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Curriculum as Social Practice: The case of Fukushima

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Abstract

Despite the persistent threat from disasters to human health worldwide, meaningful lessons in preparedness are rarely integrated into the health professional curricula of those likely to be first responders. Although core competencies in disaster management have been identified, little is known about how to translate those competencies into multiple curricula across diverse groups who must function together in complex, emotionally charged conditions. In an unprecedented collective response, the International Atomic Energy Agency (IAEA) (Chhem & Abdel-Wahab, Vienna, Austria) worked with the first medical responders (Hasegawa & Kumagai) at Japan's Fukushima Medical University (FMU) on a project led by educational scholars (Hibbert, Canada and Engle-Hills, South Africa) to address needed changes to curriculum that would authentically reflect the lessons learned. Taking a qualitative approach to study experiences of the first medical responders, this study highlights the role of context as a disruptor to the best laid curricular plans, and considers a collective response to plan for our futures.

Keywords: Curriculum as social practice; Collective competency; Critical narrative inquiry; Interdisciplinary; Teaching for social relevance.

Teaching is not simply a technical enterprise: rather, it is a creative process of healing re-integration, re-membering and re-collection.
Huebner, 1991, cf Slattery, 2013, xx

Overview

Nearly three decades ago, Japanese Canadian curriculum scholar Ted Aoki argued that “science must be taught as a humanity” (Smith, cf Aoki, 1993, p. 255). The humanities help us think critically and creatively while maintaining a healthy scepticism; to communicate and collaborate with individuals and groups across interdisciplinary settings; and to better understand the role of science within society (Flexner, 1930). Yet, in the years since, it seems that much of the curriculum around the world has been obfuscated by neoliberal ideologies that have moved the field further away from his call. In this paper, the implicit assumption that curriculum is comprised essentially of explicit, standardized, discrete skills transferable to any situation is challenged. Instead, we demonstrate through the case of Fukushima, the need to consider curriculum as a *social practice*, where humanity and context become critical to action. In particular, following Bourdieu (1977, p. 4) we ask, *what are the curricular and cultural conditions which make knowledge of curriculum as a social practice possible?*

Shifting Curricular Conditions

There is little agreement on what is meant by the word ‘curriculum’ either within or outside of the field. A century ago, Franklin Bobbitt argued that curriculum could be essentially understood in two ways:

- 1) the entire range of experience, both undirected and directed, concerned in unfolding the abilities of the individual;
- 2) The series of consciously directed training experiences ... for completing and perfecting the unfoldment (Bobbitt, 1918, p. 43).

Even then, Bobbitt had observed that the educational profession tended to think of curriculum in terms of the latter sense. Several conditions have emerged since then, that have only further emphasized attention to the notion of “directed training” and “perfecting” what many consider to be curriculum. In medical education, standardized, competency-based models have proliferated in response to the need for increased efficiency, safety, and responses to audit and accreditation systems (Ellaway, Albright, Smothers, Cameron & Willett, 2014) as much as the often stated value of improving patient care.

The shift to curriculum as ‘prescriptive’

Several factors have brought curriculum makers to emphasize an essentialist view that mirrors the latter half of Bobbitt’s definition. For example, in the past century, we have moved from educating the elite, to educating the masses. Globalization and increased labour mobility, coupled with International testing, led to the push for standardization and consistency that would allow credentials to be more portable. The shift from an Industrial Age to an Information Age turned attention to what some have called the ‘Knowledge Economy’ (e.g.,

Adler, 2001). With education more prominently tied to economic production interests, it became vulnerable to increased influence from business models.

A good example of economic influence was seen with The Organisation for Economic Co-operation and Development (OECD). With a motto of “Better Policies for Better Lives” their mission is “to promote policies that will improve the economic and social well-being of people around the world” (<http://www.oecd.org/about/>). The OECD achieves their mission through sharing information, data analyses and policies with various governments. Amongst other activities, they measure productivity and look for similarities and differences across countries.

On the face of it, the desire for systematic, consistent and predictable curriculum is understandable. Its value is even more pronounced in a context concerned with safety. However, Slattery (2013) argues that predictability is a “goal that needs to be deconstructed and examined more closely” as it has “actually contributed to the current crises both locally and globally” (p. xiii). While the pragmatic approach to comparing programs, models and policies is appealing (Gonzalo et al., 2017), it has a number of perhaps unintended consequences. Despite sharing a number of characteristics and goals, the practical application of ideas across cultures and contexts is not a uniform and unproblematic endeavour. As aims are translated into models, attention turns to producing largely generic learning outcomes, teaching strategies and assessment practices. However, this approach makes a number of assumptions (Binns, p. 760). It assumes that if educators are simply aware of curriculum designs, strategies and forms of assessment, they will use them. It assumes that the designs are universally effective, and it assumes that if the guidelines are detailed enough, that teachers will follow them in predictable, controllable ways. Experience has shown that curriculum reform is far more complex, nuanced and contextualized than described (Hawick, Cleland & Kitto, 2017; Shaw & Jackson, 2002).

Rethinking training for competence

The faith placed in standardization as a means to both develop and assess competency is naïve in its assumption of the neutrality of the individuals, the culture and context within which educational encounters take place. Training is a model “driven by a narrow instrumentalism based upon economic imperatives -- ... soft skills required for the workplace rather than the sort of powerful knowledge required to engage with the world” (Priestley & Biesta, 2013, p. 5). Even the language of *training* first permeated and then dominated medical educational discourses in many parts of the world. In a competitive, comparative environment, much attention is now paid to ensuring conformity, achievement and to the extent that is possible, transferability. In a number of contexts, these outcomes are desirable, and even necessary to a seamless operation of highly technical skills. However, it is important to recognize that they are also fragmented and disembedded from unpredictable contexts. They anticipate a consistent application of knowledge and skills in an inconsistent world. Exercises designed for training (e.g., table top examples) are limited to our ability to anticipate (or acknowledge) possible scenarios. They also resist individual or professional autonomy and systemic flexibility.

Such concerns have prompted scholars (Hodges & Lingard, 2012) to take another look at the goals surrounding competency, questioning whether competency and change ought to be targeting individuals, or the social contexts within which they practice. The idea individuals can be *trained* to be competent “implies that competence is context-free” (Lingard, 2016, p. S19-S20). Given the complexities of the challenges faced by contemporary professionals and the need for collaboration and teamwork, the focus on individual competence seems insufficient. Similarly, the belief in the ability to design a universal set of competencies to suit all contexts, is naïve. Making the shift to thinking about collective or contextualized competence is not easy or straightforward. It cannot be assumed for example, that teams that need to form around a problem are existing, harmonious groups, or that the culture of the system within which they do their work is amenable to developing *collective competence*:

Collective competence is evolving, unstable and based on situations with varying social relations and material conditions that can support or constrain teamwork in the moment. Social relations on teams are complex and nuanced, shaped by issues such as conflict, power, respect, and trust. (Lingard, 2016, p. S19-S20)

In reality, we need both; competent individuals and competent teams. In the context of a nuclear accident, the context is arguably one of the most challenging, high pressure and time sensitive issues to test collective competence. How can curricula be designed to attend to the complexity, yet acknowledge the conflict, the power struggles, and the issues of trust and respect that unfold in the midst of such a significant event? We have to let go of our fantasy that we can control and predict the reality within which we engage in our worlds.

Curriculum as Social Practice

Learning ... doesn't just involve the acquisition of facts about the world, it also involves acquiring the ability to act in the world in socially recognized ways.
(Seely Brown & Duguid, 2001, p. 200)

More than ever before, we are planning curriculum for an uncertain future. As Bourdieu (1977) cautions, if “subjects do not, strictly speaking, know what they’re doing, that what they do has more meaning than they know” (p. 79). A social practice orientation to planning acknowledges this reality, and draws on what we do know in ways that help plan in more sophisticated ways, taking into account the social relations that people draw upon in their practices (Barton & Potts, 2013, p. 816). It is an acknowledgement that curriculum making occurs as a result of living in, and through our worlds. Nettleton and Green (2014) invite us to think about how context, circumstance and practice coalesce because “practical (rather than cognitive or intellectual) reasoning underpins action” (p. 241). Scholars are beginning to imagine strategies for developing capacity in this area:

- Consider collective (self) positioning in relation to the curriculum experience as an alternative to a rational curriculum model;
- Examine the potentialities afforded by transformative rather than normative approaches to practices in the curriculum that recognize the resources learners bring into the learning encounter;

- Recognize the role of interprofessional faculty development in curriculum design and enactment as an ongoing collaborative and scholarly process of inquiry.
 - Expand the limited focus on standardizing instrumental responses to engender coherence and flexibility through contextualized, critical encounters between students, lecturers and subject disciplines.
- (Adapted from Weller, 2012, p. 22)

If we think about curriculum making as a more “holistic process of *engagement with*, rather than the *acquiring of*, disciplinary knowledge” it better reflects the “complex social practice” within which we are working to “demonstrate transferable critical thinking and problem solving skills” (Weller, 2012, p. 25, emphasis ours). A social practice approach makes room for students to relate the curriculum to their own experiences, and what they know of the world. Rather than taking a learning outcome approach that expects to achieve consistency and uniformity across programs of study, this approach recognizes the complexities of the world that we are preparing our graduates to enter, and their need to apply situated knowledge to suit the problems before them and the iterative, relational process needed to achieve it.

Theoretical and Methodological Approach

Bourdieu’s (1972) *Theory of Practice* conceptualizes three elements central to practice: *field*, *capital* and *habitus*. He theorized that social *fields* are rendered visible empirically. The fields are tacitly understood by those interacting in a *network of positions* at play within various structures. Within the social field Bourdieu identified particular sets of helpful resources as *capital*. Capital could be social, symbolic, economic or cultural (Bourdieu, 1986) and largely influenced an individual’s position within the social fields. The positions individuals hold influence which practices are possible, and which are not. Finally, he developed the concept of *habitus* (1977), a multi-layered notion that demonstrates that not only are we practicing in the social world, but the social world is acting on (at times reproducing) us; predisposing us to certain dispositions or behaviours. Bourdieu’s theory of practice, in our case, alerts us to the socialization of curriculum-makers; to the ways in which embodied practice can reproduce socialized understandings; and, how context can disrupt all three notions of field, capital and habitus.

Context is a disruptor because *habitus* is linked to individuals’ histories and experiences with the world. To better understand this, we adopted a Critical Narrative Inquiry (CNI) (Iannacci, 2007) approach as a way of documenting and analyzing experiences. CNI is

... a collaboration between researcher and participants, over time, in a place or series of places, and in social interaction with milieus. An inquirer enters this matrix in the midst and progresses in this same spirit, concluding the inquiry still in the midst of living and telling, reliving and retelling, the stories of the experiences that make up people’s lives, both individual and social. Simply stated ... narrative inquiry is stories lived and told” (Connelly & Clandinin, 2000, p. 20).

We were interested in understanding how the experiences of those living through a global crisis could shed light on the conditions needed to practice differently. CNI invites us to question *what has been* or *what is*, in favour of *what might be*. (Barone, 2001a, p. 736). It is a methodology that attends to the context and the emotions central to lived experience (Denzin, 1992), bringing

various parts of human experience together in ways that allow participants to collaborate in the telling and interpreting of events retrospectively (Freeman, 2007). Consistent with CNI approaches, understanding how and where power operates and is expressed, the counter-narratives, and the silences, helps identify the issues that allow an informed response or action in a complex, socially entangled future.

The Case of Fukushima

Background

On March 11, 2011, a magnitude 9.0 earthquake struck Japan's north-eastern shore. The Great East Japan Earthquake generated a powerful tsunami that damaged the reactors at the Tokyo Electric Power Company's (TEPCO) Fukushima Daiichi Nuclear Power Plant, causing the worst nuclear accident since Chernobyl. Following the accident, staff from the Division of Human Health at the International Atomic Energy Agency in Vienna, Austria, worked closely with staff from Fukushima Medical University, to coordinate response efforts. Early on in the recovery process, lengthy interviews were conducted, documenting the experiences of 18 physicians, nurses, psychologists and psychiatrists, radiation safety experts, administrators and leaders who formed a contingent of first responders to the accident.

Sixteen interviewees were men, and two were women. The semi-structured interviews took, on average, about an hour and a half. The interviews all began by inviting the interviewee to describe their relevant personal and professional background, before turning to the events of March 11, 2011. As each interview unfolded, the interviewer probed the stories to learn more about their *readiness* and *response* before ending with questions about what they believed, given this experience, was needed in terms of curriculum reform efforts. The interviews were then transcribed and translated into English.

The analysis was an iterative process, undertaken by the educational researchers on the team. The first phase of the analysis employed a biopsychosocial lens (Jehn & Techakesari, 2014) to organize the interviews according to their physical responses, their emotional responses and the social, contextual and cultural factors within which they were acting. The interview texts were then restoried into a consistent narrative arc that allowed them to be analysed a second time, looking for the overarching 'meta stories' that were emerging from the experiences. In phase two, we conducted a workshop modelling curricular responses to the data, engaging participants in activities such as role play, debate, and designing communication briefs for various audiences. We also documented their reconceptualised classroom spaces and individual course materials. In the final phase, data was analysed through a curricular lens informed by our theoretical framework and shared in Japan on the 5th anniversary of the accident.

Key Findings

The key findings that we have articulated in this section underscore the tension between the acquisition of knowledge, and the application of knowledge in context. In this study, confidence in the knowledge and training provided, in the

systems that had been established to respond to nuclear accidents, in the ability to communicate what they knew at a time of intense public fear and distrust – was not only shaken, it was irrevocably damaged. The Fukushima Nuclear Accident became a call for change.

Faith in Training

To begin with, our findings pointed to a *faith in training* as a precautionary measure to address potential risks. Prior to 2011, the programmatic curriculum largely focused on radiation emergency medicine. For example, What is radiation? What are radiation effects? How do you treat a contaminated person? How do you treat radiation exposure? Since Fukushima Medical University was designated as a hospital for radiation emergency medicine in Japan, training was provided to ensure adequate knowledge:

That's just a very short course, one-week course for radiation emergency and a formal one. They had some demonstration and desktop drills including lectures and also other things. Our institute has many training courses for medical doctors and first responders in Asia. We learned much from the course in the US. Every year we have invited experts from Asian countries and we trained these people from Asia, and at the same time we also learned ourselves (P2).

Skills, such as how to measure radiation were considered to be important at that time. Hospitals designated as radiation emergency medicine sites used their own materials, including textbooks but were not standardized. Participants had mixed feelings about this training. P8 told us,

My feeling for this nuclear power plant disaster training, I think it is not so effective if disaster happened because the training all took place offsite and each training group was independent. It was really just about the ceremony.

The most commonly held 'unexamined norms' of the group of participants in this collective, was a belief that a nuclear accident simply would not, could not occur. In Japanese – the word *shinwa* – mythology – is used to describe the collective belief in total nuclear safety. It was a hard reality to accept that nothing is *zero risk*.

A second narrative that emerged from the data was that “almost all doctors, knew about “radiology” but almost no doctor knew about radiation health effects to the human body” (P11). Doctors were taught about radiology in the context of reading CT images, performing ultrasound and looking at chest x-rays. Those who had received some education about radiation health effects had forgotten their training over the years, as there was no call to use that knowledge in a clinical setting.

The medical oncologists know how to kill tumour cells, but they don't know much about radiation risk and radiation protection. Because radiation protection is a very specific field, it was believed that general medical doctors don't need it (P4).

The Complexity of the Incident

The complexity of the incident also emerged as an important finding. As P17 described,

... we were not ready for this kind of disaster where a natural disaster combined with a nuclear accident. We have never been prepared for this kind of event. Since 1999, we have been preparing for the event of isolated radiation accident (P17).

The skills needed to handle radioisotopes would be an acknowledgement of the frailty of the belief in nuclear safety. “We have to be more aware of the possibilities of bad things happening including bad things involving nuclear facilities. Of course, that kind of knowledge should be enhanced” (P17).

A darker side to the ‘hidden curriculum’ is the ways in which fear of nuclear exposure manifests in discrimination against the ‘exposed’. P16 tells us that we can learn from lessons in Hiroshima and Nagasaki, because those victims were labelled as *hibakusha*.

If you translate that from Japanese, it would mean the “exposed people”. That word was used in a discriminatory way. Some *hibakusha* had tried to move out of Hiroshima or Nagasaki, so that people would not know that they are from the affected area. Those *hibakusha* might have thought “I am not able to have a happy life. I am not able to get married.” A woman might say that “I will not be able to have children, because I’ve been irradiated and I won’t have a happy life for my children.” Social awareness is a key to solve this issue, because I think that’s the primary factor to fight against discrimination.

P9 underlined the concern for such discrimination.

All Japanese people wanted exact information about radiation exposure. Just after the explosion of the Fukushima nuclear plant, as residents of Fukushima evacuated to other places, they were met with fear. People believed that if patients from Fukushima come near me, I will get contaminated – so don’t come! Even my son said, ‘Father! I can’t marry anyone except a girl from Fukushima’. Fearing he had internal exposure, he believed he would not be able to marry a girl from another place Stigma is a very important problem.

A narrative concerning the null curriculum flowed from the hidden curriculum. Cultural beliefs can powerfully shape practice. The belief in the safety of nuclear facilities led to a focus on disaster response teams such as DMAT, well prepared for responding to earthquakes and tsunamis, but rarely prepared for radiation. Since this was a combined tragedy, responders were unprepared to take care of patients contaminated with radionuclides and/or radiation exposure.

The existing curriculum had not anticipated the critical need for public communication. Instead, it focused on a time-honoured practice of developing medical expertise. There was little ‘practical training’ according to the participants, and certainly no preparation for being ambushed by an angry and frightened public or the media. P7 pleaded for help “to make sure the people who are talking in front of the cameras or into the microphones know what they’re talking about”. Communication was a widespread problem. Information was at first slow to come out from a government scrambling to manage three crises at once; when it did start to flow, it was at times contradictory and at best, difficult to understand:

There were many experts in the government. They provided various information to the public. However, the public did not understand whether these experts were right, because government experts said that effects of radiation were not dangerous and that 1 mSv was no problem. On the other hand, other experts were saying that 1mSv was too high. This was very confusing to the public (P1).

The need for Communication around Risk Management and Mental Health

A story of risk management and mental health emerged as critical to this accident. P4 visited several locations and gave advice. His first responsibility was

to share the current state of scientific knowledge with the public. Translating highly technical scientific knowledge in 'lay' terms was very difficult, particularly about the radiation effects on health. He had studied it for a long time based on long term studies of "a-bomb" survivors. From that research, he acquired the knowledge and technology of radiation risks and radiation protection. He went to the public places like schools, arenas and even households. P4 recalls,

As you know, a radiation accident induces not only physical damages but also a psychological and social problems. So many people are suffering from various problems. People worry about health condition. Particularly the parents who have young children worry about the health condition of their children. Also, many Fukushima residents are worried about food contamination; furthermore, they suffered from the harmful rumours. There are the huge economic damages because of harmful rumours. It is very difficult to explain the issue. Radiation risk is not simple. Generally speaking, we are not familiar with the idea or concept of risk. We tend to have black-and white viewpoint. On the other hand, risk is not a black and white issue. We can't say this is absolutely safe or this is absolutely risky. There are some risks for everything, but we are barely conscious of this reality in our daily life. Particularly, cancer risk by radiation exposure is considered as stochastic effect. This means that there is a linear relationship between radiation dose and cancer risk.

The level of confusion and the fear that followed in the aftermath of the accident was a problem that grew. Many respondents claimed that the Mental Health issues were the biggest casualty of the accident. "Almost all the staff were scared about radiation after the second explosion of Unit 3, including me" (P2).

... all we could do is just fear. Nurses asked me, whether they're safe or not. But I can't answer their question before the support team come to FMU. Actually, except radiation disaster, we prepared and experienced for natural disasters like earthquakes and tsunami. Disaster medical assistance team have already existed. Without radiation, we are familiar with facing disaster. So we strongly rely on usual system of disaster management.

The usual systems of management P2 referred to were learned in exercises like *table top training*; a method that was widely used prior to the accident. Scenarios were imagined, and then trainees were invited to participate in a simulated response. This approach to training proved necessary but insufficient in the face of the accident:

Usually I taught doctors how to do situations faced with contaminated patients, how to treat, how to guard from contaminated patients but unfortunately we didn't imagine a situation where everything was contaminated. After the nuclear power plant accident, everything in the Fukushima prefecture was contaminated; the ground was contaminated, cars were contaminated. Before accident, our training scenarios focused on small isolated accidents inside a NPP. Only contaminated patients were imagined to be transported to our hospital, where everything but the patient was clean. But this was completely different. Everything was contaminated, and the radiation dose level is completely different from what we had predicted. (P5)

Counter-narratives emerged in the context of preparedness. There was a lack of coordination amongst the various institutional organizations who touched on responsibilities for the complexity of such a large accident. For example, The Ministry of Health told the Disaster Medical Assistance Team (DMAT) not to get involved in radiation disaster medicine because that is the job the Ministry of Science Technology and Education. But P17 now believes,

We need to incorporate more on radiation and radiation medicine and radiation disaster in to the medical education. We need to have coordination, and mitigate friction between the ministries, or some laws which restricted our ability to respond easily. We need some laws to coordinate and lead the system regardless of the ministries.

In short, there was a need for a change in the way that people in Japan think about their relationships within and between organizational structures and institutions and in terms of how they approach education and training. P17 provides an explanation:

The Fukushima NPP accident is a kind of turning point; we must change. Not only our medical education but also the human relationship we have with society. In Japan, for example, it is very competitive to enter the good universities and the school of medicine for university. So it means young people, especially in junior and high school, only concentrate on entering the good universities to learn only knowledge-based studies. Even after entering the school of medicine, everything is about certifying – they must pass examinations. Even after graduation, in their first or second year of training, they enter a specialized course, so they are always focusing on just a small field. If this kind of education system continues, nothing changes. So this is a turning point in the history of our education; one in which the university plays an important role. We must learn how to ask different questions and learn how to think differently. We do not have to become masters at debating, but we need to learn lessons from history, philosophy and sociology for example, so that we can learn to think differently.

Inadequacy of Knowledge of Risk and Emergency among those Left to Lead

The experiences of first responders were where all of the planning and articulation of goals and objectives are truly tested in the real world. P2 said he was simply not prepared for a radiation accident. “To my regret, I don’t have knowledge nor preparedness for radiation emergency medicine...in either material or mind”. P1 describes the fear and confusion. He had forgotten all of the content that he had studied at NIRS 10 years ago, honestly admitting,

All I remember was that I just enjoyed drinking. When I learned that the patients were coming, I started to relearn. There was no time. I remembered where the textbook was on the shelf and I started reading. During the disaster, I had a huge number of new experiences. My sensitivity decreased mentally and physically from exhaustion. All I could do in that moment was ask a radiation specialist to protect me. I called my friend who is in radiation medicine, “Please come to the radiation contamination examination space and please, let’s face this together.” I asked nurses -not young nurses but older or middle-aged nurses to join me. Also specialists; those in charge of taking X-ray, also operating computer tomography machine and magnetic sources of imaging and radiation specialists. The early phase of the team building relied on just my personal contacts. I was completely tired – too tired to care for patients and also worry about the risk of radiation. I lost the will to take care of my risk. Exhaustion makes human beings worry less about the risk. It’s important. Lesson learnt.

P1 described going to the J Village, a front-line base for responding to the accident. The radiation workers, the police, the fire fighters – all were worried about their exposure and the effects of radiation. In the hospital, he observed that the equipment was sufficient. Most hospitals deemed to be radiation emergency hospitals had radiation detectors. “But the medical doctors did not have enough knowledge about how to use the radiation detector, especially the whole body

counter (WBC). Even when they could measure amounts of radionuclide in the body by WBC, they did not know how to estimate the dose of internal contamination.”

They also quickly realized that anxiety was significantly higher than what they would have expected given the relatively low exposure. “We are being exposed to natural radiation every day but doses are not so high. Therefore, actually we should not have much anxiety from the low-dose radiation exposure” (P1). But people were very anxious about any level of exposure, which was leading to an increase in other health risks.

P2 thought that there was a need for all hospitals to know the basic things about radiation emergency. Without that basic knowledge, they cannot examine patients related to the radiation disaster.

If we can't assess the risks facing our patient and ourselves, we cannot respond. Globally, we should learn how to face critical situations - not only radiation disaster - but general critical situations. Doctors and students need to learn how to make decisions in critical situations. One reason why doctors were scared of radiation was due to the lack of knowledge and the lack of the awareness of risk themselves. Without their own safety guidelines to assess the risk, we did not have enough awareness for facing a crisis situation, not only due to the radiation, but all other risks. So after disaster, I try to have our own risk ruler. Also, in case of lecturing I request students to have their own risk ruler. Risk scale. Without their own risk scale, people can't make decisions by themselves.

The Lack of Coordination among Key Players and Organizations

Expert knowledge alone was not enough to make decisions however. There was widespread agreement that a multi-disciplinary response was needed to tackle an accident of this magnitude. Trying to communicate across disciplinary specialties was not easy but they group pulled together and used some practical strategies to make it work:

We held meetings, multi-disciplinary meetings that were largely about information sharing. In the early phase of the disaster, we held a morning conference with a member joining radiation emergency medicine, a member of the containing support team, and also nurses and specialists and doctors and logistics. To hold our focus, we prepared small lectures. To build our motivation, we reported on what we had been able to achieve. To use time effectively, we try to focus on urgent problems and also stop complaining to the Tokyo Electric power company. We also wrote our goals on the palms of our hands, so we would not lose sight of them.

They exemplified the notion of learning on the job. As P15 tells us, they

... were forced to adapt to circumstances. The reality didn't go as described in the manual. For example, at the screening of affected residents, the screening level of surface contamination was 13,000 CPM. With this regulation, there were too many people for us to decontaminate at the same time. Additionally, it was too cold to decontaminate them. This situation indicated that we had to keep them in cold outside for a long time, and it would exposed them to other health risks such as flu, pneumonia, hypothermia. Therefore, our team proposed to change the decontamination level. It was approved by the local government and the nuclear safety committee in Japan. So they changed the level for the decontamination promptly.

The Physical Challenges

On top of all of these challenges, there was a serious lack of water. The Self-Defence Force was placed in charge of decontamination in some places. The water supply was interrupted, so they carried the water by truck, but still the

water was running short for decontamination. Information systems were interrupted and much of the early information was gleaned from the television, and later the internet. Roads in some places were impassable, railway lines broken and store shelves empty of food. Those that came to offer support arrived by helicopter, but had no means of transportation so they stayed together, night after night at the university hospital. Exhausted emotionally and physically, they expressed their fear, their anger and their disbelief at their predicament to one another. Eventually, they resigned themselves to the fact that in his moment, at this time, they were the only team in the position to accept this challenge and they changed their outlook. It was a philosophical shift; it wasn't about technique or skill, but a shift toward their responsibility to humankind.

I realized my starting point as medical doctor by this Fukushima disaster, because humanity, human ability is most important in this case. So I realized that. Every time when I meet the residents, every time when I face the contaminated patient, every time we are teaching the doctors, every time the most important thing is the *human ability*. So this accident made me realize this; to go back to the starting point of becoming a medical doctor. (P7)

Discussion

We began our inquiry by wondering what the curricular and cultural conditions might be, to make knowledge of curriculum as a social practice possible. The stories we have studied, have helped us understand that practical knowledge has its own logic (Bourdieu, 1991). Because the stakes in this incident were so high, and every detail has been scrutinized, it has provided a view into the lived experiences that of those who had to have the courage to make decisions in the moment. By looking with and through the experiences of those involved, we were able to study what they did in the absence of sufficient knowledge, coordination, leadership and resources. There was a level of metacognition at play in these stories that made visible the ways in which the cultural, historical and contextual conditions led the responders to weigh their prior knowledge and experience against the reality of the context they were in, and make decisions. In other words, the case was a clear example of the *social field* acting upon the individual. Traditional forms of *capital* gave way to who had the knowledge needed in the moment. Power had been disrupted, at least temporarily, and in the absence of coordinated leadership, in the chaos of an earthquake, tsunami and nuclear accident, people acted.

In light of our findings, the dominant social fields that emerged in this accident included *Knowledge and Training*, *Communication and Coordination*, and *Physical Resources*. In each of the examples, capital disintegrates; knowledge and training were insufficient. Even the most specialized and knowledgeable individuals had never experienced an accident quite like this one. There was minimal information about the effects of low dose exposure over long periods of time. Communication and Coordination proved to be needed for different purposes, with different groups, and across multiple professions. Habitus – that ability to cope with the unpredictable, overcame the deeply entrenched training protocols that proved insufficient *in this context*.

To prepare for an accident of this magnitude is to prepare for an unknown crisis. The curriculum response to such an event must reflect a process that

promotes learning for the unexpected. The lessons learned from Fukushima allowed us to take note of attitudes, skills and responses of those who lived this very difficult experience in order to teach us about the personal and professional dispositions required to prepare us to think on our feet, think creatively and problem solve. Collectively, this research demonstrated that it is possible to participate in curriculum inquiries from a much broader focus; including looking at systems themselves, and how they function to enable or inhibit curricular goals.

Bourdieu extended his *Theory of Practice* in his later work on language and linguistic exchange. The linguistic power of the written (prescribed) curriculum, the textually defined standardized objectives and measurable outcomes have perhaps lulled educational institutions into a false sense of certainty. They were produced in the conditions of a neoliberal society which values the capacity to demonstrate economic accountability and efficiency of publicly funded institutions. Overlooked perhaps, was the diversity of the social fields within which curricula is enacted. Stories like those shared here, have demonstrated that habitus, even in a reproductive educational environment can be disrupted and disruptive. Curriculum as a social practice, begins from the premise that we aim for collective impact (Kania & Kramer, 2011); moving from acting alone, to acting together. This was certainly the realization that the responders arrived at. Collaborating across disciplinary and paradigmatic boundaries is challenging work and was further complicated by diversity in language and culture, but we shared a resolve to learn together and through our collective efforts, find ways to respond to what was learned from the experiences of the brave men and women who responded to the best of their ability in the midst of a chaotic tragedy.

A social practice approach invites individuals, each bringing particular expertise to the curricular dialogue, to be better able to function with an awareness of the whole; the varied expertise, resources, structures, contexts and so on, within and across system(s). It reminds us that we depend deeply on our humanity and our relationships to succeed. Collectively, it is possible to participate in curriculum inquiries from a much broader focus; including looking at systems themselves, and how they function to enable or inhibit curricular goals. And collectively, we can face our future challenges.

Notes

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