama 1992, p. 14). According to Yoneyama, the vital significance of this feeling is that it contains the issue of “loyalty to the original and essential experience” (p. 13). In short, survivors “remain mute so as not to fall into the abyss of an infinite chain of arbitrary interpretations which deprives the truth of their experience, the original essence of the event in their eyes” (p. 15). As a regular occurrence when trying to tell of events and experiences which brought deep sadness, words seem powerless to reconstruct the past which the teller believes him- or herself truly to have experienced.

In this way, teachers’ and children’s learning and education in schools from earthquake experiences must face a fundamental contradiction. In short, the attempt to practice disaster education is inevitably faced with the question of how to describe and pass on painful wounds and memories of loss, and how to overcome the cracks which appear between these and the pointlessness and sense of impotence regarding them.

Here, as a practice which took on these contradictions and struggles of learning for disaster reconstruction, I want to introduce the learning project “Walking the suffered areas” at Kobe Municipal Suma High School (now Kobe Municipal Suma Shofu High School) in Hyogo Prefecture (see Suma High School 1998; Yamazumi 2001, 2004). This year-long practice was carried out by high school students and their supervising team of teachers in 1997, two years after the Hanshin-Awaji Earthquake, in “Period for Integrated Study” (this period looks at interdisciplinary and cross-curricular themes for third-grade and older students, in addition to regular school subjects in Japan).

The “Walking the suffered areas” activity began in May 1997, as a field trip in the regions worst suffered. 320 students split up into groups of six or seven each and walked

around looking at shops and churches which had collapsed or burned in the earthquake, and the walls, “Kobe’s walls,” of buildings which had remained standing. Many students said it was the first time since the earthquake that they had walked through these areas. The students listened to the stories of storeowners in temporary shops, people living in temporary housing, church volunteers and so on. Immediately afterward, each group began creating poster newspapers, a project which lasted through October.

This kind of learning for disaster reconstruction actually contained conflict from the outset. For example, a teacher who was at the center of the activity expressed feelings to the students at a class assembly before the field trip in this way:

I just want you to see, I just want you to think, of the school at the center of the suffered areas once again as a symbol of the earthquake. ...**I don’t know what you can do.** But I want you to feel something and make use of it some way. ...**We, the teachers, are afraid of trying this too, but** a lot of us here will probably go on living in Kobe. For the sake of the people who died, too, I hope we can at least make something good out of this activity.... (Suma High School 1998, pp. 121-122)

As well, a student’s essay seems to express the uncertainty she, and probably many other students, felt at the beginning of the learning process (in fact, when this field trip was suggested at the class assembly, students’ reactions were extremely negative, along the lines of “Why are we going there, whose good idea was that, it’s boring to go where I live anyway, it’s just going to be tiring, I’d rather go to an amusement park, that kind of school excursion so embarrassing I can’t tell kids from other schools about it”).

Field trip this time was honestly not very fun. I didn’t lose anything in the earthquake. Not my precious family, not my friends, not my house. But it was because I think the people who lost even one thing must have had a really hard time. We visit the suffered areas. I didn’t want to go if I could help it. **Only I keep remembering that**

**time.** (Suma High School 1998, p. 29)

Here, the kind of “individually manifested doubt, hesitation and disturbance” by the teachers and students can be seen as the driving force which will lead to the “expansive learning” which Yrjö Engeström places at the center of activity-theoretical research (Engeström 1987, p. 322). “Expansive learning” is a model of collaborative learning for the purpose of more broadly controlling one’s own life and practical activities, transforming them, and collectively creating them. Through expansive learning the learners construct a radically new, broader, complex object and concept for their own activity, and through implementing this create a new practical activity to be realized (see Engeström and Sannino 2010, p. 2).

Hesitation and conflict such as the teacher’s “I don’t know what you can do. But I want you to feel something and make use of it some way,” and the student’s “Only I keep remembering that time,” are, conversely, what makes possible the kind of expansive learning which creates the new objects and concepts of this “what can we do?” activity in regard to the deep scars left by the violent experience of suffering a disaster.

After the field trip, scriptwriting for the class year play based on the earthquake disaster, “We won’t forget that day,” began in June; rehearsals took place during summer vacation and after school, and sets and props were built. At the school festival in October, this play was performed before an audience of local people, including some who had sheltered at Suma High School just after the earthquake. As well, the song cycle composed by a music teacher, “The walls of Kobe,” was sung with an adjunct soprano as soloist and the chorus club with volunteer teachers as a mixed chorus. Furthermore, a display on the shopping area visited during field trip was turned into a bazaar during the festival, selling trademark croquettes and donating the proceeds to the stores, while displaying poster newspapers.

At the three-year memorial of the earthquake on January 17th, 1998, teachers and students assembled in front of “the walls of Kobe” and, along with local residents, displayed their poster newspapers and artworks containing reactions to the earthquake disaster, and performed the song cycle “The walls of Kobe.” This memorial event was planned to let the

people of the suffered areas know about their activities. As well, they also collaborated with an FM radio station which had participated in providing local information to suffered residents, and took part in the municipal high schools' English speech contest with speeches describing their activities. In July 1998, a report on these practices, "Walking the suffered areas" by the 50th graduating class of Kobe Municipal Suma High School (Suma High School 1998), was published.

In this way, the yearlong learning activity "Walking the suffered areas" was begun by actually having the students "walk" through the suffered areas, and from these individual actions, collectively develop and create various collaborative activities after that. In this sense, the "Walking the suffered areas" activity created the kind of expansive learning discussed above. Expansive learning in schools has the following characteristics, according to Engeström: "The expansive learning approach would break the encapsulation of school learning by a stepwise widening of the object and context of learning" (Engeström 1991, p. 257). Traditional learning in school has become, as it were, "encapsulated," closed in by textbooks and classroom walls. Expansive learning transforms the activity structure of school learning from the inside, trying to create "networks of learning that transcend the institutional boundaries of the school" (p. 257).

The student's essay quoted above continues thus:

But when we actually went, people from the Sugawara market said "I'm glad you came. Take a good look around," and I felt ashamed of myself. I realized that even though these people had had a much harder time than I had, they were welcoming us so warmly, and **I was ashamed that I hadn't wanted to come.** (Suma High School 1998, p. 29)

In the change of this student, we can see the expansion of the "object" and "context" of learning created by the "Walking the suffered areas" activity. In short, the students' activity, mediated by actually "walking the suffered areas," has gone beyond textbooks or classroom

walls, or the scope of information given to them, and through encountering, touching, and empathizing with suffered people directly, has become connected to that real life and its painful struggles, thus expanding the “object” and “context” of learning. The voice that says “I was ashamed that I hadn’t wanted to come” goes beyond the discontinuity of experience and memory toward a shared connection of mutual telling, showing that the teachers’ and students’ expansive learning has emerged. In the next section, based on a case study of the approaches which an elementary school continues to practice 18 years after the Great Hanshin-Awaji Earthquake, I want to discuss further expansive learning with regard to earthquake experiences.

## **2. “Telling earthquake stories” and learning through “knots”**

The practice taken up during Period for Integrated Study at Ashiya Municipal Seido Elementary School, Hyogo Prefecture, of “Telling earthquake stories” is an earthquake learning activity which has continued since 2004, nine years after the Hanshin-Awaji Earthquake. Within Seido Elementary School’s district, roughly seventy percent of houses (1,874 out of 2,777) suffered complete or partial collapse, and 153 precious lives, including eight children and six parents, were lost. As well, because the damage to the school’s facilities and equipment was relatively light, it became an aid center, shelter, and temporary morgue. At the peak time, as many as 1,330 people were forced to use the school as a shelter.

Seido Elementary School has held a memorial ceremony every year on the anniversary of the earthquake, as an opportunity to rethink the “weight of life.” At the turning point of the ten-year anniversary, teachers and children tried out the following change in the nature of the ceremony.

There were a lot of transfer students, and fewer kids now remembered [the earthquake]. So, through an activity where, instead of the teachers planning and carrying out the ceremony as before, the children did it themselves, we hoped to deepen their learning of life, and have the kids carry it out as a part of the larger

process of their “Period for Integrated Study.” (Ashiya Municipal Seido Elementary School 2005, p. 141)

Thus, the sixth-graders’ learning for disaster reconstruction, with “making a Hanshin-Awaji Earthquake memorial ceremony themselves” as a new object and concept, began. There, based on the children’s interest in what they wanted to investigate and to do, and what they seemed likely to be able to do, the class was divided into groups. The homeroom teacher handed out themes and provided support for each group. The groups’ themes were as follows: 1) flower offering, 2) silent prayer, 3) the damage in the school’s district, 4) the school as a shelter, 5) the memorial prayer stone, 6) victims, and 7) the memorial ceremony itself (Ashiya Municipal Seido Elementary School 2005, pp. 141-142).

In this way, since 2004, the sixth-graders’ Integrated Study class has become a space for “Telling earthquake stories,” intending to learn from the disaster and pass on that learning. In this practice, each year “the sixth-graders pass on what they’ve learned about the disaster in the area to the fifth-graders” (Ashiya Municipal Seido Elementary School 2009, p. 48). As stated before, the children divide into groups according to their interests and collaborate on independent inquiry-based learning. In 2011, as seen in Figure 1, eleven themes were chosen as “what ‘stories’ to tell” (the way earthquakes work, the situation just after the earthquake, the damage and fear of the earthquake, the importance of life, the feelings of the suffered people, reconstruction from the earthquake, volunteer activities, cooperation, support from overseas, the memorial prayer stone, and disaster prevention). On the day of “Telling earthquake stories,” the sixth-graders held poster sessions by group to pass on what they had investigated and thought about earthquakes to the fifth-graders.



**Figure 1** What the “Telling earthquake stories” wants to tell

“Telling earthquake stories” creates a horizontal group learning across the class based on interest themes, as well as a vertical mixed grade learning pairing off sixth-graders with fifth-graders. However, all are children born after the earthquake, with no direct experience of it. How is it possible, then, for these children who don’t know the earthquake to “tell its stories”? I discuss this point in detail below.

During their learning for disaster reconstruction, the children of Seido Elementary School do not learn only within the scope of textbooks or the classroom. In their Integrated Study class, they begin with a visit to the Kobe City “Great Hanshin-Awaji Earthquake Memorial Disaster Reduction and Human Renovation Institution,” invite as guests teachers and graduates who were at the school at the time of the earthquake, and have opportunities to hear about the school’s situation at the time, the damage to the region, and feelings about the earthquake. As well, the children interview families of the children who died in the earthquake, the current principal and teachers, employees of the city disaster prevention division, and firemen.

In this way, just as at the practice of learning for disaster reconstruction at Suma High School, the Seido Elementary School “Telling earthquake stories” activity involves teachers and children cooperating with diverse partners outside school to create a collaborative, inquiry-based learning. This kind of learning for disaster reconstruction, if it uses the

developmental framework of activity theory, can be taken as generating a *hybrid learning activity* which goes beyond encapsulated traditional school learning and the limits of the narrow conceptualization of pedagogical practices to collaborate and interchange with outside communities and organizations, realizing and creating problems in the complex context of real life. At present, activity theory takes as its task going beyond the limits of a single activity system (for example, a school), to develop new conceptual frameworks which analyze and design boundary crossing among a variety of diverse activity systems (for example, communities and organizations within and without schools) and their mutual effects, networks, partnerships, dialogues, and collaborations, breaking through the boundaries of organizations, systems, cultures, and nations (see Akkerman and Bakker 2011; Engeström 2009; Spinuzzi 2012; Tsui and Law 2007; Yamazumi 2009; Yamazumi and Engeström 2008).

Through the mutual effects and merging of various activity systems in the boundary zones of school and outside school, a hybrid learning activity creates collaborative expansive learning among diverse participants including children, teachers, and people outside school (for details regarding the development of hybrid learning activities in schools, see Yamazumi 2008, 2009, 2010b). However, as we see in the typical examples of Suma High School and Seido Elementary School, a hybrid learning activity does not necessarily have to involve a strong fixed network among teachers, children, and various individuals and organizations from outside the school. Regardless, these diverse partners partially share the object of the activity, and through mutually cooperating with each other's activity in a flexible, improvisational way, create a collaborate activity.

Thus, different individuals and organizations make loose connections, without a single individual or fixed organization in control at the center; the collaborative actions in which the authority of the activity changes from moment to moment can, according to Engeström, be compared to the creation of "knots," that is, "knotworking," and their characteristics analyzed (Engeström 2006, 2008; Engeström, Engeström, and Vähäaho 1999; Yamazumi and Engeström 2008). Knotworking is the creation of connections in which, although the actors and activity systems are only weakly connected, they suddenly and improvisationally resonate

together, set collaborative actions beating, knot themselves together, unknot themselves again, and then knot themselves together once more, setting up a rhythm.

As stated in the previous section, learning for disaster reconstruction in school involves facing the fundamental contradiction of inexpressible memory and incommunicability, and taking it on as a challenge. In this context, one of the things which makes overcoming this contradiction possible is thought to be the practice of knotworking, creating flexible, improvisational, loose connections. Knotworking is called an improvisational mutual resonance because it creates “something new and unpredictable through partial connections” (Katsutoshi Yamazumi 2008, p. 187). For example, in the “Walking the suffered areas” Integrated Study class at Suma High School analyzed in the previous section, through students’ actually leaving the school to “walk” through the suffered areas, they discovered many scars of the disaster and encountered a variety of suffered people struggling toward reconstruction. One can say that an unpredictable, ungraspable knotworking, full of improvisational resonance, has taken place. This is not a planned, previously determined connection. Rather, through “Walking the suffered areas,” the students’ relations and connections with concrete and diverse suffered people came to exist improvisationally at each place, and thus a learning for disaster reconstruction which overcame deep cracks and discontinuities became possible.

The “Telling earthquake stories” activity at Seido Elementary School, as well, contains a similar contradiction in the “telling” of the earthquake experience by children born after the disaster. Here, however, through knotworking which leads to experiencing improvisational encounters with various others and worlds outside the school, the children produce a mutually shared learning for disaster reconstruction in which they tell of deeply tragic memories.

For example, when they interviewed the family of a first-grader who died in the earthquake, the children encountered the “notes for my teacher” which the first-grader had written the day before the earthquake (Ashiya Municipal Seido Elementary School 2005, pp. 141-142). There, the “words” of the child looking forward to tomorrow were written. However, because of the earthquake, tomorrow never came to that child. In their presentation while “Telling earthquake stories,” the children conveyed the “words” of that child to teachers

and other children. This kind of knotworking of empathy and solidarity can be thought to have spun out improvisationally new knots of “words” not planned in advance, even new knots of “being.”

As we saw in the previous section, Yoneyama (1992) makes clear the hollowness and pointlessness felt by the survivors of the atomic bombing in Hiroshima when telling of their experiences in words. However, regardless of this sense of impotence, the atomic bomb survivors continue to be called to engagement in “narrative practices.” Yoneyama suggests that the motivation for this is the irreconcilable resentments and objections which the survivors themselves feel deep down. For this reason, despite of their pessimism regarding the possibility of conveying the authentic meaning of the experience, the survivors narrate their catastrophic experiences. Yoneyama writes:

...[N]o one will die a death devoid of significance, ...all living beings, even those who meet seemingly “absurd” deaths, will not perish without leaving traces from which the meanings of their existence can be redeemed. (Yoneyama 1992, p. 18).

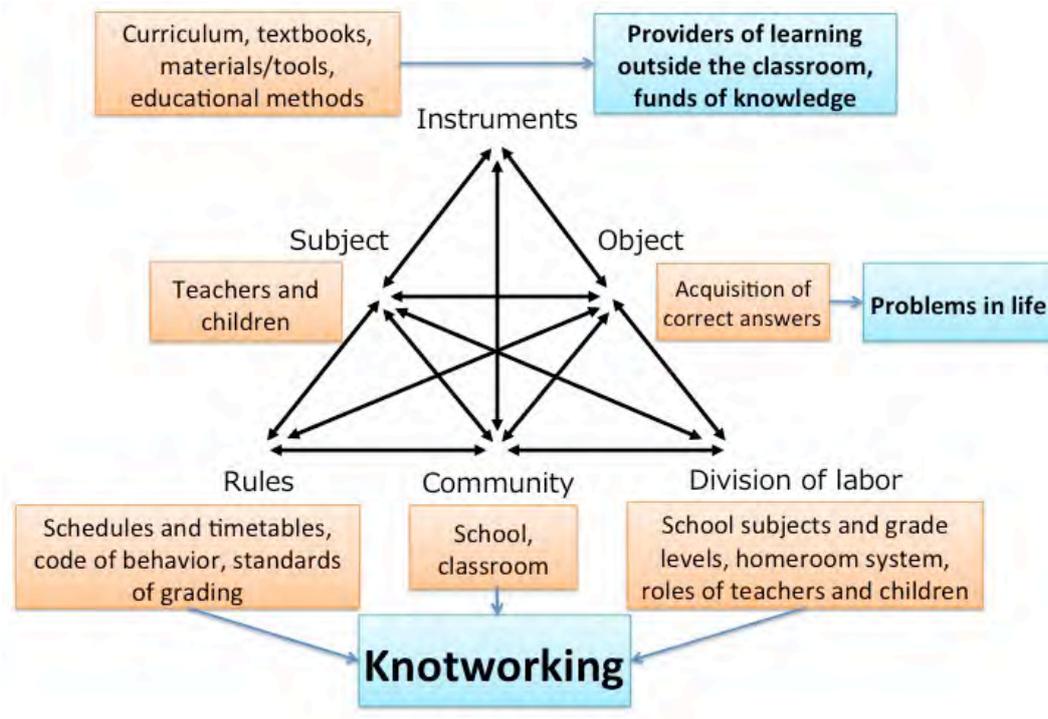
Learning for disaster reconstruction through knotworking is also an attempt to give voices to the “leaving traces” left by people who had met with “absurd” deaths (for example, the previously mentioned knot of the words of the child who had been looking forward to tomorrow). It creates a “scaffolding” in order to recover the *meaning of existence* from the “traces” of loss and absence brought by the earthquake. That “scaffolding” is no other than being a “witness” to history. The Seido Elementary School “Telling earthquake stories” activity, still being sustainably continued now, eighteen years after the Hanshin-Awaji Earthquake, through knotworking which gives children who didn’t experience the earthquake a scaffolding as a witness of history, is trying to become a collective and collaborative creative activity which shares and broadens “telling and passing on” beyond the contradiction of inexpressible memory, that is the experience of the earthquake.

In the next section, I want to take up reconstruction learning in the suffered areas of the

Great East Japan Earthquake, which resonates at its base with the education intended to learn from the experiences of the Hanshin-Awaji Earthquake, and to discuss the new possibilities for learning at school which it reveals.

### 3. Learning for reconstruction and the education of creators of a sustainable future

As discussed above, education from earthquake experiences creates hybrid learning activity through knotworking. Learning for disaster reconstruction among these knots can expand the institutional boundaries of traditional learning, characteristically “learning by acquisition of correct answers as responses to given tasks in school texts and the classroom” in “socially isolated schools.” Here, if we use in support the model “collective activity system” (Engeström 1987, p. 78) proposed as a basic framework by Engeström for activity-theoretical research, the expansion of learning for disaster reconstruction can be shown as in the following Figure 2.



**Figure 2** Expansion of learning for disaster reconstruction through knotworking

The activity which activity theory tries to grasp is not the discrete “*individual actions*” intended to accomplish a goal over a short term, but the *collective activity* which shares an “object” and investigates it over the long term. As in the activity system model, mediated by

“instruments” (cultural artifacts, that is tools and signs, words and symbols, concepts and model, ideas and visions, technology and so on), it is activity which evolves historically, motivated, towards the object. At the same time, activity, as the deep layer of the social infrastructure, is also mediated by the various elements of “community,” “rules,” and “division of labor.” Figure 2, using the model of this activity system, shows with arrows how the encapsulated traditional school learning activity system expands through learning for disaster reconstruction. Through knotworking, learning for disaster reconstruction can break through the boundaries of “community,” “rules,” and “division of labor,” closed by acquisition of correct answers and classroom walls, and, making “tools” of connections to diverse others outside the school and the societal world, expand as an object collaborative inquiry into the meaning learning for disaster reconstruction can have for our lives and our future.

In this kind of learning within knotworking, communities, organizations, and participants outside the school can become so-called “providers of learning,” setting off activity initiatives while changing and exchanging moment by moment. Through connecting and interchanging potentially diverse resources within and without the classroom, knotworking brings new “tools” in the form of the “outside providers of learning” as shown in Figure 2 to the activity system (Yamazumi, in press). These resources are equivalent to what Luis Moll and James Greenberg have called “funds of knowledge” (Moll and Greenberg 1990).

This kind of learning for disaster reconstruction can be said to be the schools’ expansion of the curriculum and learning, with the inquiry of real social problems and the imagination of future life as its essential content. This can be said to be a form of school which creates expansive learning that knots up with outside communities and organizations, linking with social approaches. As well, learning and education from earthquake experiences can also bring what Masaru Takahashi calls a school’s paradigm shift, that is “*transforming a school from a closed, one-dimensional ‘functional space’ to an open, multidimensional ‘meaning space’*” (Takahashi 1997, p. ii).

This kind of school format is extremely similar to what was proposed for the “local

community schools” in the immediate postwar education reforms (Ishiyama 1949; Umene 1951). Satoru Umene, the chief proponent of this idea, wrote that “the new schools...[will become] a service center to make regional society a better one” (Umene 1951, p. 357). This would involve teachers and children working together as “cooperators” on “research” and “projects” while “living there, constantly raising the level of life higher and improving society” (pp. 358-359). Umene calls this way of being itself “a life school where old and young become one” (p. 359).

As well, today, as a typical example of inheriting the concept of the local community school or life school, we can look at the practice of “Education for Sustainable Development (ESD)” being carried out around the country primarily by UNESCO schools (ASPnet: Associated Schools Project Network) (see Project Committee for “A Guide to Developing and Using ESD Materials” 2009). Here, “learning with the region as topic, rooted in the region” is being carried out, using local “valuable educational resources” (Tada, Ishida, and Teshima 2008, pp. 44-50). In this kind of sustainable local education as well, a notable practice is the ESD project in which almost all municipal elementary and junior high schools in Kesenuma City, Miyagi Prefecture, participated, “Möbius.” In order to realize “deep learning appropriate to children’s curiosity and needs,” the Möbius project collaborated with NPOs, industrial organizations, local authorities, and expert organizations in the area of “non-official education” to “construct a regional network which will become a knowledge base” for learning (Oikawa et al. 2009, p. 3).

It was in this context that Kesenuma City faced the Great East Japan Earthquake of March 11th, 2011, when it was suffered by a tsunami and fires of unimaginable scope. On April 21st, 2011, regarding the path to reopening all the elementary and junior high schools in the city, Yukihiro Oikawa of the Kesenuma City Board of Education spoke on the theme that “the reviving of education will draw the reconstruction of the region.” “...Teachers and staff of Kesenuma City, even in the middle of this unheard-of struggle, cooperated with one another and, ‘to protect the children’s lives,’ ‘to help the people of the region find shelter,’ and ‘to revive schools and education,’ put all the strength they had into the work to fulfill

their mission” (Oikawa 2012, p. 11). As well, Oikawa points out that the ESD approaches which had taken place in Kesennuma up until then were being put to use by the children as follows:

Elsewhere, the students also made good use of their learning experiences with disaster prevention education and ESD, doing everything they could at what they could do—helping old people in shelters and schools, helping cook there, cleaning up debris and cleaning toilets, even giving concerts at shelters, contributing enormously to regional reconstruction. (Oikawa 2012, p. 11)

Thus Kesennuma City is now, through connecting the successes of its built-up ESD practice, further developing its learning and education for reconstruction from the Great East Japan Earthquake into a structure of learning for disaster reconstruction. There, the aim is to educate all the children of the region into “creators of a sustainable future,” and for that purpose “an experiential, inquiry-based learning approach rooted in the region” is called for (Oikawa 2012, p. 12). That is, the learning for reconstruction in Kesennuma’s schools is trying realistically and specifically to expand the principle of ESD, which will educate “creators of a sustainable future,” into a creative reconstruction process in the region. In actual fact, the “key concepts” for aiming at the object of learning for reconstruction are thought of as follows.

...1) Disaster prevention education which fosters the ability to help oneself and others, 2) A lifestyle coexisting with nature, 3) Community-building which makes good use of the rich blessings of the region, 4) Revival of the region’s traditions and culture, 5) Ability to communicate with the world, and 6) Ability to design one’s own future, as well as, in order to realize that, 7) Construction of community bonds and global networks... (Oikawa 2012, p. 12)

John Dewey once thought of schools as the place where a democratic society is built, and spoke of this image as “school as the social center” of regional society (Dewey 1902). Approaches to learning for reconstruction also strongly remind us of the active role schools play in societal change. Aiming at our new way of being in society and life, that is “sustainable living” (Stone and Center for Ecoliteracy 2009), schools connect to developing a new educational practice which will be the agent of societal change (regarding the concept of “school as societal change agent,” see in detail Kansai University Center for Human Activity Theory 2009; Yamazumi 2010a). The approach to learning for reconstruction, thus, through contributing actively to the creation of collaborative activity for regional creation, shows us the possibilities of schools expanding to a place which fosters the “creators of a sustainable future.”

## **Conclusion**

Raphael refers to the work done by local society to deal with catastrophes like the Great Hanshin-Awaji Earthquake and the Great East Japan Earthquake as the creation of “disaster subcultures” (Raphael 1986, pp. 38-39). Creating this kind of a subculture, in which individuals and local society have recognized the danger of disasters and understand how to be prepared, is a great strength.

Nobuhiko Iwasaki points out that at the starting point of the minds of people taking in disasters is the “mourning work” regarding the sudden loss of “people they care about,” and that this becomes a source spring of “disaster subculture” (Iwasaki 2008, p. 17). The “mourning work” here, however, is not “sharing all of the suffered people’s sadness and pain,” but little by little “‘distributing’ it among each” (p. 22). Thus, Iwasaki thinks that “the thought of a network in which sorrow and pain are mutually ‘distributed,’ spread out and connected,” creates the foundation of “disaster subculture” in which people support one another (p. 22).

As this paper has discussed with regard to three case studies, learning for disaster reconstruction at schools faces the fundamental cracks and gaps of inexpressible memory and incommunicability, and yet challenges them, overcomes their contradictions, and shares

earthquake experiences mutually, attempting in practical terms to create and spread disaster subculture. This creates a learning activity in which children and their partners within and without school collaborate and interact to participate in the creation of a newly mutually supportive culture, involved with better changes for local society.

The attempts at learning for disaster reconstruction in schools analyzed above are all practical methods, which, even in the face of struggles and contradictions, created innovations which went beyond the institutional boundaries of school learning. Knotworking, creating improvisational connections and collaborations with diverse heterogeneous worlds outside the school, is thought to have been an important factor in the success of each attempt. In the midst of these knots of learning, the children were able to encounter openly diverse others as well as the social world existing outside the school, to be empathetically interested and involved in various different things and other people in the outside world, and to develop actions of solidarity (see Katsutoshi Yamazumi 2008, pp. 196-198).

The creation of learning through this kind of knotworking is effective not only for learning and education from earthquake experiences, but beyond that, for universal searches into innovations in school learning. Through knotworking linked to activism in order to create a sustainable future built into the community, schools can be said to become a “scaffolding” from which children can relate actively to the society around them and to their own lives. The “scaffolding” which schools create through knotworking itself brings the space, structure, and support necessary to create with collaboration children’s own lives and futures, through sympathy and solidarity with various others and the outside society with which children diversely connect.

### **Acknowledgements**

This work was supported in part by Grant-in-Aid for Scientific Research (B) (24330228) carried out from 2012 through 2014 on “Collaborative learning activity for regional creation centered on children: Research and development based on activity theory” (PI: Katsuhiro Yamazumi). I am grateful for the support received.

## References

- Akkerman, Sanne. F., and Bakker, Arthur (2011). Boundary crossing and boundary objects. *Review of Educational Research*, 81, 132-169.
- Ashiya Municipal Seido Elementary School (2005). *Hanshin-Awaji daishinsai tsuitôshiki wo jibun tachi no te de* (Our own memorial ceremony for the Hanshin-Awaji Earthquake). In Hyogo Prefectural Board of Education, ed., *Shinsai wo koete: Kyôiku no sôzôteki fukkô 10 nen to ashita e no ayumi* (Beyond the earthquake: Ten years of the creative reconstruction of education and paths to tomorrow) (pp. 141-142), Hyogo Prefectural Board of Education.
- Ashiya Municipal Seido Elementary School (2009). *Inochi no tôtosu wo manabi, inori wo todokeru tame ni* (Learning the sacredness of life, to deliver prayers). *Kôhō shôbô kikin (Fire Prevention Fund News)*, 171, 47-49.
- Daniels, Harry (2001). *Vygotsky and pedagogy*. London: Routledge/Falmer.
- Dewey, John (1902). School as social center. *The Elementary School Teacher*, 3(2), 73-86.
- Engeström, Yrjö (1987). *Learning by expanding: An activity-theoretical approach to developmental research*. Helsinki: Orienta-Konsultit.
- Engeström, Yrjö (1991). Non scolae sed vitae discimus: Toward overcoming the encapsulation of school learning. *Learning and Instruction: An International Journal*, 1, 243-259.
- Engeström, Yrjö (2006). Development, movement and agency: Breaking away into mycorrhizae activities. In Katsuhiko Yamazumi, ed., *Building activity theory in practice: Toward the next generation* (pp. 1-43). Suita, Osaka: Center for Human Activity Theory, Kansai University.
- Engeström, Yrjö (2008). *From teams to knots: Activity-theoretical studies of collaboration and learning at work*. Cambridge: Cambridge University Press.

- Engeström, Yrjö (2009). The future of activity theory: A rough draft. In Annalisa Sannino, Harry Daniels, and Kris D. Gutiérrez, eds., *Learning and expanding with activity theory* (pp. 303-328). Cambridge: Cambridge University Press.
- Engeström, Yrjö, Engeström, Ritva, and Vähäaho, Tarja (1999). When the center does not hold: The importance of knotworking. In Seth Chaiklin, Mariane Hedegaard, and Uffe Juul Jensen, eds., *Activity theory and social practice: Cultural-historical approaches* (pp. 345-374). Aarhus: Aarhus University Press.
- Engeström, Yrjö, and Sannino, Annalisa (2010). Studies of expansive learning: Foundations, findings, and future challenges. *Educational Research Review*, 5, 1-24.
- Ishiyama, Shuhei (1949). *Chiiki shakai gakkô* (Local society schools). Kaneko Shobo.
- Iwasaki, Nobuhiko (2008). *Kanashimi ha tsutaeru koto ga dekiru ka?* (Can sorrow be told of?) In Nobuhiko Iwasaki, Yasuo Tanaka, Isao Hayashi, and Masakiyo Murai, eds., *Saigai to tomo ni ikiru bunka to kyôiku: 'Daisaigai' kara no message* (Culture and education living with disaster: A message from the great disasters) (pp. 14-23). Showado.
- Kansai University Center for Human Activity Theory, ed., Yamazumi, Katsuhiko, supervision. (2009). *Manabiau shokuiku: Kodomo tachi no new school* (Mutual learning in nutritional education: The children's new school). Chuo Koron Shinsha.
- Kawata, Yoshiaki (2011). *Kiken shakai kara anzen/anshin shakai wo mezashite* (From a danger society toward a safety/security society). In Katsuto Uchihashi, ed., *Daisaigai no naka de: Watashi tachi ha nani wo subeki ka* (Within a great disaster: What should we do?) (pp. 246-253). Iwanami Shoten.
- Moll, Luis C., and Greenberg, James B. (1990). Creating zones of possibilities: Combining social contexts for instruction. In Luis C. Moll, ed., *Vygotsky and education: Instructional implications and applications of sociohistorical psychology* (pp. 319-348). Cambridge: Cambridge University Press.
- Nakai, Hisao, and Isozaki, Arata (1998). *Higeki ni kô suru kenchiku ni mukete* (Toward an architecture which resists tragedy). *Hihyô kûkan (Critical Space)*, II-19, 146-159.

- Narita, Ryuichi (1996). *Kantô daishinsai no metahistory no tame ni: Hôdô, aiwa, bidan* (For the metahistory of the Great Kanto Earthquake: Reportage, sad stories, moral stories). *Shisô (Thought)*, 866, 61-90.
- Noe, Keiichi (1998). *Rekishi no narratology* (Narratology of history). In Keiichi Noe, ed., *Shin tetsugaku kôgi 8 Rekishi to shûmatsuron* (New philosophy lectures 8: History and eschatology) (pp. 1-76). Iwanami Shoten.
- Oikawa, Yukihiro (2012). *Kesenuma shi no Higashi Nihon Daishinsai kara no kyôiku fukkô e no michinori* (Kesenuma City's path to educational reconstruction from the Great East Japan Earthquake). In Takashige Onodera et al., eds., *Kiroku "Higashi Nihon Daishinsai" Hisai kara zenshin suru tame ni* (Record "Great East Japan Earthquake" To move forward from affliction) (pp. 10-13). Kesenuma City Municipal Schools' Principals Committee, Kesenuma Municipal Board of Education, Miyagi University of Education.
- Oikawa, Yukihiro et al., eds. (2009). *Möbius: Jizoku kanô na junkan 2002-2009* (Möbius: A sustainable cycle 2002-2009). Kesenuma Municipal Board of Education, Miyagi University of Education, Ministry of Education, Science and Technology UNESCO Domestic Committee.
- Polkinghorne, Donald E. (1988). *Narrative knowing and the human science*. Albany: State University of New York Press.
- Project Committee for "A guide to developing and using ESD materials" (2009). *ESD kyôzai katsuyô guide: Jizoku kanô na mirai e no kibô* (A guide to developing and using ESD materials: Hope for a sustainable future). UNESCO Asia Cultural Centre.
- Raphael, Beverley (1986). *When disaster strikes: How individuals and communities cope with catastrophe*. New York: Basic Books.
- Sannino, Annalisa, Daniels, Harry, and Gutiérrez, Kris D., eds. (2009). *Learning and expanding with activity theory*. Cambridge: Cambridge University Press.
- Spinuzzi, Clay (2012). Working alone together: Coworking as emergent collaborative activity. *Journal of Business and Technical Communication*, 26(4), 399-441.

- Stone, Michael K., and Center for Ecoliteracy (2009). *Smart by nature: Schooling for sustainability*. Healdsburg: Watershed Media.
- Suma High School (1998). *Hisaichi wo aruku* (Walking the suffered areas). Kobe Municipal Suma High School.
- Tada, Takashi, Tejima, Toshio, and Ishida, Yoshihiro (2008). *Mirai wo tsukuru kyôiku ESD no susume: Jizoku kanô na mirai wo kôchiku suru tame ni* (An invitation to ESD to create the future: In order to build a sustainable future). Nihon Hyojun.
- Takahashi, Masaru (1997). *Gakkô no paradigm tenkan: “Kinô kûkan” kara “imi kûkan” e.* (Schools’ paradigm shift: From a “functional space” to a “meaning space”). Kawashima Shoten.
- Tsui, Amy B. M., and Law, Doris Y. K. (2007). Learning as boundary-crossing in school-university partnership. *Teaching and Teacher Education*, 23, 1289-1301.
- Umene, Satoru (1951). *Shin kyôiku e no michi* (A path to new education). Revised and expanded version. Seibundo Shinkosha.
- Yamazumi, Katsuhiro (1998). *Kyôka gakushû no shakai bunkateki kôsei: Hattatsuteki kyôiku kenkyû no Vygotsky-teki approach* (Sociocultural construction of subject learning: A Vygotskian approach to developmental education research). Keiso Shobo.
- Yamazumi, Katsuhiro (2001). Orchestrating voices and crossing boundaries in educational practice: Dialogic research on learning about the Kobe Earthquake. In Mariane Hedegaard, ed., *Learning in classrooms: A cultural-historical approach* (pp. 97-120). Aarhus: Aarhus University Press.
- Yamazumi, Katsuhiro (2004). *Katsudô riron to kyôiku jissen no sôzô: Kakuchôteki gakushû e* (Activity theory and creative educational practice: Toward expansive learning). Kansai University Press.
- Yamazumi, Katsuhiro (2006). Activity theory and the transformation of pedagogic practice. *Educational Studies in Japan: International Yearbook of Japanese Educational Research Association*, 1, 77-90.

- Yamazumi, Katsuhiro (2008). A hybrid activity system as educational innovation. *Journal of Educational Change*, 9(4), 365-373.
- Yamazumi, K. (2009). Expansive agency in multi-activity collaboration. In Annalisa Sannino, Harry Daniels, and Kris D. Gutiérrez, eds., *Learning and expanding with activity theory* (pp. 212-227). Cambridge: Cambridge University Press.
- Yamazumi, Katsuhiro (2010a). Schools that contribute to community revitalization. In Katsuhiro Yamazumi ed., *Activity theory and fostering learning: Developmental interventions in education and work* (pp. 133-160). Suita, Osaka: Center for Human Activity Theory, Kansai University.
- Yamazumi, Katsuhiro (2010b). Toward an expansion of science education through real-life activities in Japan. In Yew-Jin Lee, ed., *World of science education: Science education research in Asia* (pp. 187-202). Rotterdam: Sense Publishers.
- Yamazumi, Katsuhiro (in press). Beyond traditional school learning: Fostering agency and collective creativity in hybrid educational activities. In Annalisa Sannino, and Viv Ellis, eds., *Learning and collective creativity: Activity-theoretical and sociocultural studies*. London: Routledge.
- Yamazumi, Katsuhiro, and Engeström, Yrjö, eds. (2008). *Knotworking: Musubiau ningen katsudô no sôzô e* (Knotworking: Toward the creation of a mutually binding human activity). Shin-yo-sha.
- Yamazumi, Katsuhiro, Engeström, Yrjö, and Daniels, Harry, eds. (2005). *New learning challenges: Going beyond the industrial age system of school and work*. Suita, Osaka: Kansai University Press.
- Yamazumi, Katsuhiro, and Yamazumi, Katsutoshi (1999). *Aitô suru kioku: Hanshin Daishinsai no shisha no na wo yobu tame ni* (Mourning memory: To call the victim's name of the Kobe Earthquake). *Osaka Kyoiku Daigaku Kiyô (Memoirs of Osaka University of Education)*, Ser. V, 48(1), 1-25.
- Yamazumi, Katsutoshi (2008). *Cosmopolitanism, America bungaku, gaikokugo to shite no eigo* (Cosmopolitanism, American literature, English as a foreign language). In

Katsuhiro Yamazumi, and Yrjö Engeström, eds., *Knotworking: Musubiau ningen katsudô no sôzô e* (Knotworking: Toward the creation of a mutually binding human activity) (pp. 179-203). Shin-yo-sha.

Yoneyama, Lisa (1992). *Hiroshima narratives and the politics of memory*. Ph.D. Dissertation, Stanford University.