Disaster Risk Reduction Literacy As the Foundation for Successful Risk Communication

Submitted by: Doshisha University
Disaster Risk Reduction Literacy as the foundation for Successful Risk Communication

Session One: Collection and Synthesis of Research, Data and Analysis for Effective Warning

September 25, 2018

Shigeo Tatsuki
Doshisha University, Kyoto, Japan
statsuki@mail.doshisha.ac.jp
Sendai Framework for DRR: Priorities for Action

**Priority 1:** Understanding disaster risk.

**Priority 2:** Strengthening disaster risk governance to manage disaster risk.

**Priority 3:** Investing in disaster risk reduction for resilience.

**Priority 4:** Enhancing disaster preparedness for effective response and to “Build Back Better” in recovery, rehabilitation and reconstruction.
Understanding How we perceive Disaster Risk and Enhancing preparedness accordingly

- The Power of DRR literacy that counteracts “risk seeking” bias in potential loss situations: 2015 Hyogo Survey on Disaster Risk Reduction Results
- The Outcome Evaluations of School- & Community-based DRR Education

Kumamoto Earthquake: A Nursing Care Home Administrator’s Decision on April 16, 2016
Kumamoto Earthquake: A Nursing Care Home Administrator’s Decision on April 16, 2016

Evacuated in front of Mashiki Public Health Center (April 16 AM)

Preparing for Heavy rainfall (April 16 PM)

EQ damaged nursing care home entrance floor (April 17 AM)

The home was red-tagged by the town (April 24 PM)
Prospect Theory by Kahneman and Tiversky (1979)

Question 1: Which would you choose?
   A) Receive $900 for sure
   B) Receive $1,000 with 90 % probability (10% chance of receiving none)

Question 2: Which would you choose?
   A) Lose $900 for sure
   B) 10 % chance of no loss, but lose $1,000 with 90 % probability

If we are hoping to gain something, we look for the sure-fire option rather than a gamble.

If we know that we are going to lose something, we would rather gamble on the chance that we would lose less, than automatically accept the loss of a set option.
Prospect Theory Item in the 2015 Hyogo Survey on Disaster Risk Reduction

You are wondering whether to retrofit your house. If you do, it would cost 2.5 million yen ($25,000) and you experience no damage. If you do not, you would experience damage with 50% probability and it would cost 5 million yen ($50,000) to repair the house.

2,800 questionnaires sent by DRI from Nov. to Dec. 2015
1,103 returned (39.4%)

1995 Kobe EQ Heavy Damage Experience and Protective Action Decisions

Disaster Risk Reduction (DRR) Literacy and Protective Action Decisions

3 Constructs of DRR Literacy

- Understanding of Hazards & Vulnerability
- Confidence in Immediate Action
- Awareness of Self-help, Community help & Public Help

Warning/Alert

Protective Action
3 Constructs of DRR Literacy

Warning/Alert

Protective Action
Formal Disaster Risk Reduction Education

Collaboration of Public Elementary School Teachers, a Local Meteorological Observatory Scientist & a Social Psychologist

Menuma Elementary School, Kumagaya City, Saitama Prefecture

Provided by Professor Reo Kimura
February 17, 2011
Earthquake Disaster Management Programs/A Teacher’s Guide (Step 1)

**Title:** Earthquake Disaster Management Programs/A Teacher’s Guide (Step 1)

**Learning Objective:**
1. Know the basic knowledge on the Earthquake Early Warning.
2. Know the movements of the objects caused by an earthquake and consider how to respond when hearing the Earthquake Early Warning.

**Flow of Learning**

<table>
<thead>
<tr>
<th>Structure</th>
<th>Contents of Learning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Introduction (5 minutes)</td>
<td>Know the fear of earthquake</td>
</tr>
<tr>
<td>2 Development 1 (35 minutes)</td>
<td>Know the movements of the objects caused by an earthquake and consider how to respond when hearing the Earthquake Early Warning</td>
</tr>
<tr>
<td>3 Development 2 (3 minutes)</td>
<td>Learn the rules on the movement to a safe place</td>
</tr>
<tr>
<td>4 Conclusions (1 minute)</td>
<td>Explain the disaster response and evacuation drill using the Earthquake Early Warning</td>
</tr>
</tbody>
</table>

**Notes in the guide (Main questions and assistance to children):**
- "First, are you familiar with "Earthquake Early Warning"? The message of this is "Earthquake Early Warning". Please be cautious about "Earthquake Early Warning" broadcasted on television or radio after the sound of chime. Same message can be heard from mobile phones, too.
- The Earthquake Early Warning is the sound of chime that signifies a message of "be cautious" before the arrival of strong shake. It takes only several seconds in tens of several seconds between the Earthquake Early Warning and the arrival of a strong shake.
- It is better to let the students confirm the sound of chime through playing it on mobile phone or a radio cassette player.
- Let the students understand the meaning of the double-underscored words.

**Evaluation Points**

1. Whether the students understand what kind of action they should take when they hear the Earthquake Early Warning.
2. Whether the appropriate actions, which were learned in the prior learning, could be practiced also in the exercise.

**Related Learning**

1. With the cycle of learning program of "prior learning—practical exercise—review," it is possible to learn disaster response and evacuation drill using the Earthquake Early Warning.
2. For the upper grades, this can be linked with learning of "Science," for example, taking the mechanism of the Earthquake Early Warning as a theme.

---

Earthquake Disaster Management Programs/Worksheet (For Teachers)

### Protect yourself from an earthquake!

<table>
<thead>
<tr>
<th>Grade</th>
<th>Class</th>
<th>Name ( )</th>
</tr>
</thead>
</table>

1. **Let us consider how you can protect yourself.**

<table>
<thead>
<tr>
<th>Location</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classroom</td>
<td>Go under a desk. Hold tight the legs of the table so that the desk cannot move.</td>
</tr>
<tr>
<td></td>
<td>*Teach the actions that can prevent from the desk to move.</td>
</tr>
<tr>
<td></td>
<td>*Go under the desk, which is not your own but the one nearby. If there is no desk around you, teach how to protect the head.</td>
</tr>
<tr>
<td></td>
<td>*Teach that heavy object with casters could move by a strong shake.</td>
</tr>
<tr>
<td>Corridor</td>
<td>Keep away from the window. Squat down while protecting your head.</td>
</tr>
<tr>
<td></td>
<td>*Teach the students that he/she cannot move to a classroom nearby if a strong shake occurs.</td>
</tr>
<tr>
<td>Stairs</td>
<td>Hold on to the rail. Squat down while protecting your head.</td>
</tr>
<tr>
<td></td>
<td>*Teach the students that he/she cannot move to a landing or the classroom nearby if a strong shake occurs.</td>
</tr>
<tr>
<td>Schoolyard</td>
<td>Escape to the place where any object would not fall down, for example, the center of schoolyard. Keep away from schoolhouse and play equipment and squat down while protecting your head.</td>
</tr>
<tr>
<td></td>
<td>*Teach the students that he/she cannot move to the center of a schoolyard if a strong shake occurs.</td>
</tr>
<tr>
<td>Library</td>
<td>Keep away from bookshelves. Squat down while protecting your head.</td>
</tr>
<tr>
<td></td>
<td>*Teach the students that a heavy object with casters could move by a strong shake.</td>
</tr>
<tr>
<td>Toilet</td>
<td>Keep the door open. Squat down while protecting your head.</td>
</tr>
<tr>
<td></td>
<td>*Teach the students that a door could possibly not open because of a strong shake, hence, they would be locked in a toilet room.</td>
</tr>
</tbody>
</table>

2. **What you should beware of to protect yourself?**

- **Move to the place where any object “would not drop” from above.**
- **Move to the place where any object “would not fall down” from the side.**
- **Move to the place where any object “would not move” from the side.**

---

Let's review the exercise!

Grade _ Class _ Name ( )

1. Please circle the applicable answer.

① Could you hear the sound of chime and broadcasting of the Earthquake Early Warning quietly?
   I could do it well, I could do it, I could not do it well, I could not do it

② Could you think about what to do by yourself when hearing the Earthquake Early Warning?
   I could do it well, I could do it, I could not do it well, I could not do it

③ Could do behave swiftly to protect yourself safely?
   I could do it well, I could do it, I could not do it well, I could not do it

④ Could you observe the rule of “OKASHIMOCHI” (don’t push, don’t run, don’t return, and don’t approach) when moving to safe place?
   I could do it well, I could do it, I could not do it well, I could not do it

2. Where did you stay when the exercise began?

3. How did you protect yourself at that time?

---

Questionnaire on Earthquake

Grade _ Class _ Name ( )

1. Please circle the applicable answer.

① Know how to protect yourself correctly if an earthquake occurs.
   I know well, I know a little, I cannot tell either, I slightly don’t know, I don’t know

② Know what is the Earthquake Early Warning.
   I know well, I know a little, I cannot tell either, I slightly don’t know, I don’t know

③ Know that it takes only a short time between the issuance of Earthquake Early Warning and arrival of a strong shake.
   I know well, I know a little, I cannot tell either, I slightly don’t know, I don’t know

④ Know what to do when hearing Earthquake Early Warning (Sound of Chime).
   I know well, I know a little, I cannot tell either, I slightly don’t know, I don’t know

⑤ A place where any object would drop, fall down, or move is dangerous if an earthquake occurs.
   I know well, I know a little, I cannot tell either, I slightly don’t know, I don’t know

⑥ Drop your body low, cover your head and body, and hold on until the shake ceases if an earthquake occurs.
   I know well, I know a little, I cannot tell either, I slightly don’t know, I don’t know

⑦ Protect yourself in the same way as in the case of an earthquake if you hear the Earthquake Early Warning (sound of chime).
   I know well, I know a little, I cannot tell either, I slightly don’t know, I don’t know

⑧ Think and behave by yourself to protect you if you hear the Earthquake Early Warning (sound of chime).
   I know well, I know a little, I cannot tell either, I slightly don’t know, I don’t know

---

School, Meteorological Observatory & DRR Expert Collaboration

Community-based Disaster Risk Reduction Camp

- July 30-31, 2016
  Aoyama Elementary School, Otsu

- August 6-7, 2016
  Kido Elementary School, Otsu

- November 10-12, 2016
  Sakuradani Elementary School, Hino

- August 5-6, 2017
  Gamo Community Center, Higashi-Omi

DRR Camp

• Overnight Camp for Elementary School Children
• Experience and Learn about DRR through Group Activities and Simulations
• Organized by Local Community Leaders including Volunteer Fire Brigades, Local Emergency Response Organizations, and Other Volunteers
• Supported by Local Fire Department

Emergency Soup Kitchen

Shelter Simulation Game

Fire Extinguishing Drill

EQ Motion Simulation
### 項目調整後の「災害の理解」項目

<table>
<thead>
<tr>
<th>問1-3</th>
<th>ハザードマップ（まわりのキケンさをあらわす地図（ちず））を見てわたしの家（いえ）の近（ちか）くでキケンなところがわかる</th>
<th>主成分負荷量</th>
<th>尺度の信頼性（α）</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>問1-2わたしたちの家（いえ）の近さについてよく知っている</td>
<td>0.818</td>
<td>0.620</td>
</tr>
<tr>
<td></td>
<td>問1-8さいがいはわたしにはあまりかんけいないことだ</td>
<td>0.534</td>
<td>0.725</td>
</tr>
<tr>
<td></td>
<td>問1-1さいがいのことを友（とも）だちよりもよく知っている</td>
<td>0.500</td>
<td></td>
</tr>
</tbody>
</table>

### 項目調整後の「必要な備え」項目

<table>
<thead>
<tr>
<th>問2-1</th>
<th>さいがいが赤いときにどうするか家（か）ぞくと話（はな）したい</th>
<th>主成分負荷量</th>
<th>尺度の信頼性（α）</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>問2-9地（ち）いの防災（ぼうさい）くんれんにもさんかしてみたい</td>
<td>0.773</td>
<td></td>
</tr>
<tr>
<td></td>
<td>問2-4わたしたちの家（いえ）の近さについてよく知っている</td>
<td>0.646</td>
<td></td>
</tr>
<tr>
<td></td>
<td>問2-12 まわりの人ともうもえそうな物（もの）をおかないようにしたい</td>
<td>0.623</td>
<td></td>
</tr>
<tr>
<td></td>
<td>問2-5わたしのねるところの近（ちか）くに家具（かぐ）（本（ほん）だなタンス）などをおかないようにしたい</td>
<td>0.538</td>
<td>0.713</td>
</tr>
<tr>
<td></td>
<td>問2-11 一人でいるときにさいがいが赤いのとき近所（きんじょ）の人（ひと）といっしょにひなんできる</td>
<td>0.527</td>
<td></td>
</tr>
<tr>
<td></td>
<td>問2-2さいがいが赤いときに水（みず）や食（た）べものを家（いえ）においておきたい</td>
<td>0.477</td>
<td></td>
</tr>
</tbody>
</table>

### 項目調整後の「とっさの行動」項目

<table>
<thead>
<tr>
<th>問3-5</th>
<th>ひなんじょでそうじや片付（かたづ）けを手伝（てつだ）いができる</th>
<th>主成分負荷量</th>
<th>尺度の信頼性（α）</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>問3-4 ひなんじょでボランティアの人たちに元気（げんき）にあいさつができる</td>
<td>0.758</td>
<td></td>
</tr>
<tr>
<td></td>
<td>問3-6ひなんじょでみんなの手伝（てつだ）いができる</td>
<td>0.737</td>
<td></td>
</tr>
<tr>
<td></td>
<td>問3-2こまったときにまわりの大人（おとな）に「助（たす）けて！」と言える</td>
<td>0.698</td>
<td></td>
</tr>
<tr>
<td></td>
<td>問3-3 かりがいが赤いときにすぐにしようほうじやをよべる</td>
<td>0.623</td>
<td>0.744</td>
</tr>
<tr>
<td></td>
<td>問3-9家（いえ）にだれもいなくてもひなんするかどうかを自分（じぶん）で決められる</td>
<td>0.601</td>
<td></td>
</tr>
<tr>
<td></td>
<td>問3-1さいがいが赤いときもあわてずに行動（こうどう）できる</td>
<td>0.508</td>
<td></td>
</tr>
</tbody>
</table>

---

**Understanding of Hazards & Vulnerability**

**Awareness of Self-help, Community help & Public Help**

**Confidence in Immediate Action**
Research Design

Camp Participants (Experimental G.)
49 Children

Camp Non-Participants (Control G.)
196 Children

Pre-Assessment (Time 1)

Post-Assessment (Time 2)
Understanding of Hazards & Vulnerability

Awareness of Self-help, Community help & Public Help

Confidence in Immediate Action

Community-based Overnight Camp

Overnight Camp Committee

- Local Board of Education
- Neighborhood Associations
- Senior Clubs
- Red Cross Volunteers
- Parent-Teacher Association
- District Welfare Volunteers
- District Welfare Promotion Society
Community-based DRR Camp

Local Board of Education
Senior Clubs
Neighborhood Associations
PTA
Children Clubs
District Welfare
Welfare Promotion Society
District Volunteers
Red Cross Volunteers
Local Fire Department
Volunteer Fire Brigade
Community Emergency Response Team (some Badges)
Formal & Community-base DRR Education to Form DRR Literacy

School, Meteorological Observatory & DRR Expert Collaboration

Community-based DRR Camp

- Prefectural Board of Education
- Meteorological Observatory
- Comprehensive Support Project for Practical Safety Education
- Municipal Board of Education
- Model Project for Disaster Management Education
- Public School
- Meteorological Observatory
- Expert

- Community Emergency Team (SCRE Team)
- Red Cross Volunteers
- Volunteer Fire Brigade
- Local Board of Education
- Local Fire Department
- District Welfare
- District Volunteers
- Promotion
- Society
- Neighborhood Association
- Junior Red Cross
- Senior Red Cross
- Cooperation
- Feedback