

Introducing Gamification into Disaster Education for Foreigners Living in Japan

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Abstract: In Japan, such a disaster-prone country, lacking correct knowledge may contribute to death when encountering disaster, so disaster education aiming at foreigners is necessary. However, many foreign people are unwilling to spend time on it. To improve this situation, gamification is employed. Gamification is defined as using some game design elements in non-game context. Gamification now is a hot spot in education field, which can promote students' motivation and engagement in learning activities. In this paper, a brief introduction on gamification, as well as some game elements used in disaster education is given.

Keyword: foreigner, disaster education, gamification, ICT

1. Introduction

An increasing number of foreign people are coming to and living in Japan these years, and the trend keeps rising. Unlike Japanese, the majority of the foreigners have neither disaster awareness, nor disaster knowledge, they have no idea how to do when encountering disasters. Such foreign people may die in disasters, which may contribute to social problems and diplomatic events.

One method proved feasible and effective for disaster reduction and prevention is disaster education. For example, Japan, as well known, is a disaster-prone country, however, Japan always has the lower casualties in disasters compared with other countries and areas, which benefits from the completed and advanced disaster education system.

Most foreigners are reluctant to invest time on disaster education, and furthermore, disaster education is not compulsory. These negative factors lead to the low rate of foreigners' disaster education.

Considering this situation, gamification is employed into disaster education to improve foreigners' motivation and engagement.

The remainder of this paper is divided into three parts: 1) Fundamental idea, mainly introducing the definition of gamification, and common game elements that will be used in disaster education system; 2) System design, mainly declaring how to use game design elements in disaster education system; 3) Summary, stating the current status and future research work.

2. Fundamental Idea

Gamification is defined as using some game design elements in non-game context⁽¹⁾, and now it is a hot spot in education field. There have been many researches and experiments that proved gamification as an effective method in increasing participation and improving learning activities.

In general, most researchers have reached a consensus in game design elements, including badge, level, point, leaderboard, competition and collaboration, challenge, etc. All of these elements relate to some theories in intrinsic or extrinsic motivation. The motivation needs corresponding to different game elements are illustrated in Fig.1⁽²⁾.

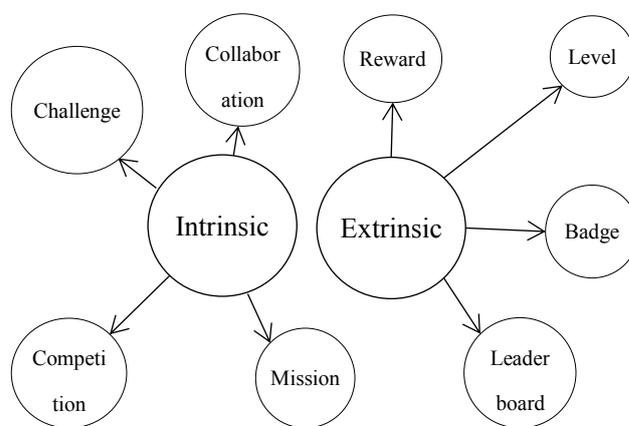


Fig.1 Motivation needs and game design elements

Current research work will introduce some common game elements into the disaster education system, including: 1) Badge, to give immediate feedback for participants' collaboration and competition, goal setting, challenge achieving; 2) Leaderboard, to encourage social interaction, promote participants' feelings of honor and competition; 3) Point, to be as extrinsic rewards for performing tasks⁽³⁾.

3. Disaster Education System Design

Disaster education aiming at foreigners mainly focuses on two aspects: increasing disaster awareness and obtaining disaster knowledge. A multi-platform system will be designed and developed to provide foreigners learning resources in the forms of text, picture, video etc. These kinds of knowledge and information may make people realize they are living in a disaster-prone country, where disasters, containing typhoon, strong earthquake, as well as the sequent tsunami, occur in a high frequency, so they should build disaster awareness and corresponding measures in case of suffering disasters.

This system will consist of two parts: 1) Server side, which is mainly responsible for users' management and message pushing; 2) Client side, which focuses on users' management, learning resources management, and quiz management. The game elements mentioned above will

be used in this system to improve foreign people's disaster education. System structure diagram is shown below as Fig.2

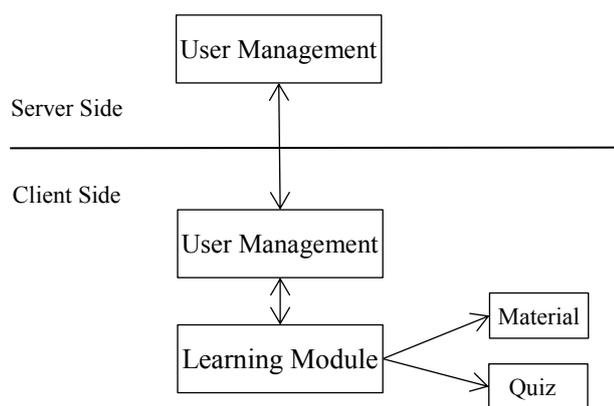


Fig.2 System Structure

3.1 Server Side

The system needs a light server, which mainly takes charge of user management, including registration, login, saving users' profile.

- 1) Registration, user can apply an account for the system, and thus the server will save user's personal information, including learning duration, learning record, badges, leaderboard, and points, so that the learning will keep sustainable. User should keep the username and password for the account. Sure, user can also use this system as guest, but the learning will not be recorded.
- 2) Login, user can login by using this system's accounts, also by some other popular Apps' accounts, like Facebook, Line, Wechat, in result that users can skip the registration step and use the system easily.
- 3) Saving Users' Profile, server will save user's personal information, including account, total learning time, learning record, quiz information, as well as badges, points that user obtains. User's profile will be download from server to application when the application being awaked, and upload from application to server when application being switched to background.

3.2 Client Side

Client side is designed as a multi-platform application which will fulfill basic function at present, including user management module, and learning module. Also, some game design elements will be adopted in application to enhance engagement.

- 1) User management module, this module focuses on users' registration, login, badges, points, levels and leaderboard managing.
- 2) Learning module, this module provides various learning materials, including texts, videos, pictures. User can obtain disaster information, i.e. the frequency of disaster in Japan, and disaster knowledge that may make them survive in disaster. This module also provides quiz, making user check

if they have a good command of disaster knowledge. Through quiz, user will find out their weak points and deepen understanding on disaster knowledge.

- 3) Gamification design mechanism, the gamification rules are as follows, a) awaking the app gets one point, no more than one point per day; b) using the app for at least five days in a week will win a bee-badge for hard working; c) reading learning materials for at least five minutes can get one point; d) completing a quiz can get one point, at most one point per day, and a high accuracy over 80% will get an extra point; e) the first place on the leaderboard in each week will get a mystery chest including a random number of points between 1 to 5. We are thinking about how to use these points, user may redeem small gift, or a discount for meal in university café.

4. Summary

This paper did not involve in further research on the relationship between gamification and theories. Gamification is used a lot in education fields, especially in offline classroom.

This paper is an attempt of gamification in disaster education combining with information and communication technology, and it is expected that gamification can play an important role in this field. Besides the mentioned common game elements, the future research work will try to use some new game design elements, such as game map, game chest, challenge etc.

In the follow-up research work, shelter map will be designed and developed in the system, which enables users to listen the voice broadcast when passing by a shelter. Subscribing function will also be provided, which enables users subscribe message. Server will push regular message, as well as some important message in case of emergency. User can disable the regular pushing, but emergency message will be given high priority.

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