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Risk management and resilience of schools in response to the COVID-19 pandemic

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1. Background

In 2011, an earthquake of 9.0 magnitude and an ensuing tsunami devastated the coastal regions around Sendai City, Tohoku area, Japan. This was followed by the Fukushima radiation contamination incident. Based on these experiences, the Sendai Framework for Disaster Risk Reduction 2015–30 (SFDRR) was adopted in 2015–16. The SFDRR aims to enhance the capacity at the national and community level to cope with risks arising from such disasters. The SFDRR includes situations arising from epidemics, pandemics, and biological hazards. It emphasizes adopting a comprehensive approach to address multiple hazards (technological, biological, and environmental) that have an impact at different scales, frequencies, and intensities. The SFDRR’s primary goal is a substantial reduction of risk and losses, along with establishing the essential foundations for rapid and sustained recovery and sustainable development (Riyanti et al., 2020).

The sustainable development goals (SDGs) also address multiple hazards (technological, biological, and environmental). SDG 11.b reinforces that a holistic disaster risk management approach should be adopted and implemented in line with the SFDRR.

SDG 3.3 states that the epidemics caused by AIDS, tuberculosis, malaria, neglected tropical diseases, hepatitis, water-borne diseases, and other communicable diseases should end by 2030. SDG 3.8 aims to achieve universal health coverage, including financial risk protection, access to quality essential health-care services, and safe, effective, high-quality, and affordable essential medicines and vaccines for everyone. A total of 83 million COVID-19 cases have been confirmed across the world so far, as of this writing. Reducing the impact of epidemics caused by communicable diseases is a challenge for countries across the world. This research advocates strategies for building resilience against biological hazards and pandemics.
UNESCO (2021) reported that schools were fully closed for an average of 4.5 months (18 weeks) from March 2020 to June 2021 (Chart 28.1). This figure rises to 7.8 months (31 weeks) if partial school closures are taken into account. Long-term school closures in response to the pandemic have led to an unprecedented risk to children’s education, protection, and well-being. However, school reopening must be safe and consistent with each area’s overall COVID-19 health response. Longer closures disrupt essential school-based services such as immunization, school feeding, and mental health and psychosocial support, and can lead to stress and anxiety due to the loss of peer interaction and disrupted routines. These negative impacts are significantly higher for marginalized children (UNESCO 2021a). For the reopening of schools, it is essential to consider school-based services such as immunization, school meals, and mental health and psychosocial support.

### 2. Objective of study

This research elaborates on the risk management and resilience of schools in response to the COVID-19 pandemic and specifically considers school-based services such as curriculum, immunization, school meals, and mental health and psychosocial support. Miyagi University of Education (MUE) accumulated lessons based on the experiences of the earthquake and tsunami in 2011 in Tohoku. Disaster risk reduction manuals and school reopening manuals have been developed.
by the university based on this experience. The effectiveness of school reopening manuals for natural disasters arising from biological hazards like COVID-19 has to be examined. Therefore, this study analyzes whether the school reopening process for natural disasters is applicable for COVID-19. Through this analysis, it would be possible to determine the special factors associated with school reopening after a biological hazard that may be applicable in the future as well.

### 3. Research design

Table 28.1 includes the school reopening manual outline as recommended by MUE, after earthquakes and tsunamis. Based on the time elapsed, the manual primarily consists of the

| TABLE 28.1 School reopening manual outline after the earthquake and tsunami. |
|---------------------------------------------------------------------------|
| **Day 1**                                                                  |
| ☐ Inquire about the safety of students and teachers                      |
| ☐ Establish school disaster management section                           |
| ☐ Confirm possible communication tools                                    |
| ☐ Confirm students’ family and residence safety                          |
| ☐ Check school building, facilities, and equipment                       |
| ☐ Report to the Board of Education                                       |
| ☐ Prepare to provide support to manage evacuation center                 |
| **Days 2–3**                                                              |
| ☐ Inquire after the condition of students and teachers                   |
| ☐ Investigate and record the damage to school building and equipment     |
| ☐ Investigate and record the damage of the school zone                    |
| **Days 4–7 (First week)**                                                 |
| ☐ Discuss the school reopening with the Board of Education               |
| ☐ Plan for the school reopening and select reopening place (own school, different school, another place) |
| ☐ Discuss the date of school reopening                                   |
| ☐ Discuss the school curriculum                                          |
| ☐ Investigate the safety of school zone                                  |
| ☐ Confirm the schedule of the school bus and public transportation       |
| ☐ Prepare to provide school lunch                                        |
| ☐ Diminish the support of the evacuation center                           |
| ☐ Discuss with local community and stakeholders                          |
| **Days 8–19 (Second and third week)**                                     |
| ☐ Decision regarding the school reopening place and arrangement of the classroom |
| ☐ Decision regarding the temporary school curriculum                     |
| ☐ Prepare to provide school lunch                                        |
| ☐ Announcement regarding the school reopening                            |
| **Day 20 (Fourth week)**                                                  |
| ☐ Reopening school                                                        |
| ☐ Temporary school curriculum                                             |
| ☐ Temporary school lunch                                                  |
| ☐ Psychological support                                                   |

School Reopening Manual, MUE.
following elements: (1) inquiring regarding student safety; (2) establishing a school disaster management section; (3) checking school buildings, facilities, and equipment; (4) having discussions with the Board of Education; (5) preparing plan for school reopening and decision regarding reopening; (6) making a decision regarding the temporary school curriculum; (7) arranging for school supplies (domestic and overseas relief aid, assistance from the PTA council, etc.); and (8) planning the school shuttle bus service routes.

The question that arises is whether the school reopening process for natural disasters is applicable for the COVID-19 pandemic as well. To analyze school reopening after biological hazards in countries other than Japan, we identified seven participating teachers from different areas, including Bhutan, Brazil, India, Nigeria, and Tonga. These teachers are the researchers who were attached to MUE when they were interviewed. They were also the research team members organized for the study and resultant report “Education for Disaster Risk Reduction Integrating SFDRR and SDGs for In-Service Teacher Training” with the UNESCO Regional Science Bureau for Asia and the Pacific and supported by Japan Funds in Trust. Information collection was conducted by semistructured interviews from Japan.

Brazil and India experienced a widespread outbreak of COVID-19, with 19,986,073 and 31,767,965 cases, respectively. Nigeria is dealing with 175,264 infected individuals (as of August 1, 2021). Bhutan had only 2532 cases. There were no confirmed cases in Tonga; however, schools were closed for 2 weeks (March 27 to April 14, 2020) to ensure safety. This research also involved data of Japanese schools, which was collected by members of the in-service teacher training course of MUE. The method used for this research involved collecting information on school reopening and analysis of the school reopening manuals (Table 28.2).

### Table 28.2 Names of participating teachers.

| Name            | Place | School                            | Location                                      | Teaching Level |
|-----------------|-------|-----------------------------------|-----------------------------------------------|----------------|
| SHUKULA Arpita  | India | Jawahar Navodaya Vidyalaya        | State: Madhya Pradesh Division: Sagar City: Tikamgarh | Upper secondary |
| MUNDOTIA Maneesh| India | Kendriya Vidyalaya                | State: Bihar Division: Saran City: Chhapra     | Lower secondary |
| KINEY            | Bhutan| Taba Lower Secondary School       | Capital City: Thimphu                         | Lower secondary |
| SETE Falepiliki  | Tonga | Government School of Nukukeka     | Island: Tongatapu Holonga village              | Primary        |
| OWOLABI Oluwafunke| Nigeria| Becky Parker College              | State: Ondo City: Akure                       | Lower secondary |
| INOTO Febian     | Nigeria| Solid Rock International School   | Federal Capital Territory Capital City: Abuja  | Upper secondary |
| SOUSA Paulo Manoel| Brazil | Escola Municipal Maria de Siqueira| State: Coias Capital City: Senador Canedo     | Lower secondary |

Created by the author.
4. Findings

The following findings are based on the interviews with respondents from Bhutan, Brazil, India, Nigeria, Tonga, and Japan. Common issues were mentioned for the school reopening after a biological hazard (Table 28.3). Long-distance education and online learning were activated. Spacing and arrangement of classrooms and feeding programs became urgent issues. Normal school curriculum was squeezed by the school closure; psychological support was required for the bullied and neglected students. These issues were new challenges at the time of the biological hazard. Sections 4.1 to 4.5 precisely describe these specific issues.

4.1 Long-distance education and online learning

Most schools were shut for more than a month due to the COVID-19 pandemic. During this lockdown period, long-distance education was considered an affordable method to ensure continued learning. Different types of long-distance education and e-learning methods were adopted, depending on the infection level in the area.

In Nigeria, printed take-home material such as activity books, worksheets, and assessment sheets were distributed to students to raise awareness. States radio and television education programs were provided to promote public awareness on preventive measures that should be taken in schools and at homes.

In Bhutan, the Education Council introduced Education in Emergency, and a curriculum targeted at all school ages was developed and adopted. The program was launched in March 2020 and included lessons that were aired through BBS every morning. Approximately 440 video lessons were broadcasted while the schools were closed.

In some areas, the impact on students in public institutions was stronger because of a lack of facilities to implement e-learning. In India, “32 Swayam Prabha” channels, which provide

| Table 28.3 Common issues for school reopening. |
|-----------------------------------------------|
| Spacing and arrangement of classrooms          |
| Water, sanitation, and hygiene                 |
| Preparing hygiene kits and preventive kits     |
| Ventilation in classrooms                      |
| Newly installed air conditioning               |
| Keeping physical distance                      |
| Physical distance among students (including in the washrooms) |
| Restriction of school visitors                 |
| No sharing of food                            |
| Long-distance education and online learning    |
| Printed take-home material                     |
| Television education programs                  |
| PowerPoint presentation                        |
| Online live classes (Google meet, Zoom)        |
| Temporary school curriculum                    |
| Reducing normal study time (including home study time) |
| Ending large gathering activities              |
| Postponing interschool activities             |
| Psychosocial support                           |
| Domestic abuse, depression                     |

*Created by the author.*

IV. Community, awareness, and education
lectures by teachers, were being aired on television. At the same time, online live classes were implemented during the lockdown, through Google Meet, Zoom, video conferencing, video lessons through YouTube, WhatsApp, PowerPoint presentations, PDF files, etc.

It is evident that long-distance education and e-learning have been implemented through varied methods, and while delivering printed material was the basic approach, radio and TV programs were also adopted as needed. For live classes, Zoom and Google video conferencing were identified as the most preferable methods. However, low-income families faced challenges in online teaching as some students did not have access to an Internet connection or devices, and teachers were not familiar with online classes, smartphones, laptops, or Internet, and therefore did not have access to online teaching materials and could not receive support.

In India, most teachers were not acquainted with online technology, and they did not have the necessary support to use online tools. Additionally, most of them could not conduct online classes, as they did not know how to operate a computer.

In most Japanese public schools, long-distance education systems were not introduced for different reasons. The availability of an Internet connection for students’ families differed drastically; therefore, the Board of Education considered this a violation of the “principle of fairness.” Consequently, it was decided that online education would not be offered. This response was similar to that after the East Japan Earthquake that occurred on March 11, 2011. Although many voluntary organizations delivered relief supplies for recovery, the local Board of Education was hesitant due to the “principle of fairness.”

4.2 School reopening space and arrangement of classrooms

Unlike school reopening after natural disasters such as earthquakes and tsunamis, the threat still exists after a biological hazard. To prevent the spread of infection, the utilization of space and distance has to be taken into consideration when reopening schools.

Masks should be mandatory and the temperature of the students and school staff must be checked by a nursing staff appointed from the local hospital. Usage of air conditioners in classrooms is not recommended; instead, doors and windows should be left open. Different entry and exit points or gates should be designated to maintain social distancing. In case of a shortage of classrooms, libraries, sports rooms, computer labs, and community halls can be utilized.

In Brazil, the cleaning staff must thoroughly clean the facilities three times each day, with a special focus on cleaning water fountains, bathrooms, and desks. In Nigeria, the installation of running water and provision of hygiene kits and preventive kits has been advised. Schools must encourage pupils to frequently wash their hands. Furthermore, thermometers and hand sanitizers should be distributed across schools as preventive kits to check the health status of all students across the country. Attempts are being made to improve ventilation in classrooms by making bigger windows.

In Japan, a hygiene management manual was prepared by the Ministry of Education. This manual elaborates on washing hands, coughing etiquette, cleaning and disinfection, ventilation, and wearing masks. Fig. 28.1 describes a suggestion to maintain social distancing in the classrooms based on different infection levels.
4.3 Temporary school curriculum

Schools were completely shut for an average of 3.5 months (14 weeks) since the onset of the pandemic and the normal school curriculum could not be followed. Consequently, measures were implemented to address the lack of in-school learning, including enacting different methods for communication, enacting a shift teaching system, reducing learning time, and cutting the syllabus. Flexibility in attendance and sick-leave formats and allowing students, with the consent of their parents, to study from home with proper learning protocols were also proposed.

In Nigeria, morning and afternoon classes were introduced. This two-shift system ensures that the available infrastructure can serve all the students and social distancing can be maintained.

In Brazil, classrooms utilized only 50% of their capacity, and students were not allowed to sit close to each other. Additionally, students did not attend classes daily: different groups attended school on different days. Major school events such as seminars, sports, and cultural parties were canceled.

In India, it was proposed that only 30%–50% of the students would attend school at a time. Grades 1 to 5 would attend school only twice a week, grades 6 to 8 two to four times a week, and grade 9 to 12 four to five times a week. Some of the suggested measures included eliminating morning assembly sessions, seminars, functions, and gatherings on schools’ premises. There was a proposed framework to reduce the in-school learning time to 100 days and 600 h and add an equal proportion of “active learning hours” at home. The syllabus was to be reduced by 25%–30% to ensure that it can be completed in the available time frame. This would also reduce the stress faced by students.

4.4 Temporary school lunch

Feeding programs and school lunches are an important part of the school education system. After natural hazards such as earthquakes and tsunamis, the lunch kitchen system was abolished, and simple meals were provided.
To prevent the spread of COVID-19, individually wrapped, uncooked, “simple meals (bread, milk, etc.)” were being provided in Japan. In other cases, schools offered a limited menu (e.g., main dish and soup with many ingredients) or serving food in a lunch box at the school lunch kitchen.

In India, schools were to ensure that there is no sharing of food, stationery items, drinking water, etc., among students. Furthermore, there should be no food stalls outside the school. Separate guidelines were to be issued regarding serving mid-day meals in government schools, including mandatory salt or turmeric washes for vegetables, monitored cooking, staggered serving of the mid-day meal to children, daily thermal screening of cooks and helpers, and ensuring the kitchen and serving areas were disinfected.

4.5 Psychological support

The pandemic has affected children physically and psychologically. It has led to strong feelings of sadness, fear, anxiety, helplessness, uncertainty, loss of interest, and hopelessness. Additionally, stressed parents are more likely to respond to their children’s anxious behaviors or demands in an aggressive or abusive manner. Research shows that increased stress levels among parents are often a major predictor of physical abuse and neglect in children. Furthermore, in this situation, children themselves are also experiencing stress and uncertainty arising from the pandemic.

Child-protective organizations are strained as all workers are not available, and consequently, they may not be able to offer home visits in areas that have stay-at-home orders.

In India, to provide support and address the mental health concerns of children during and after the COVID-19 pandemic, the National Council of Educational Research and Training (NCERT) announced “Counseling Services for School Students.” Additionally, schools were advised to introduce yogic exercises and other activities to assist students to adjust to the new format of schooling with physical distancing without any stress.

Bullying of infected students and children of health-care workers at school is one of the greatest problems that is worrying teachers in Japan. Based on the extent of prejudice and discrimination against COVID-19 patients, the Ministry of Education (MEXT) in Japan has developed guidelines for prevention. MEXT has proposed that documents and videos should be used to provide an opportunity to consider the prejudice toward infected students and to collaborate with the local community and parents. Regarding the biological hazards, teachers should take time to enhance human rights education by using the available material.

5. Conclusion

The purpose of this study is to analyze whether the school reopening process for natural disasters is applicable for dealing with school reopening around COVID-19. According to the previous discussion, the revised version of the school reopening manual outline for biological hazards is as follows (Table 28.4).
### TABLE 28.4 School reopening manual outline, case of biological hazards.

| Step 1 |  |
|---|---|
| ☐ Inquire after the safety of students and teachers |  |
| ☐ Establish school disaster management section |  |
| ☐ Confirm possible communication tools |  |
| ☐ Confirm parents’ and residence safety |  |
| ☐ Check school building, facilities, and equipment |  |
| ☐ Report to the Board of Education |  |

| Step 2 |  |
|---|---|
| ☐ Inquire about the condition of students and teachers |  |
| ☐ Observe the health condition of the students and teachers |  |
| ☐ Investigate and record the school building and equipment |  |
| ☐ Investigate and record the school zone |  |

| Step 3 |  |
|---|---|
| ☐ Discuss the school reopening with the Board of Education |  |
| ☐ Plan for the school reopening and select school reopening place and space |  |
| ☐ Discuss the date of school reopening |  |
| ☐ Discuss the school curriculum |  |
| ☐ Printed take-home material |  |
| ☐ Television education programs |  |
| ☐ PowerPoint presentations |  |
| ☐ Online live classes (Google Meet, Zoom, Microsoft Teams) |  |
| ☐ Investigate the safety of the school zone |  |
| ☐ Confirm the schedule of the school bus and public transportation |  |
| ☐ Prepare to provide school lunch |  |
| ☐ Discuss with local stakeholders |  |

| Step 4 |  |
|---|---|
| ☐ Make decision regarding the school reopening space and arrangement of classrooms |  |
| ☐ Water, sanitation, and hygiene |  |
| ☐ Preparing hygiene kits and preventive kits |  |
| ☐ Ventilation in classrooms |  |
| ☐ Newly installed air conditioning |  |
| ☐ Make decision regarding the renewal of school curriculum |  |
| ☐ Make preparations to provide school lunch |  |
| ☐ Announce the school reopening |  |

| Step 5 |  |
|---|---|
| ☐ Make plans for reopening school |  |
| ☐ Maintain physical distance among students |  |
| ☐ Restrict school visitors |  |
| ☐ Plan temporary school curriculum |  |
| ☐ Reduce school study time |  |
| ☐ Include home study time |  |
| ☐ Avoid activities involving a large gathering |  |
| ☐ Postpone interschool activities |  |
| ☐ Plan for temporary school lunch |  |
| ☐ Make preparations to provide psychological support |  |

Created by the author.

### IV. Community, awareness, and education
Highlighted lines show the different points from the reopening manual outline after the earthquake and tsunami (Table 28.1).

After the earthquake and tsunami, the function of the school would be recovered within 1 month, whereas biological hazards will continue to be an issue after school reopening. Therefore, in the case of biological hazards, Date of 1st week to 4th week should be changed to Step 1 to 5.

In Step 3, to plan for the school reopening and select school reopening places and spaces, place and space should be changed when the big earthquake happened. In the COVID-19 situation, the reopening place will be at the original place but, to improve the environment, special equipment is required to ensure sanitization and proper hygiene, as well as the availability of water, the distribution of hygiene and preventive kits, better ventilation in classrooms, and installation of new air conditioning units. In Step 4, regarding the renewal of school curriculum, a number of different steps should be taken, such as revising the curriculum. Printed take-home material, television education programs, PowerPoint presentations, and online live classes (Google Meet, Zoom, Microsoft Teams, etc.) should be used. The psychological support offered is the same as that at the time of natural hazards in Step 5.

6. Discussion

Biological hazards are ongoing risks. Although schools are reopening, the spread of the infection continues. Table 28.5 provides the guidelines proposed by MEXT. School activities have been defined based on the different stages of the biohazard.

According to this chart, school activities that entail a high risk of infection are as follows:

- Group work in which students face each other for a long time at a short distance.
- Activities that involve speaking loudly all at once at a short distance.
- Science: Experiments and observations that students perform in close range.
- Music: Chorus performed by students in close range, instrumental music such as recorders, keyboard, and harmonica.

### TABLE 28.5 School activities and infection stage.

| Infection stage | Social distance          | High-risk school activities                          | School club activities                                          |
|-----------------|--------------------------|-----------------------------------------------------|----------------------------------------------------------------|
| Level 3         | Around 2m                | High-risk activities are prohibited                  | Small number, short-duration, low-risk club activities are permitted |
| Level 2         | 1m, maximum distance will be requested | Under the condition of the spread of infection High-risk activities are prohibited | Low-risk club activities are permitted under the observation of the teacher |
| Level 1         | 1m, maximum distance will be requested | Low-risk activities are permitted following appropriate infectious disease control | Club activities are permitted following appropriate infectious disease control |

*Created by the author, data from MEXT (2020)*
Arts and Crafts: Drawing work and coproduction.
Home economics: Cooking training.
Physical activity: Group competition sports, set gymnastics.

Self, mutual, and public help are emphasized at the time of natural hazards (Ichinose, 2014). However, in the case of biological hazards, public help, especially support from the local community, is not necessarily effective. In some cases, local volunteers visit schools to assist in cleaning; however, it is difficult to take the support of local human resources from outside the school for this purpose.

This does not imply that schools do not need to interact with the local society. The collaboration of teachers with the local community has to be stopped if it leads to discrimination, such as identifying and blaming an infected individual or school. As stated, school activities are defined based on the biohazard stage of a school district. Therefore, just like other natural hazards, the risk management of the school should be combined with that of the local community.

Finally, the resilience of schools in response to the COVID-19 pandemic should be considered.

Resilience involves anticipating, planning, and reducing disaster risk to effectively protect people, communities, and countries, their livelihoods, health, cultural heritage, socioeconomic assets, and ecosystems (UNDRR, 2015). Imamura (2014) states that “resilience is the ability to respond to shocks and strengthening it requires investment in three directions, which are as follows: (1) investment in infrastructure such as earthquake-resistant structures and environmental restoration, (2) investment to improve capacity building by training, etc., and (3) investment to strengthen organizational capacity, including the construction of an early warning system.”

In the future, the following should be considered: (1) investment in infrastructure and Information and Communication Technology (ICT) infrastructure for primary and secondary education levels should be constructed, (2) investment to improve capacity building through training should develop the teacher’s capacity to utilize ICT skills, and (3) investment to strengthen organizational capacity and drills for biological hazards should be incorporated into the school emergency management.

The SFDRR will be applicable for large-scale, infrequent, and slow-onset disaster risks caused by biological hazards such as COVID-19. Lessons garnered from the COVID-19 pandemic must be shared with the school emergency management system.

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