

# The Development and Preliminary Evaluation of a Street View-based Educational Game - “*Guarding Ka-lah-a*”

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**Abstract:** Providing immersive experience with historical and cultural assets could be an ideal instructional strategy for teaching history. Nonetheless, organizing visiting to real world historical sites and cultural artifacts can be costly and time-consuming. Information technology could transform the real-world experiences into digital experiences. Game-based learning is regarded as an effective approach to promote students’ learning motivation and engaging experience. This study developed a street view-based educational game – “*Guarding Ka-lah-a*”, which introduced the historical and cultural assets of *Ka-lah-a*, one of the earliest reclaimed region in ancient Taipei. An initial evaluation of the game was employed with 47 junior high school students in northern Taiwan. Results suggested that students positively evaluated the game. As for students’ gaming experience, students generally reported positive experience in terms of flow experience. These preliminary findings suggested that potential of employing digital game in history teaching could lead to better learning outcomes.

**Keywords:** History education, situated learning, game-based learning, flow, educational game

## 1. Introduction

Indigenous culture is an integral part of history education. In Taiwan, a significant amount of attention and resources have been devoted to curriculums design, which involved indigenous culture as an effort to preserve the fading historical and cultural assets. For better learning history and indigenous culture, providing immersive experience such as visiting real-world historical sites and culture artifacts could be an ideal instructional strategy as it might be helpful for students to develop situated cognition of the learning subjects (Brown et al., 1989). However, creating immersive experience, such as organizing a visiting to historical sites, can be costly and time-consuming. One approach is to use videos or multimedia content in the classroom. Nonetheless, students could still remain passive to such medias for lacking motivations to learn. Game-based learning is generally recognized as an effective and treading approach to promote students’ learning motivation (Hainey et al., 2016). The interactive nature of game-playing could also facilitate students’ further interaction of the learning subject and lead to better learning outcomes. In this preliminary study, a street view-based educational game, “*Guarding Ka-lah-a*” for history education was developed and evaluated. The primary purpose of this study is to explore students’ evaluation of the game and their evaluation could be further served a guidance for refinement of the game. This study designed and deployed a learning activity in a public junior high school in northern Taiwan.

## 2. Method

### 2.1 Game Design

The game in this study is to introduce the history of *Ka-lah-a*, which is now the southern part of Wan-hua district. *Ka-lah-a* was the earliest reclaimed region in ancient Taipei around 300 years ago.

This study developed a street view-based educational game - “*Guarding Ka-lah-a*©”. In the game, there is an organized burglary, which are planning to steal the precious historical and cultural assets of *Ka-lah-a*. Students were to play a police officer to track down the burglary by collecting clues via google street view exploration (Figure 1). There are three chapters (stages) of the game - “*Guarding Ka-lah-a*©”. Each chapter introduced the historical and cultural assets of three representative period of *Ka-lah-a*. *Guarding Ka-lah-a*© was created using a map-based educational game maker(Hou et. al, 2016) developed by the Mini Educational Game development group in e-Learning Research Center, National Taiwan University of Science and Technology using Google Map Street View API technology. The game clues (or scaffolds) can be pre-defined by the instructor and triggered when the learners reach a particular location. To create a game, instructor simply upload text and pictures to the maker; then, instructor can assign a location or conditions as triggers in the maker.



Figure 1. Left panel – game scene of exploring the map; Right panel – Game clues as the learning scaffold

## 2.2 Participants and Procedure

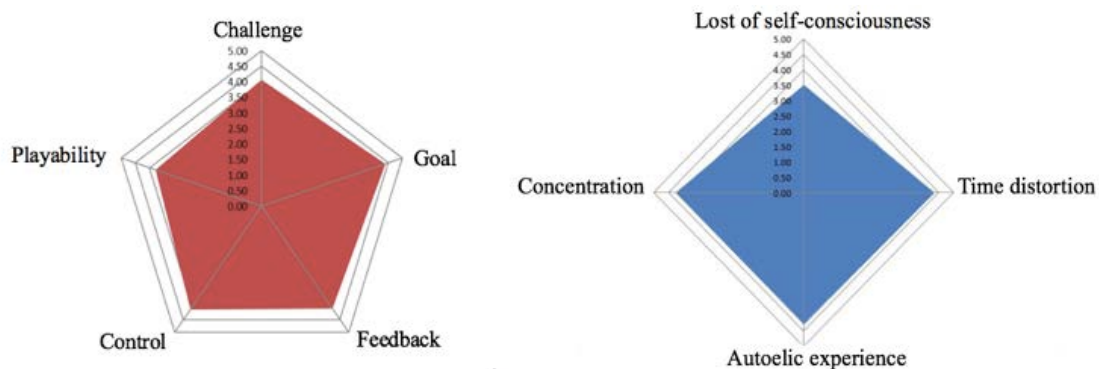
To evaluate “*Guarding Ka-lah-a*©”, forty-seven junior high school students (25 males and 22 females) were invited to participate this study. Players’ positive flow experience is generally regarded as an indicator of good game design (Csikszentmihalyi, 1994; Kiili, 2005). According to flow theory, a good educational game that promotes learners engagement should be challenging, of clear goals and feedback, and providing engaging learning experiences to learners. The optimal experience derived from an educational game could be helpful in facilitating learners to engage in the learning. Kiili (2005) also pointed out that such optimal experience should be take into account when designing educational games. In this manner, this study adapted flow scale for games from Kiili (2006), 23 items were used to evaluate learners’ perceptions toward the game and their gaming experience. Flow antecedents includes five sub-dimensions, namely Challenge, Goal, Feedback, Control, and Playability. Flow experiences were measured by four sub-dimensions, which are Concentration, Time distortion, Autotelic experience, Loss of self-consciousness. All items were measured in five-point Likert scale. Chronbach’s alpha for both sub-dimensions (flow antecedents: 0.918; flow experience: 0.922) were higher than 0.9, suggesting good reliability. Students were grouped with two to three members in each group. Each group was given a tablet computer for playing the game – “*Guarding Ka-lah-a*©”. Students were encouraged to discuss on the collected clues and strategies for completing the game.

The procedure of the learning activity began with five-minute introduction the purpose of the learning activity, story of the game, game rules and goals. Followed by thirty-minute gaming time. At beginning, only Chapter 1 was opened for students to access. Five minutes later, a QR code for accessing Chapter 2 was shown to students. And another five minutes for Chapter 3. Students had to complete the game in the remaining twenty minutes. Finally, ten minutes was allocated for administering the survey. Each group was allowed thirty minutes for completing the game.

## 3. Results

The means of each flow antecedents were as shown in Figure 2. In general, students showed positive perceptions of each flow antecedents (all means are higher than 4 except playability). Among the flow antecedents, the average score (mean = 3.78) of playability was relatively lower than those of other dimensions. This finding suggested that students regarded the playability of the game as positive, but

not as high as other flow antecedents. As for flow experiences, Similar to flow antecedents, the average score of flow experience were positive (all exceeded 4 except the loss of self-consciousness). This finding suggested that students generally had positive experience when playing the game. Nonetheless, the average score of sub-dimension – loss of self-consciousness was 3.5, relatively lower than other sub-dimensions. This result implied that students might not be so immersed to the game. Discussions of these findings are presented in the following section.



**Figure 2.** Radar chart for the means of flow antecedents (left panel) and flow experience (right panel).

#### 4. Conclusion

As can be seen in the evaluation of this preliminary study, students generally possessed positive perceptions toward the street view-based educational game - “*Guarding Ka-lah-a*©”. Furthermore, students also had positive experiences when playing the game. These findings suggested the potential of integrating a street view-based educational game in history education. The subsequent version of “*Guarding Ka-lah-a*©” would be refined based on the current evaluation. Meanwhile, the future study is to assess the learning performance of the game-based learning activity in this study. Future research is encouraged to further analyze students’ behavioral patterns when playing the game. This approach could be helpful for researcher to develop a more comprehensive view of the game-based learning.

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