

A Survey on The Disaster Preparedness Status of Foreign Residents in Japan

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Abstract: Japan is a county in which natural disasters occur frequently. In contrast to Japanese citizens' high awareness for natural disaster preparedness, foreign residents in Japan are assumed to be vulnerable to the disasters due to language barriers, cultural differences and especially, lack of disaster preparedness education. In order to address this problem, the authors aim to build a multiple language mobile educational platform for foreign residents in Japan to improve their disaster preparedness and awareness. As preliminary work for the platform building, a survey was conducted in May - June, 2020 to investigate the current status of disaster preparedness and awareness of foreign residents in Japan. Two hundred fifty-one foreign residents located in 29 different prefectures of Japan responded to the survey. The results of the survey confirmed part of our assumptions that foreign residents in Japan are concerned about possible future occurrences of natural disasters but are not confident with their disaster preparedness knowledge and skills. Despite the fact that 69% of foreign residents reporting that they had participated in disaster drills, the majority of such drills were conducted in Japanese and targeting Japanese citizens. The results of the survey indicate that a multi-language mobile disaster preparedness education system would be welcomed and is needed for foreign residents in Japan.

Keywords: Survey, disaster preparedness, foreign residents in Japan, multi-language mobile learning system

1. Introduction

According to the Basic Resident Register Population and Households issued by the Japan Ministry of Internal Affairs and Communications, up to January 2, 2020, the number of foreign residents in Japan was 2,866,715, being 2.25% of the total Japanese population. The population of foreign residents in Japan has continuously increased for the past six years while the population of Japanese citizens has continuously decreased since 2009 (Japan Ministry of Internal Affairs and Communications, 2020). Obviously, foreign residents in Japan play a very important role in keeping Japan's economy and society dynamically moving and they have made and will continue to make contributions to Japan. Thus, how to attract foreign talent and enable those people to work and live in Japan safely is linked to Japan's sustainable development.

Japan is the country that is most affected by natural disasters. Living in such an environment, Japanese people are highly aware of disaster prevention. There are numerous disaster preparedness websites on the Internet, but most are in regular Japanese, at the most with a simple and incomplete English translation. (Japan Fire and Disaster Management Agency, 2020; Citizens' Disaster Prevention Lab, 2020; Matsue City Government, 2020; Shimane Disaster Information, 2020). Some disaster prevention websites indeed provide multiple languages, however, which in most cases are machine translations from Japanese. See website of Tokyo Disaster Prevention Information (2020): <https://www.bousai.metro.tokyo.lg.jp/index.html>. Disaster drills are regularly organized in schools, work-places and communities. However, almost all such drills are designed for Japanese citizens and conducted in Japanese. For those who have limited Japanese language ability such websites drills are hurdles for them. These foreign citizens are isolated from the disaster information world and are therefore vulnerable to disasters and so they are called "disaster vulnerable" (Okamoto, 2006).

In order to help foreign residents in Japan to learn disaster preparedness and equip them with disaster prevention skills, a multi-language mobile educational system for foreigners to prepare for

disasters is being built (See Figure 1 and Figure 2). For the purpose of designing a mobile educational disaster preparedness system which can meet the needs and demands of foreign residents, a questionnaire survey on Disaster Preparedness and Awareness for Foreign Residents in Japan was conducted in May and June, 2020. Through the survey we aimed to discover to what extent foreign residents in Japan are prepared for disasters, what are their concerns and needs in preparing for disasters.

There were similar surveys conducted in the past. However, these surveys either focused on an individual area or on a certain group of foreign residents, or on an individual form of disaster. For example, Bureau of Olympic and Paralympic Games Tokyo 2020 Preparation conducted a survey to investigate awareness and needs in terms of foreigners' safety and security in Japan (Bureau of Olympic and Paralympic Games Tokyo 2020, 2016). However, this survey targeted only foreigners in Tokyo region. Yang, Akase & Kiritai (2010) surveyed foreign residents only in Nagaoka City and Chiba City. Wei & Hisamoto (2019) investigated only international students' awareness toward earthquakes and typhoons, not general foreign residents.

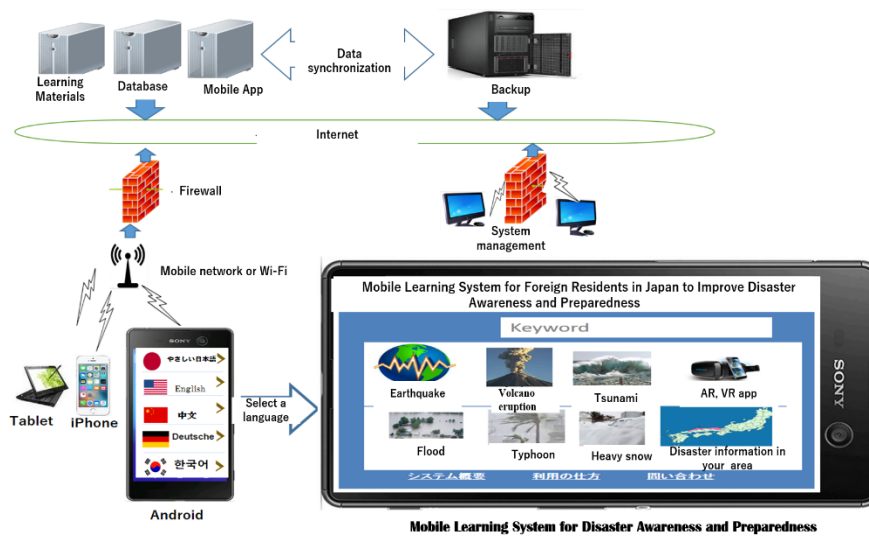


Figure 1. Technical structure of the mobile learning system for foreign residents in Japan to improve disaster awareness and preparedness

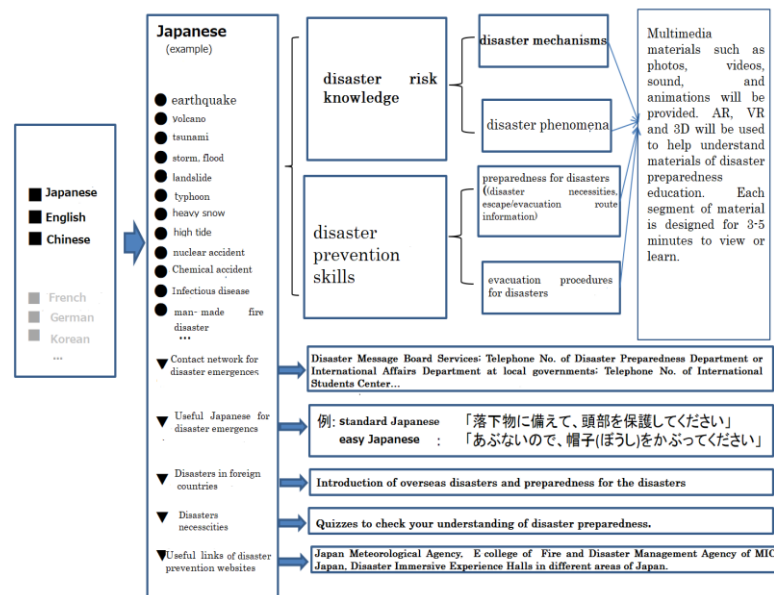


Figure 2. Learning content to reside on the mobile disaster prevention system

2. Survey methodology

2.1 Survey questions and survey purposes

The survey asked questions in the following six categories: Demographic questions; Foreign residents' experience of disasters in Japan and home country; How foreign residents acquire knowledge of disaster preparedness; Current status of foreign resident's preparedness for and countermeasures against disasters; How to improve awareness of foreign residents toward disasters; Structure and functions being designed for the disaster preparedness educational system.

The demographic questions include sex, age, country of origin, status of residence, current residential area and profession. Questions about foreign residents' experience of disasters in Japan and home country include if fear of disasters affects their life plan in Japan, what kinds of disasters have been previously experienced, whether they have participated in disaster drills. Questions to ask for the status quo of foreign resident preparedness for and countermeasures against disasters in Japan is the key part of the survey as the system design is to reflect such results. We assume that foreign residents in Japan do not have much, if any, access to disaster information and disaster preparedness drills. In this part, we include questions about whether they are confident with their current disaster preparedness. The last part of the survey has questions seeking participants' expectations for the mobile disaster educational system, e.g. what functions and content they think they need and should expect.

The survey consists of 31 questions and is written in three languages from which respondents are to choose the most familiar in order to answer. An average respondent can complete the questionnaire in seven minutes. See the link of the survey: <https://survey.shimane-elearning.net/English.html>.

2.2 Survey procedure

In order to test the appropriateness of the survey questions and survey design, a pilot survey was administered in February, 2020 at Shimane University among 29 international students. The printed questionnaires were distributed to students by a Japanese teacher, and the international students were asked to answer the questionnaire in class. Such a group administered survey received a very high response rate. All of the class attendees answered the questionnaire.

Based on the pilot survey and feedback from the participants, three questions were amended in order to avoid repetition and ambiguity. One single-choice question was removed and two open ended questions were added.

The revised questionnaire was then written not only in easy Japanese but also in English and Chinese in order to cover a larger sample size. The questionnaire was transcribed to Microsoft Forms and the automatically generated survey link was sent by email to potential respondents. The questionnaire can be answered on any digital device with Internet connection available.

The first author sent the questionnaire URL to foreign friends and colleagues in Japan after a brief request in an email or SNS message. They were encouraged in turn to forward the survey link to their families. The reason for asking friends or acquaintances to answer the questionnaire was because it was expected that the respondents would have a heightened sense of duty and responsibility to seriously answer the questionnaire so that the survey reliability might be guaranteed.

2.3 Data collection

The Microsoft Teams recorded every entry to the questionnaire and added up the data to the generated Excel form. Each version of the questionnaire generated a separated Excel form. On June 24, one month after the first entry to the online questionnaire, the first author downloaded three Excel forms and exported all data to one Excel form for analysis. Two entries were regarded as invalid as the respondents indicated that they were international students but they had not entered Japan and had no experiences of living in Japan.

Data of the pilot survey from the 29 international students at Shimane University was not used for this research, although we cited some of the free remarks in the discussion section of this paper.

3. Results and Discussions

3.1 Respondents profiles

Two hundred fifty-one (251) foreign residents took the survey, of whom 95 were males, 181 were females, 4 were unclear of gender, i.e. these four respondents did not wish to respond to this gender question. It is not clear why female respondents were almost double the male questionnaire participants. The reason could be that women are more likely to participate in online surveys in general (Smith, 2008). Nearly 80% of the survey participants were between the ages of 20-49. The average stay of the total respondents in Japan was 6.4 years. Thirty-eight percent of them were international students or researchers or professors at universities, while 54% of the respondents worked in the other areas in Japan as regular company employees or farm/factory helpers. The nationalities of the 251 respondents included those from China, Vietnam, Cambodia, South Korea, the United States of America, Singapore, Taiwan, France, Madagascar and five other countries.

The respondents were from 29 different prefectures in Japan. Of them, 46% were from the Tokyo metropolitan area, 20% were from the Kansai Area. These ratios are consistent with the general population distribution of foreign residents in Japan (Japan Ministry of Justice, 2020).

3.2 Foreign residents' experience of disasters in Japan and in their home country

Among the average respondents' stay in Japan was 6.4 years. Seventy-eight percent of the respondents with an average stay of 6.9 years in Japan have experienced some kinds of disasters in Japan and 22% of the respondents with an average stay of 4.6 years reported they had not experienced any disasters. We used the Likert scale, not at all=1, very much=5 to measure how much fear of disasters would affect their plans to stay in Japan. The result is $M=3$, $SD=1.4$. This means that worries about disaster indeed negatively affect how foreigners plan their life and career in Japan. And the fear of disaster differs between those who stay longer and those whose stay is shorter. 71 respondents who have stayed in Japan more than 6.4 years ($M=2.7$, $SD=1.28$) compared to those who have stayed shorter than 6.4 years ($M=3.2$, $SD=1.37$) demonstrated scientifically being less fearful of disasters $t(249)=2.652$, $p=.05$.

We consider that an effective and pertinent disaster preparedness education system for foreign residents needs to take disaster experiences in their home countries into consideration. Therefore, while we asked what disasters the participants have experienced in Japan, we also investigated their disaster experiences and disaster preparedness in their home countries. The results are as follows: 69% respondents have experienced earthquakes, 65% have experienced severe rainstorm events, and 48% have experienced storm winds or typhoons in Japan. The results remind us that disaster preparedness education should focus on disasters such as earthquakes, rainstorms, storm wind/typhoons and floods. Disaster occurrences in participants' home countries are different. Severe rainstorm (41%) and flood (31%) are the most commonly experienced disasters. This may suggest that when we develop disaster preparedness education content, we may need to avoid overstressing mechanism and phenomena of rainstorm and flood as foreign residents may have already experienced them before they came to Japan. See Figure 3.

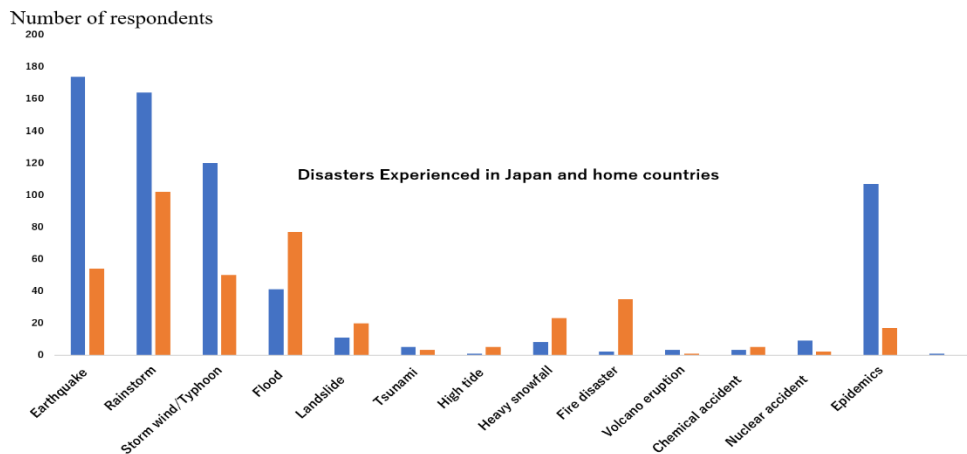


Figure 3. Disasters experienced in Japan and home countries (Blue represents disasters experience in Japan, orange represents disaster experienced in their home countries)

Forty-nine percent of respondents reported that they had received some kind of disaster preparedness training in their home countries and 51% reported they had not. Forty-nine percent is a ratio higher than we expected. We had thought that countries like China, Vietnam, and Cambodia where natural disasters are comparatively far fewer than Japan may not pay much attention to disaster preparedness training. The data shows the assumption was wrong. See Figure 4.

In recent years the world has been more aware of disasters and has better understanding of disasters than it used to in the past. Many countries have been taking measures to improve citizens' awareness and preparedness as regards disasters. Therefore, we assumed that the ratio of younger generations who have received disaster prevention training in home countries must be higher than for the elder generations. And the results confirmed our assumption. Figure 5 shows that 62% of respondents between ages 10 -29 had already joined some kinds of disaster preparedness training, while such ratio dropped to 42% for the age group 30-39, 30% for 40-49, and 23% for the age group over 50. This trend reminds us of that young foreign residents may have a higher awareness and had already received some basic disaster preparedness training before they entered Japan.

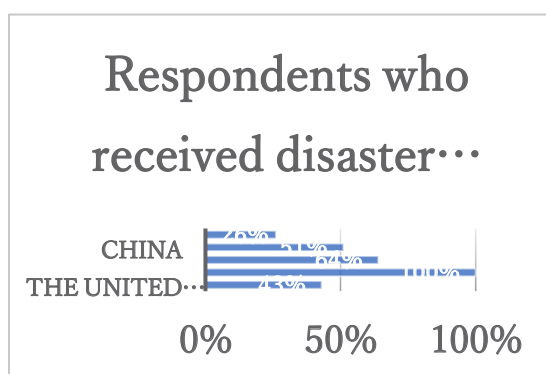


Figure 4. Respondents received train in home county training

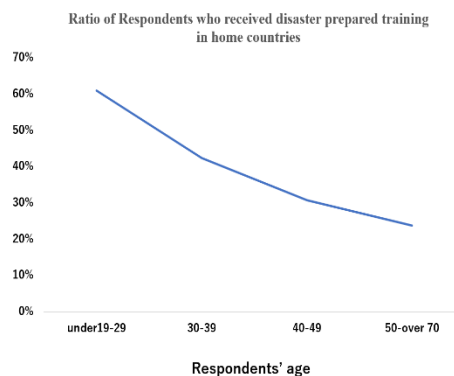


Figure5. Age trend in receiving disaster training

In respondents' home countries, earthquake (66%), and fire disaster (53%) are the most targeted training items. Among 124 respondents who had joined disaster drills in their home countries, 66% reported that they had received training for protecting themselves in case of earthquakes, and 53% said they had participated in fire disaster drills. This result shows that in other countries, disaster drills overwhelmingly focus on earthquakes and fires.

3.3 Foreign residents' disaster preparedness in Japan

We found that the majority of foreign residents (78%) in Japan have experienced disasters and the most experienced disasters are earthquakes, rainstorms and typhoons. We asked the participants if they were confident with their current disaster preparedness knowledge and skills. In general, they did not think their current knowledge and skills were good enough for preparing for and battling with disasters ($M=2.8$, $SD=1.19$. 1=Not confident at all, 5=Extremely confident). This confirmed the previous result that fear of disaster affects foreign residents' plan to stay in Japan.

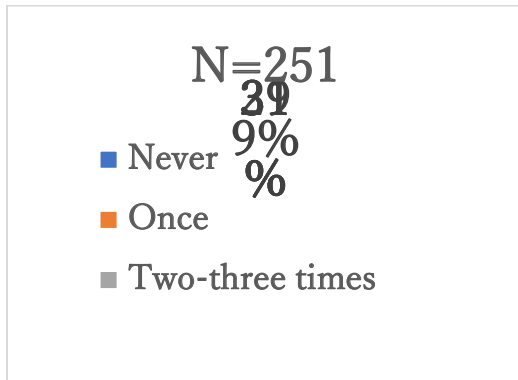


Figure 6. Experiences of disaster drills in Japan

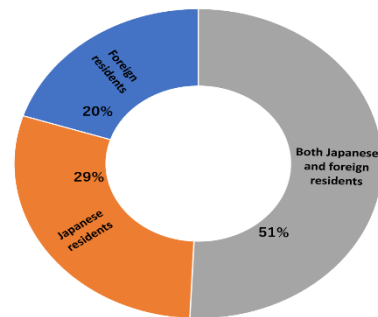


Figure 7. Targets of disaster drills

Although 31% of respondents reported they have never participated in any kind of disaster drill in any language in Japan, still 69% said they have disaster drill experiences. This is a ratio much higher than we expected. Even 40% recalled that they had participated in drills more than 2 times (See Figure 6). However, only 20% of the respondents who had participated in disaster drills reported that the drill was organized for foreign residents (See Figure 7).

Similar to those drills in their home countries, drills focus on earthquake and fire disaster. In our survey, 82% of disaster drill participants were trained for earthquake preparedness, and 58% were trained for fire disaster preparedness.

3.4 Preparedness for and countermeasures against disasters



Figure 8. Familiarity with disaster preparedness information

Figure 8 shows that 67% respondents know their nearest evacuation route, while 33% have no idea. But in terms of the earthquake-resistance status of their apartment or house, the familiarity

dramatically dropped to 28%. Seventy-two percent of the total survey participants have no knowledge about their house/apartment and its earthquake resistance. In addition, only 38% of respondents reported that they have the hazard map distributed by the community while the rest claimed that the map was either not distributed or they just did not know anything about any hazard map.

The answers to Question “In order to protect yourself, how have you prepared for possible future disaster occurrences?” are worrying. Sixteen percent of respondents reported that they have not prepared anything. Thirty-two percent said they had prepared appropriate disaster necessities, Fourteen percent said they have assured easy contact with their families and others should a disaster occur. Twenty seven percent said they know how to use a fire extinguisher. Twelve percent have signed up to the Disaster Prevention Mailing List run by the International Center or their local government. Thirty-two admitted that they did not even know how to set up disaster alert messages on their smart phones.

The survey also found that for foreign residents, the Internet (including SNS) (74%), TV (40%), schools and workplaces (30%) are the major recourses for obtaining disaster information. This indicates that any disaster information distribution should be Internet-based or at least be available on the Internet.

3.5 Mobile disaster preparedness tutorial system

When asked what was the most effective way to improve disaster awareness and preparedness skills, 43% of the respondents regarded that organizing disaster training targeting foreign residents only is most effective. Thirty percent thought that distributing disaster preparedness information in simple-to-understand Japanese is most effective, and 26% considered that they would rather study disaster preparedness knowledge and skills themselves at any time available.

Although 74% of survey participants answered that the Internet is their major disaster and disaster preparedness information recourse, the survey discovered that 88% of foreign residents have never used any online disaster preparedness training system. Thirty respondents (12%) claimed that they had used such systems before, like AU Disaster and Tokyo Bosai in Japanese language. The result suggests a potential need for an online disaster preparedness training system. We further found that in our system being developed, “Disaster prevention skills” (64%), “Disaster knowledge” (46%), and “Useful Japanese for disaster emergencies” are the most welcomed menus. This reminds us that a successful disaster preparedness educational system should be a system that uses easy language to introduce disaster knowledge and disaster prevention skills.

Some respondents expressed their expectation or hope for other menus or content that are not listed in the system which include disaster related signs, a system in Vietnamese language ...etc.

4. Conclusions and Research Limitations

This study investigated the awareness and preparedness of foreign residents in Japan toward disasters. The survey results clearly show that on average foreign residents are not confident with their current knowledge and skills to battle with disasters and that concerns toward disasters negatively influence their long-term life plans in Japan. Although earthquakes, rainstorms and typhoons are the major disasters which foreign residents have experienced, disaster drills overwhelmingly focus on earthquakes and fire disaster only. Although the Internet is the main recourse for disaster information, 88% of survey participants reported that they never used any online disaster preparedness tutorial system. They expressed expectation for a mobile disaster prevention training system with menus to introduce disaster knowledge and prevention skills in multi-language format.

This survey has its limitations. Chinese represented 70% of the total respondents, Vietnamese 22%, Cambodians 9%, while Korean respondents were only 1%. This indicates that the samples of foreign resident nationals in this survey seem to be skewed. In future research, more responses from Korean residents will be sought.

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Using an Outdoor Mapping Activity to Understand Geographical Features from the Perspective of Disaster Prevention

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Abstract: Preparing for natural disasters requires disaster awareness as well as disaster knowledge. An understanding of areal geographical features is necessary to prevent damage specific to a region. A study was conducted to examine the change in students' awareness and understanding of local features through an activity of creating a disaster prevention map, a method commonly used in disaster prevention studies. The learners' awareness of disaster prevention and understanding of local features was enhanced through the learning activity. The results revealed that proactive learning was effective in helping students understand the features of the region. The creation of a disaster prevention map with field observation activities showed that general knowledge was transformed into local knowledge. To investigate the effects of a disaster that had occurred before the study, we examined the change in disaster preparedness awareness among the learners. The results showed a change in disaster preparedness awareness among the groups less affected by the disaster.

Keywords: education for disaster prevention, geographical features, earthquakes, mobile learning, classroom practice

1. Introduction

Japan is impacted by various natural disasters that occur every year in different parts of the country. To prepare for these disasters, it is necessary to acquire disaster prevention knowledge. Earthquakes are an example of a disaster that can occur throughout Japan. Earthquakes cause various kinds of damage. In addition, personal circumstances such as risk perception and experience also emerged as significant factors related to damages of earthquakes. We focus on the areal environment and geographical features. For the purposes of this paper, we use the term “geographical features” as localized knowledge of the environment within the region based on topographical and geological conditions. Landslides in areas with high elevation changes and slopes, and tsunamis in areas near the sea, are some examples of geographical features that can be used to predict damage and provide information on disaster prevention.

Regional studies are widely used in the field of education to understand the features of a region, including its geographical features. This includes town-watching activities (Shaw & Takeuchi, 2009), in which people walk around an area and observe it. In addition, the results of these activities are widely used to create “disaster prevention maps” focusing on the hazards and preparedness in the community from the viewpoint of disaster prevention. We have been focusing on this learning activity of creating disaster prevention maps in combination with outdoor learning in students' classes (Hatakeyama, Nagai, & Murota, 2017, 2019). These studies show that learners' awareness of disaster prevention is enhanced through learning activities that include the creation of disaster prevention maps.

2. Objectives

In this paper, we examine whether regional learning outdoors that incorporates disaster prevention mapping can help learners understand geographical features.

The theme of the lesson was understanding the preparedness for an earthquake disaster in the area. Learners created a disaster prevention map through a town-watching activity outdoors. They recorded the information they observed in the field into a system that supports the creation of disaster prevention maps. The recorded information was used for a review based on the learners' knowledge and experiences. The system, which works on tablet devices, supports the creation and sharing of disaster prevention maps as a result of students' activities. Through this practice, we examined changes in the learners' awareness and understanding of geographical features.

3. Classroom Practice

3.1 General

In this study, we conducted a class over three sessions at a high school in Chiba Prefecture from October to November 2019 (Table 1). We used the "Sonael" system (Hatakeyama, Nagai, & Murota, 2014) to create disaster prevention maps using tablet devices, which is based on the "FaLAS" system (Hatakeyama, Nagai, & Murota, 2019). The target subject was 88 students from four first-year high school classes. The classes were conducted during the same period for the entire school grade as part of a period for inquiry-based cross-disciplinary study. The homeroom teacher taught each class, and students were divided into groups of three or four for class participation.

Chiba Prefecture, where the school was located, was hit by Typhoon No. 15 in early September 2019. Due to storm damage and extensive power outage, the school was closed for few days and thus, the timing and content of the class were revised in consultation with the school. For example, the second outdoor learning activities which were originally planned for the fourth session based on reflection learning activities were canceled as sufficient time could not be allotted for them.

Mitsuhashi (2018) proposes three layers of learning for disaster education: Global for basic learning, Local for authentic learning, and Individual for personalized learning. This Global-Local-Individual (GLI) model shows how learning changes depending on the content addressed in disaster education or learning. We designed each unit of the class according to the GLI model. The learning consisted of three activities: basic knowledge learning in the classrooms, an outdoor learning activity in groups, and reflection in the classrooms using the students' records and experiences.

Table 1. *Outline of the Classroom Practice*

	Learning Objective	Contents
10/10	Learning Basic Knowledge	Watched a video, received a lecture, and study using the worksheet
11/7	Outdoor Learning Activities	Recorded what they observed in the system
11/14	Reflection Learning Activities	Reflected and discussed about areal geographical features using their records

3.2 Learning Basic Knowledge

Basic knowledge of earthquake hazards and areal features was taught on October 10 to learn the global layer in the GLI model. Learners watched a video presentation on the damage caused by earthquakes and the classroom features in the classroom. The homeroom teachers provided an overview of the school area's disaster using our original booklet and explained the importance of protecting oneself and thinking about a disaster as one's own affair, using the typhoon that had just hit the area as an example.