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A Proposal to Use Walk Rally Learning with Mystery Solving to Foster Attachment to Place and Understanding of Regional Characteristics

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Abstract: Education for disaster prevention that aims at imparting disaster knowledge and fostering a "sense of ownership," based on individuals' awareness of the possibility of themselves becoming a victim of disaster, is becoming more and more important in preparing for natural disasters. It is necessary to foster an "attachment to place" that leads to a sense of community from the perspective of community disaster management. This learning is necessary not only for the cooperation of local communities but also for the family when targeting elementary and junior high school students. In this paper, we describe the design of a learning activity using a smartphone that combines Town Walking and Mystery Solving for regional learning on the theme of disaster prevention for elementary and junior high school students. In addition to fostering attachment to place through this activity, we aim to impart disaster prevention knowledge appropriate to the region and to foster risk perception, disaster awareness, and a sense of ownership.

Keywords: Disaster education, fieldwork learning, gamification, mobile learning

1. Introduction

In recent years, large-scale natural disasters have been occurring in various parts of Japan every year. In the event of a disaster, it is important to engage not only in "public support," where public organizations take the lead, but also "self-help," where individuals and their families take the lead, and "mutual support," in which neighbors and the community take the lead (Cabinet Office Japan, 2020). To achieve this, it is necessary to view disasters as one's own affair and to have an awareness of disaster prevention that considers the perspectives of self-help and mutual aid. Fostering this "sense of ownership," which is based on awareness of the possibility of oneself becoming a victim of disaster, is one of the goals of disaster prevention education.

One widespread approach is to provide disaster education to children and students. In Japanese school education, the aims of disaster prevention education are summarized as part of safety education, and systematic guidance according to developmental stages is required. For example, in elementary and junior high schools, disaster prevention is one of the themes in the community studies portion of social studies. At the same time, it has been stated that various educational activities, such as integrated studies and school events, should be used. It has also been pointed out that there is a need for opportunities for instruction in cooperation with families and local communities. In response, many initiatives are being undertaken in various parts of Japan, and knowhow gathered from outstanding and progressive initiatives is being shared (Cabinet Office Japan, 2015). Many of these initiatives include learning activities that take advantage of regional characteristics. These activities involve learning about the characteristics of the community, its risks, and the history behind them. On the other hand, there are few opportunities outside of school to learn about disaster prevention without active participation. Even if learners feel the need for disaster prevention, it is difficult for them to confirm their knowledge and obtain the latest information if they are passive. Therefore, a mechanism is needed to raise the interest of learners in participating in disaster prevention education.

In this paper, we propose a learning activity design in which learners can actively participate by incorporating gamification into fieldwork on the theme of disaster prevention. To support

fieldwork like Town Walking in this learning activity, we develop a learning support system for smartphones. In this system, "Quiz Rally" is introduced as an element of gamification so that learners can learn while walking around the area with their parents or friends. By doing so, the learning activity aims to help learners develop attachment to place in regard to the region where they live and, at the same time, to impart regional disaster knowledge and foster risk perception and a sense of ownership.

2. Fieldwork

2.1 Fieldwork in Geography Education

Fieldwork is a method used in education and research, especially in geography. It refers to the act of actually visiting a site and engaging in an activity there. There are several types of fieldwork activities: observational fieldwork, which involves observations; participatory fieldwork, which involves participation in activities; and learner-practitioner and participant observation, which involves surveys, interviews, and participant observation.

Kent et al. (1997) reviewed fieldwork in geography education. They listed four activities as constituting the structure of learning through fieldwork: Preparation and Briefing, Field Learning and Teaching, Debriefing, and Feedback. They also indicated that fieldwork should be compatible with the learners' educational experience and state of progress, and that field teaching and learning methods should complement the teaching methods, content, and ethos of the rest of the learning. These points are not limited to the field of geography but can be applied to any learning activities that incorporate fieldwork.

2.2 Town Watching

There is a type of fieldwork called Town Watching. Town Watching is a method for local residents to understand and learn about the local situation. It was initially (and still is) a method of urban planning, but it is also sometimes used for disaster prevention, such as evacuation planning for a region.

Shaw and Takeuchi (2009) listed eight purposes of Town Watching activities, including knowing the current situation of the area and increasing the awareness of disaster prevention. They also listed three elements of the actual learning process: Study through Lecture, Learn through Experience, and Learn through Presentation. These elements are similar in structure to the aforementioned four activities of fieldwork.

*2.3 Town Walking (*Machiaruki*)*

Besides educational activities, a similar activity called *Machiaruki* (Town Walking) is popular in Japan. Town Walking is the act of wandering around a town and enjoying seeing and feeling the town for yourself. Some of these activities are natural walks in daily life, while others are regional events where courses are set up or guided.

Unno (2013) conducted a survey of attitudes among participants in Town Walking events in the Nagasaki region. Unno found that active participants voluntarily participating in the events correlated with a higher frequency of daily Town Walking and a greater attachment to place. Providing opportunities to Town Walking, such as setting up a course or conducting guided tours, will lead participants to the development of attachment to place. Such attachment can also be expected to lead to active participation in local disaster prevention activities.

3. Gamification

3.1 Walk Rally

Recreation that adds a game-like element to the activity of visiting a predetermined area is common, especially in Japan. For example, Stamp Rallies, in which participants visit designated checkpoints and collect stamps, are widely used for tourism and regional development. In some cases, they are used not only for local events but also by museums and science centers for touring exhibits. There are also Quiz Rallies, where participants not only collect stamps but also solve quizzes at each checkpoint. For the purposes of this paper, we will refer to these activities as Walk Rallies. We believe that Walk Rallies are useful in actively motivating learners to participate in regional studies such as fieldwork.

In recent years, many efforts to conduct Walk Rallies virtually, using smart devices, have been reported. Ando et al. (2013) developed a system based on the Global Positioning System (GPS) for collecting stamps with a smartphone and used it with a Stamp Rally to revitalize a community. A survey of the participants confirmed that the Stamp Rally kept them highly motivated. Tanaka and Yamagishi (2015) proposed a system to support Quiz Rallies where each checkpoint is equipped with a Quick Response (QR) code, which can be used to answer the quiz by holding up a tablet device.

3.2 Mystery Solving (Nazotoki)

Among quizzes, games called *Nazotoki* (Mystery Solving) have become popular in Japan in recent years. This is an activity where you solve various problems without any formality, and Escape Game is one of them. For example, Escape Room is popular as entertainment, not only virtually but also through experiential events where you actually try to escape from the real room. As a type of serious game, it has attracted much attention due to its occasional use as an active learning method in education (Järveläinen and Paavilainen-Mäntymäki, 2019).

An example of combining Mystery Solving with the aforementioned Town Walking is Abe and Mori (2019). They investigated the changes in mood, regional impressions, and attachment to place after participants walked around a town while solving a mystery game that included information about the town. As a result, they reported, the town's image changed positively and attachment to the region was enhanced.

4. Learning Design

4.1 Overview

As mentioned above, fieldwork is considered effective for observing and understanding the local situation. Fieldwork is also expected to have a certain effect on regional learning in disaster prevention. Through fieldwork, learners not only acquire regional knowledge of an area, but also, as mentioned in the case of Town Walking, they are expected to develop attachment to place. We also believe that Walk Rally methods are effective in motivating learners to walk around the area. A Quiz Rally format that uses the connections among information in the region, rather than merely collecting fragmented information on places, is considered to be suitable.

In this paper, we propose to incorporate Town Walking activities in fieldwork. Generally, fieldwork learning, which aims at studying knowledge, requires a teacher such as a guide or an expert who is familiar with the area. However, our proposed system presents learning contents prepared in advance according to the location and activities and interacts with the learners. In addition, the system incorporates a Mystery Solving method as an element of gamification so that learners can actively participate in the fieldwork. Through the fieldwork, the learners will acquire disaster prevention knowledge based on the characteristics of the region. It is hoped that when families work together, this will provide them an opportunity to discuss disasters in the home after the study. To support this learning activity and collect the learning records, a learning support system needs to be developed. The learning contents developed in this study are targeted at a limited number of regions for practical use, but we will generalize to build a learning support system as a platform that can be used anywhere by preparing content according to the region.

4.2 Learning

Since the purpose of the fieldwork is to foster learning, it is necessary to conduct appropriate learning in advance and reflection afterward. The target learners in this study are elementary and junior high school students, who are expected to learn in groups with their parents or friends. Since the learning will be conducted in the community where they live or their school district, they will have knowledge about the community in their daily lives. However, they may not have enough knowledge about disaster prevention, so they will learn in advance about possible disasters in the area, using video resources. Figure 1 shows an image of the fieldwork to be conducted afterward. In the beginning, the learners are presented with the first mystery (quiz) on the theme of disaster prevention. They solve the quiz using what they have learned in their prior study. The answer to the quiz is a checkpoint that the learners should go to. When the learners reach the checkpoint, they are presented with feedback, additional information about the checkpoint, and a new quiz indicating the next checkpoint. Through this quiz rally, learners will acquire knowledge about disaster prevention in the area. The quiz rally ends when the participants have solved all the riddles and reached the goal point. Learners will be able to reflect on the entire learning experience by checking their actions and knowledge gained during the fieldwork.

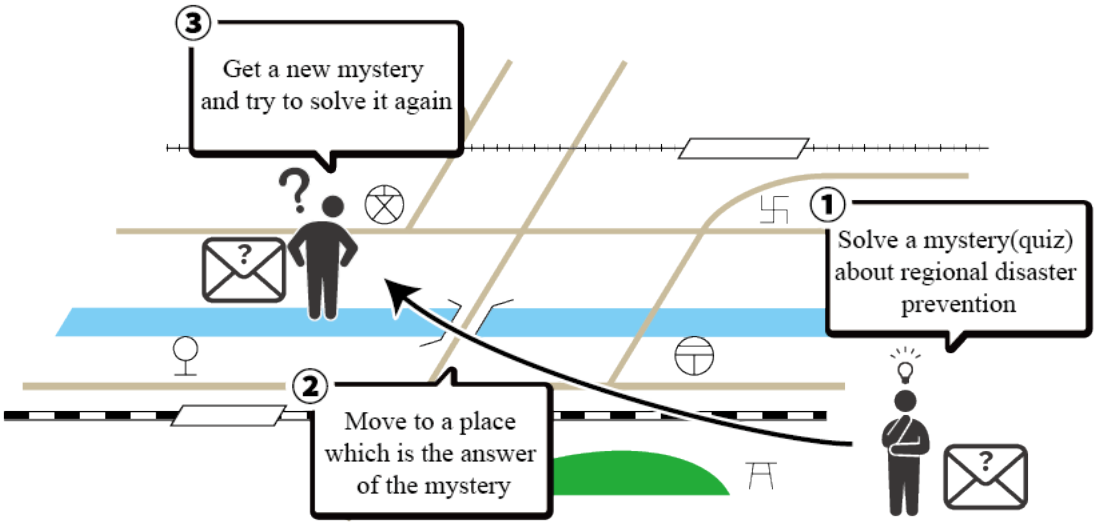

Figure 1. The concept image of the learning activity we propose.

4.3 Learning Support System

We are developing a system to support fieldwork learning and its reflection. We assume that the user's device will be a smartphone since the system will be used outdoors. The system has the following main functions:

- Displays a map of the current location and its surroundings.
- Displays a quiz.
- Displays feedback after confirming that the user is at the checkpoint.
- Displays the learner's answer history.

Checkpoints are physical objects related to disaster prevention, such as facilities and equipment. Since there is no problem even if some deviation occurs, the location of the learner is determined by the GPS.

5. Summary and Future Work

In this paper, we have described the design of a smartphone-based learning activity that combines Town Walking and Mystery Solving as a regional learning activity on the theme of disaster prevention. Through this activity, we aim to foster place attachment, impart disaster prevention

knowledge appropriate to the community, and develop the participants' risk awareness and consciousness of the possibility of their own involvement in a disaster.

In future work, we will proceed with the development of the system, as well as practice this learning and investigate the effect of acquiring disaster knowledge according to regional characteristics. We will also examine what kinds of activities lead to the development of attachment to place, risk perception, and sense of ownership in a disaster.

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