

Elementary School Teachers' Situation for Disaster Prevention Education

-Cases of both Hiroshima in Japan and Banjarnegara in Indonesia-

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【Introduction】

Natural disasters have a heavy impact and give big damage to people. In particular saving lives should always be the first priority of all countries around the world. Toward the contribution of the lifesaving, effective disaster prevention education for every generation is more important, because the education can contribute to improving people chance to deepen basic knowledge on natural disasters and to heighten their better attitude and also suitable behavior. After that, if a natural disaster happens to them in the future, they will think quickly and come up with ideas for effective activities to save themselves and also people in their neighborhood. For the promotion and enhancement of this education, the effort at elementary schools is important, because it is the first formal education systematically being executed. Therefore, elementary school teachers have important roles to make pupils learn the basis of disaster prevention.

Recently, many of heavy disasters, such as earthquake, landslide, storm, flood, volcano eruption have happened to here and there in the world. Particularly, on 20th August 2014 and 6th July 2018, Hiroshima Prefecture Japan (here after, *H*) was attacked by heavy rain and heavy sediment disasters in many places. Also, on 13th December 2014, in Banjarnegara Regency in central Java Indonesia (here after, *B*), a large landslide occurred. In both cases, around 100 peoples passed away and/or missed. Nevertheless to say those disasters gave so severe damage to every field of these localities. So, risk reduction is an important issue, common to both *H* and *B*, which is much needed at the national level.

As an activity to contribute to the risk reduction, we have researched the disaster prevention education focusing especially on pre- and/or in-service teacher training of elementary school (ex. Tuswadi and Hayashi, 2012; Hayashi et al., 2017a). Through those research, we have emphasized the necessity of effective in-service teacher training. Basically, the training is necessary to organize and arrange depending on the teachers' current situation and/or awareness of disaster and its education. In here, we will report the situation for disaster prevention education of elementary school teachers in both Hiroshima and Banjarnegara, which includes mainly their educational focus and related problems.

【Research Background】

Disasters are closely related to environment (ex. Djalante *et al.* (2017)), and disaster prevention is included in the ESD (Education for Sustainable Development) (ex. MEXT Japan (2016)), which means disaster prevention education should not be a single issues of science and/or social studies lessons, but to should be dealt as an integrated issue of environment education.

From this point of view, Hayashi *et al.*(2018) reported that awareness for either disaster or the

environment of both Indonesian and Japanese university students, are not sufficient, however they have learned about disaster and environment topics before entering universities. Also they pointed out that such status possibly reflects on the shortage of effective environment education including disaster issues at primary and secondary schools.

Tuswadi *et al.* (2013) reported the problem in Merapi Volcano area primary schools, which are caused by the shortage in teaching ways and knowledge for the development of disaster prevention lessons. Additionally, Hayashi, *et al.* (2017a) reported the status of disaster prevention education of pre-school teachers in Pacitan and Surabaya cities, East Java, Indonesia. In the report, they pointed out that those teachers seem to adapt the educational way with less understanding disaster features and mechanisms. They tend to select disaster topics depending on their own experiences of disasters.

Those reports suppose the necessity of expanding opportunities to learn in both pre- and in-service teacher training. As mentioned above, meteorological hazards are common with flooding and landslides frequently happen to both in Japan and Indonesia.

In cases of August, 2014 and July, 2018 in Hiroshima many of landslide and mud-sand-debris flow occurred by heavy rain. Unfortunately, many people could hardly evacuate the disaster refuge facilities immediately. Although such severe tragedies were repeated, we have not yet found effective solutions. For example in Indonesia, Amri.A *et al.* (2017) proposed the education for risk reduction education for children, with using a case study in Jakarta. After people could acquire important knowledge and practice about disasters, they are expected to behave appropriately, such as quick evacuation following the warning information when they encounter disasters. In Indonesia, peoples' behavior in disasters include problems such as some preparedness for the disaster and quick evacuation.

On an aspect, it is important for students to understand well the features and mechanisms of disasters throughout effective lessons at schools. Because school teachers are charged with a special mission to carry out effective lessons to make pupils learn about basement of disaster prevention, teachers' situation for disaster prevention education is important.

[Aims of the Research]

As mentioned above, teachers are the main contributors to make students to learn about disaster prevention systemically, they are required to possess good teaching capacity. Such kind of teachers' capacity can be heightened and improved through not only sufficient pre- service teacher training, but also effective in-service teacher training. In order to get basic information related to organizing effective in-service teacher training on disaster prevention, we have planned to assess elementary school teachers' situation for disaster prevention education, focusing mainly on their educational focus and problems in the teaching. This assessment is carried out for elementary school teachers in both Hiroshima and Banjarnegara, comparing two cases to each other. Through the comparison, commonality between the two cases can be found.

Based on the results of these assessments, we will propose better way for the in-service teacher training on disaster prevention.

[Methodology]

A questionnaire is used as the main instrument for this research. In this thesis for example , "Q" is

“Q1” shows Question 1, etc.

The questionnaire for *H* consists of 4 questions (Q1-Q4) and that for *B* 6 questions (Q1-Q6). Q1 to Q4 are used in both *H* and *B*, for comparing answers.

The questions are as follows; (Q1) teaching subjects for disaster prevention, (Q2) the kind of focus in disaster prevention class (choose 3 from 10 items [shown below] by order of importance), (Q3) problems in disaster prevention education (choose 3 from 11 items [shown below] by severity order), (Q4) opinions for disaster prevention education (freely writing text).

In the latter, Q5 is the kinds of activity effectively contributed to build up disaster prevention class (choose 2 from 8 items by order of effectiveness), and Q6 is about attributes of respondents, such as age, sex, teaching experience.

The 10 items for answering for Q2 are as follows:

1. Heightening students' interest in disaster prevention
2. Making pupils understand the mechanisms and features of disasters
3. Making pupils consider the daily preparation for disasters
4. Promoting pupils regarding disasters as a his/her own issues
5. Making pupils imagine clearly what happens to them when there are disasters
6. Making pupils consider their behavior when there are disasters
7. Making students interested in local status of the disaster and collect information for disaster prevention
8. Encouraging pupils to share topics they have gotten through disaster prevention lessons at school with their family members
9. Increasing disaster prevention drills at schools
10. Others () [freely writing text]

The 11 items for choosing for Q3 are as follows:

- i. Difficulty to make students imagine clearly about disaster features
- ii. Shortage of teachers' knowledge on mechanisms and features of disasters
- iii. Difficulty for pupils to get knowledge about disaster prevention
- iv. Difficulty to make pupils consider daily preparation for disaster prevention
- v. Pupils' low interest in disaster prevention
- vi. Shortage of time for disaster prevention class
- vii. Shortage of teaching materials and media for disaster prevention class
- viii. Teachers low understanding of how to get information for local disaster prevention
- ix. Difficulty in making pupils share what they have gotten about disaster prevention with their family members
- x. Shortage of disaster prevention drills at schools
- xi. Others () [freely writing text]

Those answers of the questionnaire are arranged using a spread sheet and analyzed using statistical tools. In this report, answers of Q2 and Q3 are the main component, comparing *B* and *H*. The result of answers other than Q2 and Q3 will be reported in another opportunity. Consequently, the tendency of elementary school teachers' situation, especially local teachers experience with many disasters and disaster prevention education, will be discussed.

[Research Findings]

The research was implemented in February in 2017 in *H* and March 2018 in *B*. The respondent were 301 in *H* and 81 in *B*. As mentioned above, in this report, teachers' answers of Q2 and Q3 have been analyzed. The results are described as follows.

(1) Q2:

In Q2, teachers' opinion for "the focus in their disaster prevention education" were asked. Namely it means that with what value they teach disaster and its prevention. The teachers' choices are shown by numeric value of percentage (hereafter, NVP) in items from 1 to 10 in Table 1 and Fig. 1.

The total in Table 1 means the sum of 1st, 2nd and 3rd of each item. NVP of the total of No.6 in both *B* and *H* are more than 80%. But the NVP of the 1st of *B* is 6.2 and that of *H* is 34.2. On the basis of the same way, also the items with secondary and thirdly higher NVP of the total are different between *B* and *H*. The item with secondary higher NVP of the total in *B* is No. 2, which is 58.0 and its NVP of the 1st is 45.7. The item with secondary higher NVP of the total in *H* is No.4, which is 56.8 and its NVP of the 1st is 19.6. The item with thirdly higher NVP of the total in *B* is No.1, which is 39.5 occupied only by of the 1st. The item with thirdly higher NVP of the total in *H* is No.3, which is 42.2 the its NVP of the 1st is 15.6. The NVP of the total of No.5, No.7, No.8 and No.9 range from 20 to 30, and those NVP of the 1st are less than 5.

(2) Q3:

In Q3, the teacher' opinions for "problems in their disaster prevention education" were asked, meaning kinds of difficulties, hardness and shortage when teachers carry out disaster prevention education. The teachers' choices are shown by NVP in items from 1 to 10 in Table 2 and Fig. 2. Also as same as in the case of Q2, results of the total and the 1st of items are mainly described.

The highest, secondary higher and thirdly higher NVP of the total are different between *B* and *H*. except for No.10 and No.11. Comparing with the case of Q2, differences of NVP of the total are rather small among those items.

The item with highest NVP of the total in *B* is No.vi, which is 61.7 and its NVP of the 1st is 1.2 (the third is 40.7). The item with highest NVP of the total in *H* is No.i, which is 39.5 and its NVP of the 1st is 26.6. The item with secondary higher NVP of the total in *B* is No.ii, which is 50.6 and its NVP of the 1st is 32.1. The item with secondary higher NVP of the total in *H* is No.vi, which is 35.2 and its NVP of the 1st is 14.3. The item with thirdly higher NVP in *B* is No. i, which is 43.2 occupied only by the 1st. The item with thirdly higher NVP of the total in *H* is No.vii, which is 34.9 and its NVP of the 1st is 10.6. In *H*, the NVP of the total are less different among No.i, No.vi and No.vii. NVPs of the total of items other than those mentioned above range between 20 and 30. The NVPs of both the total and the 1st of No. x and No. xi are very small.

[Discussion and Conclusions]

As for teachers' focus for disaster prevention education (Q2), more than 80% teachers in both *B* and *H* strongly think to "make pupils consider their behavior when there is a disaster" (No.6). It indicates the teachers have well understood that appropriate behavior, such as a quick response to save his/her own life, is required when disaster occurs. However many teachers of *B* has chosen this item as not the most important, but as the second or third most important. And, 47% of teachers of *B* have chosen the item of

“making pupils understand the mechanisms and features of disaster(No.2)” as the most important. Many teachers of *B* may think to weigh in “understanding disaster feature and mechanism” at first. The distribution of the focus importance level (1st, 2nd, 3rd) of items No.1, No. 2 and No.6 have significant differences between *B* and *H* (2x3 cross table, Mann-Whitney U test (exact test, $P<0.02$). Those items can be regarded as a reflection of the intended curriculum by government, local culture and/or other factors of each locality.

The distribution of the focus importance level of “making pupils consider the daily preparation for disaster (No.3)” , “promoting pupils regard disaster as a his/her own issue (No.8)” , “making pupils imagine clearly what happens to them when there is disaster (No.5)” , “making students interested in local status of disaster and collect information of disaster prevention (No.7)” and “promoting pupils share topics with their family members (No.8)” have no significant difference between *B* and *H* (2x3 cross table, Mann-Whitney U test (exact test, $P>0.05$). These focus can be regarded as common to teachers of *B* and *H*. Thus, many teachers’ value,s possibly caused by their sincere wishes and expectation for pupils’ learning, are more or less common over these two countries.

Next, as for problems in disaster prevention education (Q3), teachers in both *B* and *H* have chosen rather many items with small bias. In almost all items, the distribution of problem severity level are significantly different between B and H (2x3 cross table, Table 2, Mann-Whitney U test (exact test, $P<0.02$). It possibly reflects conditions depending on the school and the pupils of each locality.

So that, many teachers (more than 60%) of *B* have chosen the item of “Shortage of time for disaster prevention class (No.vi)” , however its percentage of 1st bigness is very small. Also about half of teachers have chosen the items of both “Difficulty to make students imagine clearly about disaster features (No.1)” and “Shortage of teachers’ knowledge on mechanism and features of disaster (No.ii)” , in which 30-40% of the 1st (problem bigness) are included respectively. Because these items are practically concerning to lesson implementing, it can see the condition teachers are struggling to manage disaster lessons. Accordingly. we have tried to clarify this status in detail through checking the relationship between items of the important focus and big problem mentioned above. So, the 1st choice of the focus (Q2) and the problem (Q3), regarding as reflecting a strong feeling, are shown in the 3x3 cross table (Table 3) . The Result is that significance relationship between item choice for the important focus shown in lines of Table 3 and the item for the problem bigness shown in columns in Table 3. could not found (3x3 cross table, Fisher's exact test: $P=0.149$, see bottom of the table), meaning situations of the focus and problem are independent to each other.

From the result of this analysis, we wish to recommend teachers to heighten their knowledge of disaster and its education way and also to promote lesson development to bring ideal shown in the focus and reality in the problem closer. For the former issue, in-service teacher training including seminars cooperating with science specialists are considered to be effective as in reports by Hayashi and Isozaki (2013), Hayashi *et al.* (2018a) and Hayashi *et al.*(2018b).

The teachers have given their opinions and ideas for disaster prevention education by free text writing. The results of analyzing those will be reported in another report.

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Table 1: Teacher's opinion for the focus in their disaster prevention education

I: items chosen, L: Locality, numbers, % for N
 B: Banjarnegara N=81, H: Hiroshima N=301
 contents of items 1 to 10 are shown in the text

I	L	importance order			total	
		1st	2nd	3rd		
1	B	39.5	0.0	0.0	39.5	**
	H	17.9	4.3	7.3	29.6	
2	B	45.7	12.3	0.0	58.0	**
	H	5.0	4.0	7.6	16.6	
3	B	1.2	9.9	1.2	12.3	
	H	15.6	13.6	13.0	42.2	
4	B	3.7	8.6	0.0	12.3	
	H	19.6	22.9	14.3	56.8	
5	B	2.5	23.5	4.9	30.9	
	H	5.0	17.3	4.0	26.2	
6	B	6.2	33.3	42.0	81.5	**
	H	34.2	29.6	20.9	84.7	
7	B	0.0	9.9	9.9	19.8	
	H	1.0	3.3	4.0	8.3	
8	B	0.0	1.2	14.8	16.0	
	H	0.7	3.0	22.9	26.6	
9	B	0.0	0.0	22.2	22.2	—
	H	0.3	0.0	0.3	0.7	
10	B	1.2	0.0	1.2	2.5	—
	H	0.0	0.0	0.0	0.0	

Mann-Whitney U test (exact test) ** P<0.02

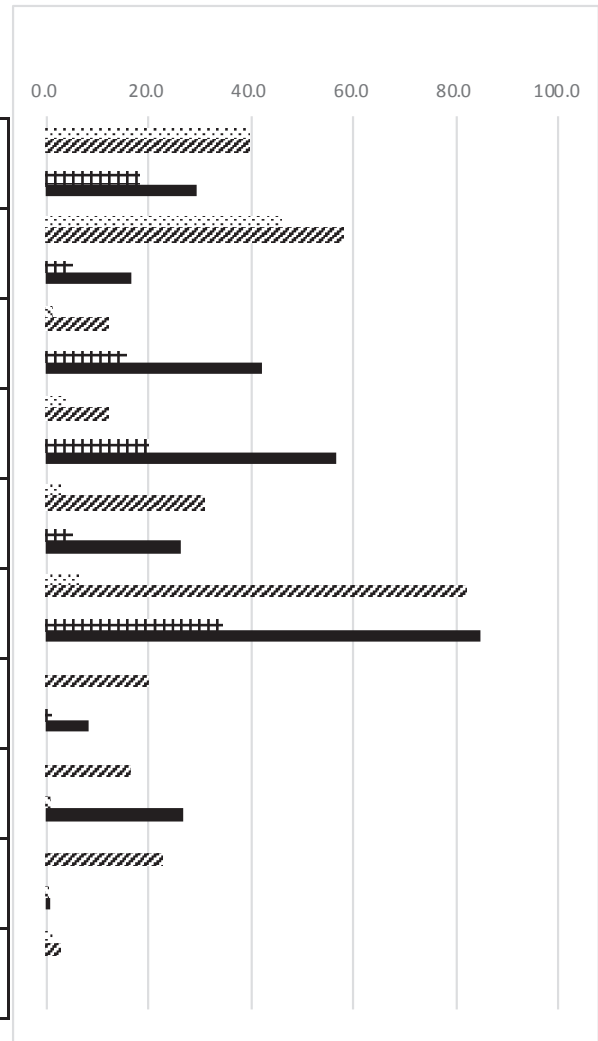


Fig. 1: The 1st and the total chosen in each item.
 Upper bar: the 1st, lower bar: the total

Table 2: Teacher's opinion for the problems in their disaster prevention education
 Abbreviations are the same as in Table 1
 contents of items i to xi are shown in the text

I	L	bigness order			total	
		1st	2nd	3rd		
i	B	43.2	0.0	0.0	43.2	**
	H	26.6	8.0	5.0	39.5	
ii	B	32.1	18.5	0.0	50.6	**
	H	13.3	11.3	8.0	32.6	
iii	B	7.4	17.3	3.7	28.4	
	H	9.0	9.0	5.0	22.9	
iv	B	11.1	17.3	2.5	30.9	**
	H	6.3	11.6	8.3	26.2	
v	B	4.9	23.5	11.1	39.5	**
	H	12.3	7.6	5.6	25.6	
vi	B	1.2	19.8	40.7	61.7	**
	H	14.3	11.6	9.3	35.2	
vii	B	0.0	2.5	17.3	19.8	**
	H	10.6	13.3	11.0	34.9	
viii	B	0.0	1.2	17.3	18.5	**
	H	2.0	5.3	5.6	13.0	
ix	B	0.0	0.0	2.5	2.5	—
	H	3.7	7.6	14.6	25.9	
x	B	0.0	0.0	0.0	0.0	—
	H	0.3	1.0	3.0	4.3	
xi	B	1.2	0.0	1.2	2.5	—
	H	0.0	0.0	0.0	0.0	

Mann-Whitney U test (exact test) ** P<0.02

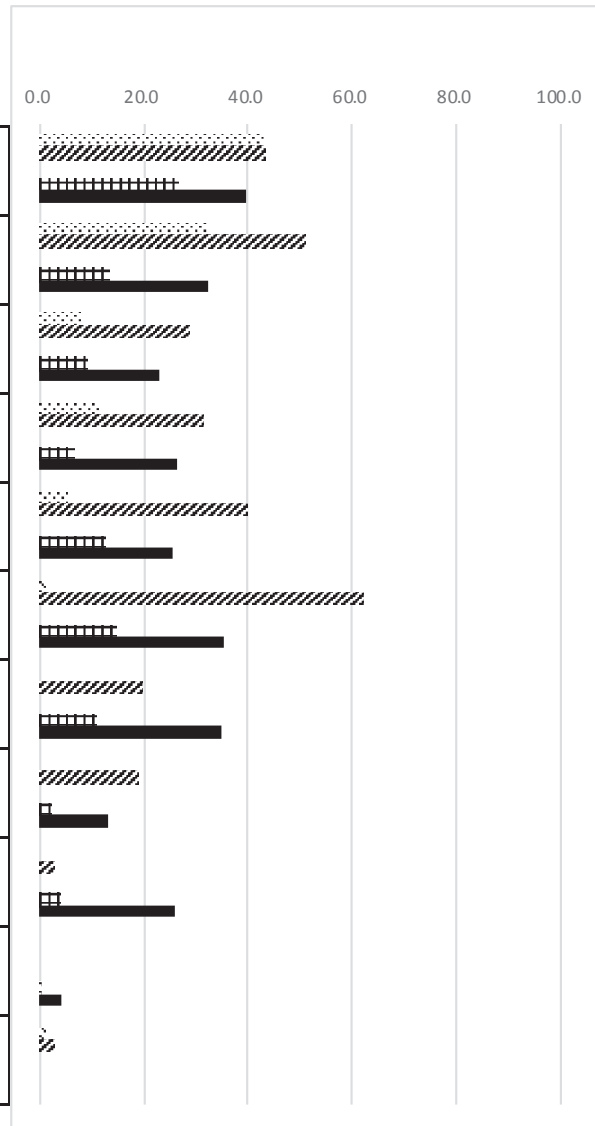


Fig. 2: The 1st and the total chosen in each item.
 Upper bar: the 1st, lower bar: the total

Table 3: Cross table of Focus and problem in the didaster prevdntion Educational (1st choice only)

%		problem in your disaster prevention education biggest (1st)			
		Difficult to make students imagine clearly about disaster features	Shortage of teachers' knowledge on mechanism and features of disaster	other items	total
disaster prevention class 1st important	Heightening students' interest in disaster prevention	22.2	11.1	6.2	39.5
	Making pupils understand the mechanisms and features of disaster	17.3	17.3	11.1	45.7
	other items	3.7	3.7	7.4	14.8
	total	43.2	32.1	24.7	100.0

3x3 Fisher's Exact test: P=0.149