Current Status of University Students' Awareness on Disaster Prevention and Environment

-Cases of Islamic University of Ahmad Dahlan in Yogyakarta and Hijiyama University in Hiroshima-

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【Introduction】

Natural disasters have a heavy impact not only on children but also on youth and education systems. In many developing countries, children form the bulk of the population and along with women and the elderly are frequently the most vulnerable to natural disasters (Enarson, 2009). Many studies of disaster suggest that each year 175 million children are likely to be affected by natural hazard related disasters alone.

Saving children should be always the first priority of all countries in the world. Toward contribution of the saving, effective disaster prevention education is important, because the education can make pupils chance to get basic knowledge on natural disasters in order to build up their better attitude and also behavior. So that in future if they face natural disasters, they will think quickly and choose effective activity to save themselves and also their neighborhood people. So, effective disaster prevention education should be continuously organized not only to children but also to all generation. Of course, early stage of the education set up in pre-school and/or elementary school followed by secondary school. Therefore, school teachers are charged with the important role to the education. So, the authors have researched the teachers' awareness on natural disaster and its prevention education. Recently, 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 get the educational way to manage disaster prevention lesson with less understanding disaster and its mechanism shown by the case of selecting disaster topics in which many teachers are occupied by their own experience on disaster. Additionally, they emphasized that continuous in-service training is important for teachers to get new knowledge and skills for more effective teaching. After the report, it means the teacher training programs of university or colleges are not sufficient and/or include some teaching problems. At any rate, it is needed to set up appropriate curriculum about disaster prevention for university students attending teacher training programs.

Recently disaster prevention education has been included in the ESD (Education for Sustainable

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Development) (MEXT, 2016). It means disaster prevention should not be a topic of science and/or social lessons simply but to be dealt as an integrated topic of environment education.

【Research Background】

Recently heavy natural disasters have frequently happened to many places in the world, and lots of people, including many students and teachers, have suffered from those disasters. For example, some 38,000 students died in the 12 January earthquake in Haiti, which also killed 1,300 teachers and education personals (UNESCO, 2010). Also, during the Sichuan earthquake May 2008 in Chins, approximately 10,000 students were crushed in their classrooms and more than 7,000 school rooms collapsed. The 2007 Sidr cyclone in Bangladesh destroyed 496 school buildings and damaged 2,110 more. The Super Typhoon Durian in the Philippines caused large damage correspondent to 20 million $US damage to school, including 90-100% of school buildings in three cities and 50-60% of school buildings in two other cities (UNESCO, 2010).

Indonesia and Japan, as large archipelagic countries positioned on the subduction zone of "plates", are highly prone to the impacts of earthquakes, volcanoes and tsunami genic earthquakes. Also in Japan the extremely large earthquake (named as "The 2011 off the Pacific coast of Tohoku Earthquake") brought about so heavy damages. The specifically large-scaled tsunami generated by the earthquake let out more than 19000 people passed away (FDMA, 2016).

Meteorological hazards are common with flooding and landslides frequent both in Japan and Indonesia. In the western islands of Indonesia while drought is persistent problem in many eastern areas which also suffer strong seasonal winds (Haynese *et al*., 2010). Between January and August 2015, Indonesia experienced 1,160 disasters, including drought, forest fires, volcanic eruptions, landslides, and floods. Also during that period, there were cases of 373 flooding, affecting 607,000 people. Rains in January 2015 submerged roads in Jakarta, and more downpours in February caused further flooding, affecting more than 27,000 people. The floods affected 351 schools in northern Jakarta (Japan Times, 2016). August 2014 Hiroshima City suffered from both landslide and mud-sand-debris flow caused by heavy rain, in which 77 people died. Unfortunately, the heavy rain attacked the suffered area in midnight so that many people could hardly evaporate to the disaster refuge facilities immediately. Although such tragedies were repeated so far, we have not yet found clear and effective solution for this severe problem. Such kind of suffering has been brought partially by shortage of knowledge or ineffective education. After people have acquired important knowledge and practice about disasters, they will act more appropriately when they face the disasters. When disaster happens to people, at first, they must select better way to save their life against the disaster. Preparing the higher risk of the disaster, it is needed for us to consider always the disaster prevention as an important issue of home.

The risk management for such disasters includes both "soft" and "hard" components (Tuswadi and Hayashi, 2014). The former contains some constructions such as the tall bar against Tsunami, necessary rescue tools and facilities prepared for disasters. For example, schools in the Merapi volcano area, many schools have prepared some tools and equipment against volcanic eruption (Tuswadi, 2012). The latter contains kinds of persons' wisdom leading suitable attitude and activities to save their own, families' and neighbors' life and properties from disasters, which are expected to grow up mainly through the appropriate lessons and practical drilling on the disaster prevention. As to such soft components Tuswadi

(2012) has reported the status of these components in schools in the Merapi area, in which teachers' knowledge and usage of teaching media are not always enough for disaster prevention teaching. Of course, the most desirable way is the best combination between the former and the latter.

【Aims of the Research】

In school education, disaster prevention teaching is charged with the important role of the soft component. Teachers are the main actors to make pupils chance to study about disaster prevention deeply. In order to effectively deliver knowledge and skills about disasters and prevention to pupils, teachers are required to possess good teaching capacity. Such kind of teachers' capacity can be acquired and improved through not only sufficient pre-service teacher training but also effective in-service one. To guarantee that the teachers have good skills in implementing disaster prevention education at school, we have researched to assess both teachers' and teacher applicants' status on understanding about disaster prevention teaching.

As shown above, shortage of knowledge through ineffective education will possibly make disaster heavier, it is needed to expand and improve teachers' capacity for disaster teaching as main educator. Therefore, it is needed to improve and expand the teachers' capacity in disaster education (Hayashi *et al*., 2017a).

Especially in the case of pre-school (kindergarten and nursery school) teachers in the central Java, they should play important roles not only to organize effective teaching in disaster prevention classes but also to save younger children if disasters happen to them following suitable judging. Accordingly, we researched the pre-school teachers' status for disaster prevention education by the questionnaire containing items of disaster teaching, availability of time for disaster teaching, teaching materials and teaching aids, teaching technique, and their understanding about disasters and mechanism. Consequently, it is clarified that those pre-school teachers' understanding level on disaster feature and mechanism relate less with their selection for disaster teaching focus. And these teachers seem to get the educational way to manage disaster prevention lesson with less understanding disaster and its mechanism shown by the case of selecting disaster topics in which many teachers are occupied by their own experience on disaster (Hayashi *et al*., 2017a).

However, the status for disaster lessons at an elementary school have been reported (Tuswadi *et al*., 2013; Tuswadi and Hayashi, 2014), any research reports on status of Indonesian university students attending teacher training programs for elementary and secondary schools have not been reported as well as university students in Japan. Because those students will possibly work as teachers in future, they must acquire basic information to enrich the curriculum of disaster and its prevention much more. Therefore, we have tried to clarify students' current status of awareness related to disaster prevention. After the above-mentioned report by Hayashi *et al*. (2017a), one of important focus of this research, as same as the pre-school teachers case, is how students' experience of disasters influence awareness for issues on disasters prevention and its education. The conclusion of this research is expected to contribute to the curriculum development of university lessons on disaster prevention.

【Methodology】

An exploratory and non-experimental research design was used this study. A non-probability

purposive sampling technique was adopted. Questionnaire was used as the research instrument for this research.

168 students of semester 3, Guidance & Counseling Department, Faculty of Teacher Training and Education, Islamic University of Ahmad Dahlan and 79 students from Department of Child Development and Education, Hijiyama University have participated in this research. Almost all of the students wish to become a teacher after they graduate from each university.

The questionnaire for Islamic University of Ahmad Dahlan students consists of three sections. Section I assessed the students' attributes about their age, sex, senior high school and home town. Section II was focused on students' experience of disaster and learning about disaster and its prevention. Questions are as follows; status of home town (Q1), status of boarding house (Q2), place to get disaster learning experience (Q3), disaster learning content the students got (Q4), disaster learning theatrically (Q5), disaster drill (Q6), disaster learning at university. (Q7), university student learn disaster prevention (Q8), students' knowledge & skills in disaster prevention (Q9), students' top learning resources (Q10), volunteer in disaster event (experience) (Q11), victims of disaster (experience) (Q12), actions during earthquake in the room (both experience and opinion) (Q13). Section III asked Indonesia traditional spirit for disaster and human behavior. In this paper, the results of Section Ⅲ questions are omitted and will be reported in another opportunity.

Questionnaire for the Hijiyama students asked students' awareness of both social and natural environment through the freely writing way. Particularly main purpose of this case is to check how much the interest to natural disaster, as an important problem of environment, is in the consciousness of the environment. Because those students belong to 1st grade, so they have not yet learned about any environment topics including disaster.

These questionnaire researches have implemented in September 2017 at Islamic University of Ahmad Dahlan, and in October 2017 at Hijiyama University respectively.

Collected data from students of Islamic University of Ahmad Dahlan was utilized for finding awareness for both disasters and disaster prevention education. Data from Hijiyama University students was utilized for finding awareness for both social and natural environment. After that, these two results were compared to each other. Consequently, the tendency of students' awareness on disaster prevention and environment, which are regarded to be formed by learning and experience so far, was discussed.

The contents of questions are shown together with those results in the next chapter. Answers of the questionnaire are arranged using spread sheet and analyzed using descriptive and inferential statistics.

【Research Findings】

(1) Islamic University of Ahmad Dahlan students' case

Section I; In this section, students' some attributes were asked. The students participating as the respondents in this research consist of 30% of male and 70% of female. Their ages composition is 19 years old (66%), 20 (21%), 18 (8%), and 21-22 (1.2%). Those students belong to third semester of the

Table 1: Cross table of the status of students' boarding houses & the status of their home towns

		Status of home towns			
N=165	%	safe	risky	very risky	total
Status of boarding houses	safe	41.8	3.6	0.6	46.1
	risky	28.5	24.2	0.0	52.7
	very risky	0.0	0.6	0.6	1.2
	total	70.3	28.5	1.2	100.0

Fisher's exact test P=0.000

University. Their home town widely distributed in Indonesia.

Section II; The question on students' awareness for disaster and its education. The results of questions (Q1-Q12) are as follows. Some questions of them are shown in cross tables.

The students' status of both home town (Q1) and boarding house (Q2) are rather safe (Table 1). On the other hand, the half of boarding houses is risky (52.7%). After the statistic test, it is shown that the risk status of home town and home town is closely related to each other (Fisher's extended exact test, 3x3 contingency table, P=0.000). It may suggested that those students can find the problem of the house conditions for disaster such as earthquake.

As shown in Table 2 for Q3, the students' experience about disasters learning is mainly in "primary and senior high schools" (totally 23.1%), and cases in "primary, junior high, university" (14.3%), "Univ. only" (7.7%) and "junior high only" (7.1%) are quite many.

As for Disaster learning contents asked in Q4 in schools, dominant one is "forget" followed by "earthquake only" (26.0%) and "disaster drill" (9.6%). Other than these three contents are few (less than 4%). The "forget" may mean that they were given low impact from disaster leaning in their experience.

Table 2: place to get disaster learning experience

N=168	%
in primary school only	13.1
in primary, junior, and senior high schools	10.1
in junior and senior high schools	4.8
in primary, junior, senior, and Univ	14.3
in Univ. only	7.7
in senior high school only	19
in senior high school and Univ.	2.4
Totally never	0.6
primary & junior high	1.8
Jinior high only	7.1
junior, senior & univ.	2.4
primary & senior	1.2
junior high & univ.	0.6
Not clarified	14.9

Table 3 shows students' opinion on both disaster drill and disaster learning theoretically. Generally speaking, those students think both the former and the latter are important. Around 32% of students think disaster drill very important and around 40% think that disaster leaning theoretically is very important. After the statistic test, there is high significant relationship between these two questions (Fisher's extended exact test, 3x2 contingency table, P=0.000).

Table 3: Cross table for disaster learning theoretically & Disaster Drill

		Disaster Drill		
N=167	%	Very important	Important	total
disaster learning theoretically	Very important	32.3	7.2	39.5
	Important	25.7	34.1	59.9
	Not Important	0.6	0.0	0.6
	total	58.7	41.3	100.0

Fisher's exact test P=0.000

Table 4 shows the frequency of disaster learning at university (Q7) and opinion learning disaster prevention (Q8). The opportunity of disaster learning at university is not much as 43% of "often" and "sometimes". On the other hand, the students think the latter is important, 40% of them think it is very important.

There is significant relationship between these two questions (Fisher's extended exact test, 4x3 contingency table, P=0.017).

Table 4: Cross table for disaster learning at University & learning disaster prevention

		learning disaster prevention			
N=165	%	Very important	Important	Not Important	total
disaster learning at University	Often	9.1	4.8	n.a.	13.9
	Sometimes	8.5	20.6	n.a.	29.1
	Seldom	13.3	21.8	n.a.	35.2
	Never	9.1	11.5	1.2	21.8
	total	40.0	58.8	1.2	100.0

Fisher's exact test P=0.017

Table 5 shows opinion for the frequency of

Table 5: Cross table for the Disaster learning at University & knowledge and skills in Disaster Prevention.

		Students' knowledge & skills in Disaster Prevention				
N=162	%	Much	Quite much	Few	Very few	total
Disaster learning at University	Often	2.5	4.9	6.8	n.a.	14.2
	Sometimes	1.2	15.4	11.7	n.a.	28.4
	Seldom	1.2	14.2	19.1	0.6	35.2
	Never	n.a.	4.9	15.4	1.9	22.2
	total	4.9	39.5	53.1	2.5	100.0

Fisher's exact test P=0.006

disaster learning at university (Q7) shown above and self-assessment for knowledge and skill in disaster prevention (Q9). In both question, the students to give positive answer are less than 50%. In particular students having much knowledge and skill in disaster are few (less than 5%).

It could be found that student having the higher knowledge and skills in disaster prevention, they have the higher opportunity for learning it (Fisher's extended exact test, 4x4 contingency table, P= 0.006).

From the totaling of Q10, students' (N=166) dominant learning recourses on disaster are "mass media" (80.1%), subdominant "teacher and lecture" (13.3%), thirdly "others" (6.6%). It suggests that they usually get information of disaster from media.

In Q11, it has been found that around one third of the students have the volunteer experience in disaster event, and in Q12, 18.5% of the students have experiences of victims of disaster (Table 6). Numbers of both volunteer and victim experiences are not few respectively. It means that disaster is not rarely, but often happens to Indonesia.

Table 6: Cross table for victims of disaster & students' knowledge & skills in disaster prevention

		volunteer in disaster event (experience)		
N=168	%	yes	no	total
victims of disaster (experience)	yes	9.3	9.3	18.5
	no	23.5	58.0	81.5
	total	32.7	67.3	100.0
Students' knowledge & skills in Disaster Prevention (self assessment)	Much	2.5	3.1	5.6
	Quite much	17.5	21.9	39.4
	Few	13.1	39.4	52.5
	Very few	n.a.	2.5	2.5
	total	33.1	66.9	100.0

Fisher's exact test P=0.032(upper), P=0.032(lower)

After the statistic test, close relationship between the volunteer experience in disaster event and experiences of victims of disaster as well as a case between the volunteer experience and students' knowledge & skills in Disaster Prev. (self-assessment) (Q9), (Fisher's extended exact test, 2x2 and 4x2 contingency tables, both P=0.032).

In Q13, actions during earthquake in the room (both experience and opinion) is asked (N=167). As a result, two third of students answered "hiding under the table", and one third "run quickly out of the room and protecting the head". The former way is effective for saving one's life during earthquake. As mentioned above, if students realize the problem of houses like as construction weak to earthquake, they cannot help to take the latter way.

(2) Hijiyama University students' case

As mentioned above, Hijiyama University students gave answers text through free-writing corresponds to questions about students' awareness on social and natural environment. From each students text on both social and natural environment, keywords were picked up.

A) Social environment

The list of students' keywords over than 2 frequencies is shown in Table 7 respectively. Totally 163 words have been picked up. On average, students wrote 2-3 words. Another keyword omitted from the Table 7.

The keywords other than in Table 7 are as follows. The frequency of every keyword is only 1.

[adult around us, advanced traffic system, all-time restaurant, artificial matters, atmosphere, atmosphere of staying place,

Table 7: Keyword from text written by Hijiyama students (N=79)

keyword	frequency	%
school	11	13.9
home	9	11.4
human relationship	9	11.4
company	5	6.3
classroom	4	5.1
family	4	5.1
house	4	5.1
friend	3	3.8
birthrate and aging	2	2.5
food	2	2.5
law	2	2.5
living place	2	2.5
play space	2	2.5
town	2	2.5
working	2	2.5
working place	2	2.5

% frequency/79(N)x100

barrier-free, black company, boss, bullying, children's personality and character by life living, clean, cleanliness and tidiness, cloth, CO2 from car, common sense, communication, confliction between US and Korea, constructed matters, control our future, convenience store, current thoughts, daily life with family, danger, difference of the poverty and wealth, drainage from factory, electric pole electric wire, electricity, electronic tools development, employment system, environment around us, exhaust gas, facilities around us, feeling throughout life living, globalization, greeting, greeting , group, group behavior, high level of life living, higher hygiene status, highway, human and matters around us, human beings around us, husband and wife working, hygiene, hierarchy, important, increasing children waiting, information device, insufficient sleep by the business, keeping time, less relationship with local community, life living environment, life style related disease, livable, living, local area, money, monster parent, neighborhood, nuclear family, obesity, ordered road, parental leave, park, place, play equipment, political issue of Japan, political trend, position, public traffic, relationship with persons around us, residential place, respecting elder persons, road, sand box, school and town watching, seasons, set up of chair and desk for studying and eating, shop, sleeping, social problem, social rule under the law, social security, social system, society, staff room, stress by long working, study starting, tall building, terrorism, thing around us, traffic rule, traffic signal, with nature, wood, zebra crossing].

From surveying, all over keywords (Table 7 and others shown above), every issue of daily life is covered. Dominant keyword is places and facility, such as school or family etc., where they spend lots of time every day are just "social environment" for students. On the other hand, issues on whole and/or local society, such as working or town, are rather few.

B) Natural environment

As same as in the social environment, the list of students' keywords over than 2 frequencies is shown in Table 8. Totally 149 words have been picked up. On average, students wrote 2-4 words. Another keyword omitted from the Table 8.

The keywords other than in Table 8 are as follows. The frequency of every keyword is only 1.

[activities with nature, animals, atmosphere temperature, biotope, clean, clean air, climate, colored water, cutting tree, dangerous ant, disaster, disaster prevention, earth, ecosystem, environment problem, environment for living things, family, feel nature trough study, few movement of environment protection, few place for outdoor playing, fish, flower growing, flower stand, forest, fruit, full green, geographical features, glass and wood, global environment, growing plants, importance of nature, increasing CO2, land, much nature, natural destruction, natural disaster, natural matters, natural phenomenon, observation in lessons, outdoor, ozone depletion, place of living things, planting, plants, play equipment, play with sand, pond, rabbit and killifish keeping, rain , recycle, relationship as human, sardines run, school ground, seasons, sky, snow, soil, star, surrounded by nature, temperature change of atmosphere, tradition, tunnel opening, vegetables, water quality, zoo]

Table 8: Keywords from text written by Hijiyama Students (N=79)

keyword	frequency	%
river	18	22.8
wood	17	21.5
sea	16	20.3
mountain	15	19.0
global warming	13	16.5
insect	13	16.5
weather	9	11.4
plant	8	10.1
animal	7	8.9
glass	5	6.3
tree	5	6.3
air	3	3.8
living things	3	3.8
season	3	3.8
water	3	3.8
acid rain	2	2.5
desertification	2	2.5
flower	2	2.5
glass and flower	2	2.5
moon	2	2.5
rain	2	2.5
sea level rising	2	2.5
sun	2	2.5
untouched matters	2	2.5
untouched nature	2	2.5
wind	2	2.5

%=frequency/79X100

Comparing with the keywords of the social environment case mentioned above, kinds of keyword is fewer, and it tends to concentrate into specific words. Those are mainly natural matters, such as river, mountain, sea or wood which are entirely familiar with student because of natural matters around them in daily life. The keyword about natural matter includes 74% of the total keywords, and that about natural phenomenon is 26%.

However natural phenomenon is rather few, "global warming", as a big global environment problem, is not few (16.5% students wrote). Additionally, the total frequency of "acid rain", "desertification", "sea level rising" and others is 15 (19%). 3 students wrote a word about "disaster" respectively.

【Discussion and Conclusions】

However, disasters frequently happen to here and there in Indonesia, it seems that many of Islamic University of Ahmad Dahlan students have not much study on disaster in both primary, high schools before university entered (Table 2). It is supported that the students having much knowledge and skill are very few and students having few ones are over than 50% (Table 5). Reflected on such status, almost all of the students think disaster learning at university important (Table 4).

The students think "theoretically learning disaster" so strongly important that their "disaster drill" times more (Table 3). Following students' status and opinion, disaster learning at university must be focused not only on theoretical topics but also on disaster drill. At university, theoretical learning on academic viewpoint may be major contents, so the drill may be difficult to organize. So how to manage the drill into the theoretical topics is critical; how to merge the drill for disaster, how to implement the drill independent from lectures. At least, we wish to recommend special lecture or activity on disaster and its prevention for students who wish to become school teachers.

During a disaster, many volunteers are needed. In such cases; the authorities, such as the government and/or disaster relief, may demand people's assist. At that time, young people such as university students will be frequently asked to join in the activities for the assist. Not few students have experience of disaster volunteer, and some of them have experience of victims of disaster (Table 6). In particular, students' victim experience may heighten their volunteer mind in disaster event. Such kinds of experience possibly have an influence on disaster teaching as the report by Hayashi *et al*. (2017a). In the same report, they emphasized that "teachers seem to get the educational way to manage disaster prevention lesson with less understanding disaster and its mechanism shown by the case of selecting disaster topics in which many teachers are occupied by their own experience on disaster". Referring these authors' pointing out, it is important to learn disaster and its prevention theoretically based on his/her "experience on disaster".

As for actions during earthquake in the room, Islamic University of Ahmad DahlanIndonesian university students well understand effective attitude and behavior. When an earthquake occurs during school time, as an important mission, teachers must take the best action quickly to save both pupils and themselves. So, learning for better preparedness for earthquake is required toward further risk reduction of earthquake.

Regarding Hijiyama University students' awareness on environment, in social environment aspect they have a tendency to be occupied by facilities, home and human relationship closely related to their activities in daily life, which are just current status of students' awareness limited to rather narrow

range. Because they have not yet attended in authentic environment education lectures, effective lessons of later semesters must be well arranged to extend their knowledge and concept on social environment much more.

As same as in natural environment case, Hijiyama University students' awareness is tend to be occupied by natural "matters" such as river, wood, sea and so on. These natural matters with people's good image may easily lead students to associate with natural environment. On the other hand, some students are aware of environment problem such as global warming and acid rain. And few students are aware of "disaster".

In cases of both Indonesian Islamic University of Ahmad Dahlan and Japanese Hijiyama University students, either disaster or environment are not enough, however they have learned about disaster and environment before entering universities. Such status may mean shortage of effective environment education including disaster issues at primary and secondary schools. Such status of students' awareness upon environment and disaster can be regarded to be more or less common in all countries.

Considering these things mentioned above comprehensively, and focusing on the aspect of "ESD", it is required to emphasize that disaster gives heavy damage not only on people's life and everything but also on environment. Namely a disaster destroys or changes simultaneously human community and natural environment surround us. But, for example, earthquake itself is a natural phenomenon. If phenomenon related to environment problem such as global warming or desertification progresses, it possibly makes disaster damage heavier. In a sense, the protecting environment can contribute to disaster prevention; just say "a kind of risk management".

Therefore, through the environment education, we recommend to emphasize that protecting nature is not only keeping directly nature well but also decreasing disaster damage indirectly.

Hayashi and Isozaki (2013), Hayashi *et al*. (2014) and Hayashi *et al*.(2017b) proposed that collaboration by science experts from university and/or special institutes concerning to disaster prevention is effective for in-service teacher training. After those propositions, we recommend such collaboration is adapted in pre-service teacher training program, too.

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