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Gamification Approach to Smartphone-app-based Mobility Management

Ryota Nakashima[a] ・ Takahiro Sato[a] ・ Takuya Maruyama[b]*

[a] Department of Civil and Environmental Engineering, Kumamoto University, 2-39-1 Kurokami, Kumamoto 860-8555, Japan
[b] Center for Policy Studies, Kumamoto University, 2-39-1 Kurokami, Kumamoto 860-8555, Japan

Abstract

This study develops smartphone-app-based mobility management (MM) system using gamification. Our application has step counter and it introduces score and ranking function as gamification technique. A case study on university students reveals that we can increase the number of steps and change the behavior of some participants. Also, we examined the smartphone-app-based mobility management in the future.

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1. Introduction

Mobility Management (MM) is policies and strategies to reduce travel demand and number of vehicle trips and encourage modal shift toward more sustainable transport. In addition, MM plans can contribute to wider policy objectives, such as reducing the level of air pollutants and encouraging healthy and active lifestyles. It tries to change the travelers' attitudes and behavior to reduce the car use and it is an effective travel demand management. MM often

* Corresponding Author. Tel.: +81-96-342-3283; fax: +81-96-342-2042.
  E-mail address: takumaru@kumamoto-u.ac.jp

uses paper-based and web-based method to change the participants' behavior, but there are some problems such as high cost and burden of participants.

Sato and Maruyama (2014) developed a smartphone-app-based Mobility Management to solve some of these problems. The app can record the participants' travel behavior and make the feedback easily. Sato and Maruyama (2014) find that participant can make a feedback easier and regardless of time and place by using smartphone-app as tool of MM. They also reveal that the app can make the participants' travel behavior environmentally and healthy one.

However, that study had some remaining problems such as how to increase the participant and keep the effect sustainably. In addition, it will be more effective to introduce the concept of gamification.

Then this study extends the MM method of Sato and Maruyama (2014) by incorporating gamification that is difficult to do in the paper and web using smartphone app. The content is pedometer or step counter. We focus the study target to young people, and enhance the gaming function to make the app more effective. In particular, we send the ranking of a daily steps for all participants and stimulate the competitiveness. The objective of this study is to evaluate the extended smartphone-app-based MM by a case study.

We divided participants into two groups, one group is used the ranking function, another one is not used the ranking function to easily validate the effect. Also, we examined the change of travel behaviour and attitude before and after the survey.

2. MM and Gamification

In this session, we summarize the properties of smartphone-app-based MM and gamification technology.

2.1. Smartphone-app-based MM

Sato and Maruyama (2014) conducted smartphone-app-based MM in Kumamoto University in 2013-2014. Content of MM is the feedback which is recording participants behaviour using their smartphone. This app needs less effort, and it can be performed regardless of time and place. It was able to good effect on the individual user awareness of the environment and health. Some participants suggested that incorporating gamification can improve the effect and increase the participants of MM.

2.2. Gamification

Gamification is combined two words to "game" and "fication" (Bunchball, 2015). Gamification is technique that is game mechanics into it to motivate participation, engagement, and loyalty. Gamification is not to create something new. It is to amplify the effect of an existing one by applying the motivational techniques that make games so engaging. Several businesses use this technology widely to promote the goods and services. Typical function of gamification includes scoring, ranking and competition.

a)   Scoring and ranking
 Scoring and ranking create a synergistic effect by arranging them; therefore it is more enthusiastic for users. When they check their own score, if it is low, it enables for them to inspire the motivation, for example, "I don't walk today" or "I will more walk tomorrow". Further, when scoring is in the ranking, it awakens a competition desire. However, if this technique is not properly used, it does not exhibit the correct effect.

b)   Competition
 Competition is technology that participants can check other participants score at real time. This technology increase motivation by checking the advance of the familiar opponent. People get more and more enthusiastic because they can decide their own behaviour by checking strategy and tactics by opponent. We have two important points: First point is to prevent the situation with too few participants. Second point is to compete with the person who has the similar ability. If you do not take care of these points, motivation of participants is lowered.

We think that these technologies will be useful in MM application.