

Use of Gamification in Mobile Application to Enhance Foreign Tourists' Cultural Experience in China

Master's Thesis



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Abstract

This master's thesis focuses on the design, prototype and evaluation of a gamified mobile app for enhancing foreign tourists' cultural experience in China. The mobile app incorporates gamification, the application of game elements in non-game context, in order to achieve purposeful goal through engagement and fun experience. China attracts more and more foreign tourists while there is a lot of cultural knowledge in the long history, making it challenging for foreign tourists to understand the culture and to integrate into the local context.

The goal of this study is to unleash the potential to implement gamification in tourism, specifically in enhancing cultural experience, through novel design concept of mobile app. Moreover, an evaluation of the artifact is performed with potential target users, validating the effectiveness in enhancement of tourists' cultural experience. The evaluation concludes that the solution is easy to use and is able to enhance tourists' cultural experience.

By using the presented solution, users can integrate themselves better into local context in the travel destination, in regardless of their prior cultural knowledge. Furthermore, the solution provides fun experience to the user in learning about local culture and history.

1. Introduction

China, as a popular travel destination, is renowned for its cultural experience. Nevertheless, it is never easy for tourists to acquire a holistic experience of a foreign culture such as that of China. Gamification, which is gaining popularity as an engaging method for understanding new contextual knowledge, could be an effective way to enhance the cultural experience for tourists in China.

Since China is a huge territory geographically, a high level of cultural diversity exists inside the country. It is practical to focus on cultural experience in specific regions, provinces and even cities. This study will mainly focus on tourists' cultural experience in Nanjing, an ancient city in China. Nanjing is one of the earliest established cities in China. It has been the capital of six dynasties, which provides Nanjing with abundant and sustainable cultural capitals. Nanjing is also among the top 15 cities that overseas tourists visit the most (China National Tourism Administration, 2014).

Mobile apps are playing an increasingly important role in tourism. From users' perspective, mobile apps, when combined with gamification, have the potential to enhance tourists' cultural experience. The topic for the master's thesis therefore aims at exploring the effectiveness of gamification features in enhancing cultural experiences by: a) prototyping a relevant mobile application; and b) validating the effectiveness of the prototype in enhancing cultural experience among foreign tourists who are interested in travelling or have travelled in Nanjing, China.

The study will begin with a review of existing mobile apps in tourism in order to identify knowledge gaps in a) definition of cultural experience for tourists; b) the use of mobile apps for

enhancing cultural experience, especially for foreign tourists in Nanjing. The literature review will offer an overview of how gamification has been utilized in mobile apps thus far as well as and its potential to bridge the aforementioned gaps in tourism.

Based on the gaps identified, key gamification features will be incorporated into the prototype, which will be mentioned as “solution” in the rest of the study. The ability of these features and functionalities to enhance tourists’ cultural experience will then be evaluated based on a survey of potential target user group.

2. Theoretical background

2.1 Cultural experience in tourism

The tourism industry is an experience-based industry, while culture is recognized as an important motivation for tourism. As Richards noted, “Creating cultural experiences and particularly cultural attractions has therefore become a fundamental part of modern societies” (Richards, 2001). Culture affects tourists’ behaviors and is important for tourists’ satisfaction (Lee, Lee, & Ham, 2014).

With increasing new demands for tourism experience, the passive consumption of cultural services is being shifted towards more interactive and proactive approaches, with not only learning but also doing. This has led to emerging tourism strategies for cultural experience production. Diversity in cultural activities and assets is so wide in tourism. Still, Richards also noted that “The value of ‘culture’ as a distinctive form of consumption has been undermined” (Richards, 2001).

The concept of “cultural experience” has seldom been identified. Major conceptual models are based on definitions of “experience”. Pine and Gilmore proposed four realms of experience: entertainment, educational, escapist and aesthetic experiences (Pine & Gilmore, 1999). Tourists’ satisfaction is affected by these realms of experience, among which entertainment experience and educational experience are the top two factors (Lee, Lee, & Ham, 2014). Lifestyle, work, leisure, and consumer behavior patterns are some of the components of cultures, which offer differential values of culture (McKercher & Cros, 2003). Based on various experience production strategies, cultural experience can be produced through two types of cultural assets, long-term and short-term. While long-term cultural assets deliver long-term economic or cultural benefits, short-term cultural assets are short-term attractions such as one—time event (Richards, 2001).

MacCannell indicates that “leisure is constructed from cultural experiences”, and that cultural experience highly depends on creation of cultural attractions (Richards, 2001). Schieder, Adukaite and Cantoni indicate that, the majority of UNESCO World Heritage Sites specific mobile apps differ little from conventional city or tourist guides (Schieder, Adukaite, & Cantoni, 2014). While World Heritage Sites represent the majority of cultural attractions, amplifying local cultural attractions’ role, in addition to promoting the travel destination as a whole in tourists’ cultural experience seems essential.

2.2 Mobile apps in tourist experience: Categories, effects

There exist various researches on mobile apps’ effect on tourism. Mobile apps can break spacious and temporal limitation for tourists, facilitating pre-trip, on-the-way and after-trip experience. Specific technologies, such as location-based services, encourage more spontaneous travel behaviors, leading to more exciting moments, experiences and surprises (Wang, Park, & Fesenmaier, 2011).

In 2011, among top 100 mobile apps available on AppStore in travel category, 53% were information oriented, such as flight information, destination guides, information about local facilities, etc. Tour guides for specific attractions accounted for 9%, and was only available for Walt Disney Theme Parks (Wang, Park, & Fesenmaier, 2011). In 2014, there were already 9 World Heritage Sites attraction-based mobile apps in the Swiss AppStore, but these attraction-based mobile apps don’t offer much different information compared to conventional tourist guides (Schieder, Adukaite, & Cantoni, 2014).

2.3 Gamification, mobile apps, and cultural experience

Gamification refers to “using game-thinking and game mechanics to engage an audience and to solve problems in a non-game context” (Zichermann & Cunningham, 2011). Gamification is a major trend for the coming years in tourism, which will appeal to consumers across all age

demographics (World Travel Market, 2011). It is found that “Among tourists’ experiences, educational experience and entertainment experience had positive effects on touristic satisfaction” (Lee, Lee, & Ham, 2014). In this case gamification becomes relevant and effective for enhancing tourists’ cultural experience, including education and entertainment aspects. Technological development has enabled physical movement to generate interaction into game world, which has also become a focus of research in recent years (Linaza, Gutierrez, & García, 2014). Considering tourists’ experience combines physical presence in attractions, and virtual exploration to information, gamification can act as a bridge to connect both aspects.

Gamification and gamified system are implemented to change behaviors towards desirable activities. Applying gamification in tourism can stimulate both intrinsic and extrinsic motivation of tourists (Xu, Weber, & Buhalis, 2014), including getting more cultural benefit out of travel experience. Other benefits of gamification in tourism include: encouraging tourists’ engagement, enhancing tourists’ experience, improving tourists’ loyalty and increasing tourism brand awareness. However, “compared with other fields, the use of gamification in tourism is still in its infancy” (Xu, Weber, & Buhalis, 2014). Few cases of application of gamification have been presented. The effectiveness in changing tourists’ behavior with gamification applied in tourism has yet to be evaluated in specific contexts, such as enhancement in tourists’ cultural experience.

With the growing trend towards mobile internet ecosystem and growing user base, mobile apps become a natural choice as the gamified platform. Examples such as ExCORA, REXplorer, Your Forbidden City, One Day as Emperor, The Amazing City Game of Trondheim are based on mobile apps.

Currently there are 28 mobile apps in App Store targeting tourists specifically in Nanjing, among which 11 apps include English or other languages except for Chinese. Only “Wan Zhuan Nanjing”

among all 28 apps is designed with game elements with game mechanics. The game storyline of “Wan Zhuan Nanjing” is similar to “Monopoly”, while game elements are adjusted based on local cultural facts and local attractions. Table 2.1 presents all the 28 apps with their unique App ID. The data is collected on App Store, and verified whether they have an Android version. Only 6 apps have an Android version, “Wan Zhuan Nanjing” not included.

Table 2.1 Mobile Apps in App Store specified for tourists in Nanjing

App Name	App ID	Foreign languages 1=Yes, 0=No	Gamified 1=Yes, 0=No	PoI focused 1=Yes, 0=No	Android Version 1=Yes, 0=No
Nanjing Travel Guides	321814203	1	0	1	0
Metro Nanjing	333478543	1	0	0	1
eTIPS Nanjing	387876223	1	0	1	0
Nanjing Map 南京地图	400619856	1	0	1	0
Nanjing Metro 南京地铁	425138019	0	0	0	1
World Explorer 360 世界指南	438170416	1	0	1	1
Itravel-Nanjing 爱旅游—南京	458571351	0	0	1	0
Itravel • Nanjing 爱旅游 • 南京	495190154	0	0	1	0

Nanjing Tourist Assistant 南京旅游助手	505454211	0	0	1	1
Nanjing Tour Guides 南京游记攻略	507436033	0	0	1	0
Wan Ban-Nanjing 玩伴-南京	513811763	0	0	1	0
Wu Wang Guo Chi 勿忘国耻	592683526	0	0	1	0
Nanjing Map	595353775	1	0	0	0
Zhang Shang Nanjing 掌上南京	616517557	0	0	1	0
Nanjing Metro Official App 南京地铁官方应用	624440115	0	0	0	0
Nanjing Offline Travel Guide	638112565	1	0	1	0
Wan Zhuan Nanjing 玩转南京	641003103	0	1	1	0
PLACE STARS	657108497	1	0	0	0

Zi You Nanjing 自游南京	669329877	0	0	1	0
Nanjing Tourist Assistant	675500082	1	0	1	1
Nanjing Pearl Spring 南京珍珠泉	692661829	0	0	1	0
Nanjing Snacks 南京小吃网	731343595	0	0	0	0
City Navigator Maps	849560888	1	0	0	0
Nanjing Olympic Museum 南京奥林匹克 博物馆	902914892	1	0	1	0
Tong Yan Kan Nanjing 童眼看南京	942378424	0	0	1	0
Lv Dao - Nanjing City Guide 驴导 — 南京 城市导游	946677811	0	0	1	0
NJU.GOV.CN 南京旅游网	967113194	0	0	0	0

FuZi Miao-Guide Assistant 夫子庙-导游助 手.旅游攻略.打 折门票	N/A	0	0	1	1
Looking for...in City Nanjing 寻城记-南京之 烟雨秦淮梦	659407899	0	0	1	0

From the literature review, some knowledge gaps can be identified. Firstly, the definition of tourists' cultural experience is needed. With the definition, specific measurements can be developed for evaluating cultural experience, which could contribute to constructing higher touristic satisfaction level. Secondly, the amount of attraction-based mobile apps has been increasing since 2011, but there exist few mobile apps that are based on local attractions in Nanjing until February 2015. The only gamified mobile app for tourists is not targeting foreign tourists. Besides, functionalities and level of gamification of existing mobile apps should also be evaluated. In general, there are still spaces for innovation in gamification applied through mobile apps to enhance tourists' cultural experience.

3. Methodology and structure

The study aims to tackle the problem of exploring cultural experience as a foreign tourist in Nanjing, China, via the creation of a gamified mobile app solution. While this study strives to contribute use case to application of gamification in tourism, and to be useful in understanding cultural experience for foreign tourists, it falls into the design science research realm. Hence, the design science research methodology, which identifies six activities for design research (Hevner & Chatterjee, 2010), is applied to this study. The six activities and corresponding structure in this study are presented in Table 3.1. The structure of this study is organized accordingly, with adjustment which aims to address the goal of the study more explicitly and clearly. How data is collected and analyzed is discussed in this part as well.

Table 3.1 Design science research activities and corresponding structure

Activity	Structure in this study
Step 1. Problem identification and motivation	1. Introduction 2. Theoretical background
Step 2. Define the objectives for a solution	4. Design objectives
Step 3. Design and development	5. Design of the solution
Step 4. Demonstration	5. Design of the solution
Step 5. Evaluation	6. Evaluation of the solution
Step 6. Communication	7. Conclusion

As identified in part 1 and 2, the study aims design and construct a conceptual prototype of a gamified mobile app, through which foreign tourists' cultural experience in Nanjing, China, could be enhanced. The objectives of design are claimed in part 4, which are defined based on motives of tourists for gaining cultural experience.

The design of the solution is described in part 5, based on the MDA framework, which is an effective approach to understand game design, and further to “bridge the gap between game design and development” (Hunicke, LeBlanc, & Zubek, 2004). It offers a good overview and guideline on how to apply gamification in non-game context, regardless of specific application realms. Except for game mechanics and game dynamics, significant game components which can contribute most to the design objectives, such as badges in the solution, and sample puzzle challenges are also elaborated on in this part.

In design science research, a viable artifact must be produced as a part of the outcome. The artifact can be presented in the form of a construct, model, method or instantiation (Hevner & Chatterjee, 2010). As for development of the solution, prototype is developed instead of a working mobile app. It is due to the fact that the major design goal is to validate a gamification system model of enhancing tourists’ cultural experience, instead of technical performance indicators. Thus the prototype is sufficient to be used for evaluation. The prototype is built using Chinese online popular mobile app prototype platform modao.io, in the forms of interactive visualized prototype which can work on mobile devices. Flow charts are used to describe how the enhancement of tourists’ experience takes place through the solution.

Potential users would be invited to evaluate of the interactive prototype. First of all, persona data would be collected in order to validate the interviewee has potential to become a user of the solution. Potential users are identified by their motivation to travel for cultural experience, to travel in China, and to form specific travel behaviors through gamification. The adjusted cultural experience model would also be validated. Secondly, the evaluation of functionalities and usability of the solution would be conducted, through observational field studies, where participants try out the interactive prototype, and go through interviews to describe difficulties in the user journey, give feedback, and reflect on whether the solution could enhance cultural

experience. Metrics would be identified before the field studies are conducted. Data collected through field studies would be analyzed to present the result of the evaluation. Limitations are also discussed in part 6.

In part 7, conclusion would be communicated, with outlook of how to improve the solution, and future work in developing the use of gamification in mobile apps to enhance tourists' cultural experience would be presented.

4. Design objectives

The ultimate goal for the solution is to enhance foreign tourists' cultural experience in China, through gamified mobile app. Since cultural experience is highly dependent on cultural assets and attractions, the solution will focus on specific region, namely Nanjing, and the attractions within.

Since "cultural experience" is a broad but self-explanatory concept, it is difficult to be measured. Thus finding a proxy of measuring cultural experience is necessary and would be more efficient. When it comes to gamification, motivation is the essence (Xu, Weber, & Buhalis, 2014). Hence enhancing motivation towards desired behaviors and activities would become central topic, in regards to applying gamification in tourists' experience. Therefore, the tourists' motives towards cultural experience become proxy of measuring cultural experience in this study. The tourists cultural experience motives model (Kay, 2009) will be introduced and applied in this study.

4.1 Cultural experience motives

Identified as a knowledge gap, cultural experience has barely been defined. None information regarding creation or construction of cultural experience has been found during the period of this study. The benchmark for cultural experience measurements is the four attributes of culture (McCurdy, Spradley, & Shandy, 2005), which are: a) Culture is learned. We acquire cultural knowledge through learning. So the cultural experience includes learning experience. b) Culture is shared. A culture has some common grounds for various cultural assets within. To find the common grounds, integration into the local context is important. c) Culture generates behavior. Certain behavior is the outcome of culture. d) Culture interprets experience.

Meanwhile, Kay developed a measurement model for tourist cultural experience motives, focusing on Western and Asian tourists in Melbourne, Australia. The four-factor model is

presented in Figure 4.1. As a cross-cultural research, Kay’s findings also suggested that there was no evidence to support significant differences in terms of dimensionality of the model, between Western and Asian tourists. The implication allows few adjustments of the model before being applied to this study.

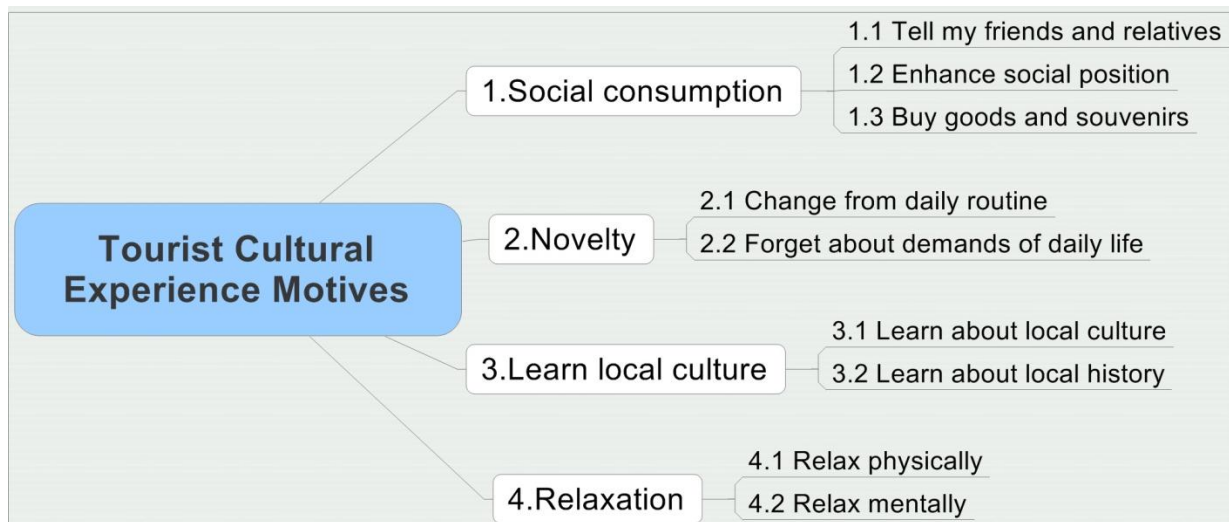


Figure 4.1 Kay’s Model of cultural experience motives

Since the model is about motives for tourists attending cultural experiences, this study will use these factors to measure enhancement of cultural experience. The tourists cultural experience motives model aligns very much with the four attributes of culture. It includes learning behavior of local culture, and focuses on experience. However, the tourists cultural experience motives model doesn’t include finding the shared common grounds for the culture, which could be reflected by integrating into local lifestyle. Thus, the model is adjusted into the model presented in Figure 4.2, with validations explained below.

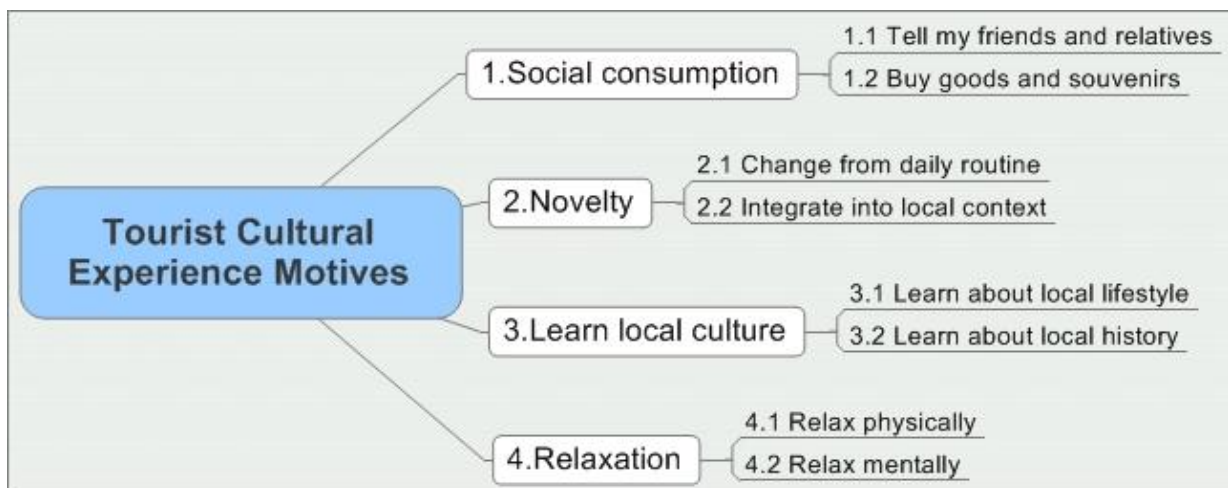


Figure 4.2 Adjusted model of cultural experience motives

One of the motives for cultural experience, namely “1.2 Enhance social position”, is not taken into consideration for the objective. Enhancement of social position might be perception out of a single experience as tourist. Nevertheless, perception of social position varies from culture to culture. There would not be a general measurement standard for this factor.

Another factor in the model “2.2 Forget about demands of daily life” seems to require high intention to escape from daily routine. Hence, the factor is adjusted into “Integrate into local context”, which adds up to “2.1 Change from daily routine” by emphasizing the specification of travel destination.

As for “3.1 Learn about local culture”, which is a broad motive and could possibly consist “3.2 Learn about local history”, the adjustment would make it more specific and clear. Instead, “Learn about local lifestyle”, which could reflect common activities such as food tasting, night life, shopping, entertainment and arts, local customs etc. (Welsh & Kersten, 2013)

Based on this model, the target user persona is described as follows. The user enjoys traveling or is motivated to travel. Seeking for cultural experience, which can fulfill more than one of the

motive factors, is the user's intrinsic motivation to travel. The user would also like to explore the interest in traveling in China. The user might face the challenge of understanding local culture while traveling.

4.2 Objectives of design

The solution is to better facilitate fulfillment of cultural experience motives through gamification. This indicates that the solution would tackle untouched demands of tourists towards the cultural experience in Nanjing. Mentioned in Table 2.1, Table 2.2 and Table 2.3, the few mobile apps targeting both domestic and foreign tourists in Nanjing provide basic service to tourists, including maps, GPS service, general introduction of local attractions, etc. When it comes to cultural experience, they mainly provide knowledge about local history, which is only part of the cultural experience for tourists.

Based on the adjusted model of cultural experience motives depicted in Figure 2, the objectives of the solution design would be described with functionalities of the mobile app, together with desired behaviors and perceptions of users.

Objective 1: Enhance social consumption - content sharing and rational consumption decisions.

Except for being solely a tool for enriched information on local cultural experience, the solution should enable content sharing and rational consumption decisions of goods and souvenirs.

Sharing towards friends and family can go through social media channels. To avoid irrelevant or promotional sharing, which might annoy target groups, sharing UGC (user generated content) could be a solution. An alternative could be to share semi-customized content. The solution can offer templates for various formats, such as pictures, texts, even multimedia.

It's not necessary to include e-commerce in the solution. However, the solution could facilitate

rational consumption decisions on local goods and souvenirs. Usually tourists in general buy local goods and souvenirs in souvenir shops, within tourism attraction regions. It is a general fact in China that these souvenir shops offer average goods which are more expensive than other suppliers. One alternative could be to incorporate recommendable places for purchase into user experience flow of the solution, while visualizing game elements, such as badges and goals, into icons reflecting real goods and souvenirs.

Objective 2: Strengthen integration and simplify travel planning. On the one hand, novelty is a motive factor for tourists to gain cultural experience. On the other hand, local integration into a totally new context becomes more important for tourists. Additionally, since daily routine is changed while traveling, travel planning comes first to construct the experience. One of the best ways for foreign tourists to forget about daily demand is to integrate themselves to local culture and lifestyle.

Even though change from daily routine seems to be natural for foreign tourists, being physically in a different cultural context doesn't directly lead to a successful tourist experience. Successful travel planning can boost the feeling of integration for tourists. While facing the challenge of new cultural context, simplifying travel planning would help foreign tourists to be more integrated and to experience the core of destination.

The solution could utilize the game component of path to mastery, to offer the convenience of constructing the experience step by step, with lower autonomy and intensity required.

Objective 3: Offer multiple interaction approaches for learning local culture. Taking into consideration that people have different learning styles and cycles, offering multiple interaction approaches, especially with game mechanic would enhance the learning of local culture.

The format of information offered in existing tourism mobile apps listed in Table 2.1, Table 2.2 and Table 2.3 are mainly written text, talking about historical background of attractions in Nanjing. Considering that Nanjing has been the capital of China for several different dynasties, it would be challenging for the majority of foreign tourists to have an overview of the cultural context.

Interactive approaches can be chosen from text, visualization, video, audio, or even advanced technologies such as virtual reality, augmented reality, etc. In order to measure the enhancement of learning, specifications or game settings should be made clear.

Users of the solution would make more sense of cultural facts after their travel experience, compared to using existing tourism mobile apps. Users would know cultural roots better as well.

Objective 4: Balance between fun and purpose. The solution would incorporate various types of fun, while keep the purpose aligned throughout the user experience. This would enable the solution to help users relax mentally.

For the motive of Relaxation, the solution will mainly enhance the experience of mental relaxation. The solution will make the cultural experience more mentally relaxing, by integrating game elements into the whole experience. While serious purpose of learning and memorizing more cultural knowledge exists, the balance would be evaluated.

The design objectives of the solution align with enhancement of cultural experience motives model. Table depicts how the design objectives align with the cultural experience motive model.

Table 4.1 Alignment between cultural experience motive and design objective

The cultural experience motive	The design objective
<p>1. Social consumption</p> <p>1.1 Tell my friends and relatives;</p> <p>1.2 Buy goods and souvenirs.</p>	<p>1. Enhance social consumption</p> <p>1.1 Enable content sharing;</p> <p>1.2 Enable rational consumption decisions.</p>
<p>2. Novelty</p> <p>2.1 Change from daily routine;</p> <p>2.2 Integrate into local context.</p>	<p>2. Strengthen integration and simplify travel planning</p> <p>2.1 Simply travel planning;</p> <p>2.2. Strengthen integration.</p>
<p>3. Learn local culture</p> <p>3.1 Learn about local lifestyle;</p> <p>3.2 Learn about local history.</p>	<p>3. Offer multiple interaction approaches for learning</p>
<p>4. Relaxation</p> <p>4.1 Relax physically;</p> <p>4.2 Relax mentally.</p>	<p>4. Balance between fun and purpose</p>

5. Design of the solution

The design of the solution would follow the MDA framework. While the design objectives are aligned with motives of cultural experience, MDA framework ensures gamification is applied properly in the context of enhancement. MDA framework breaks down consumption of games into three components, which are **Rules, System** and **“Fun”**. When it comes to game design, the counterparts of these three components are **Mechanics, Dynamics** and **Aesthetics**. Combining the MDA framework and practical gamification toolkit (Werbach & Hunter, 2015), Figure 5.1 presents briefly how different elements are classified into these three components. The following part will shed light on each component, and how it is designed in the solution.

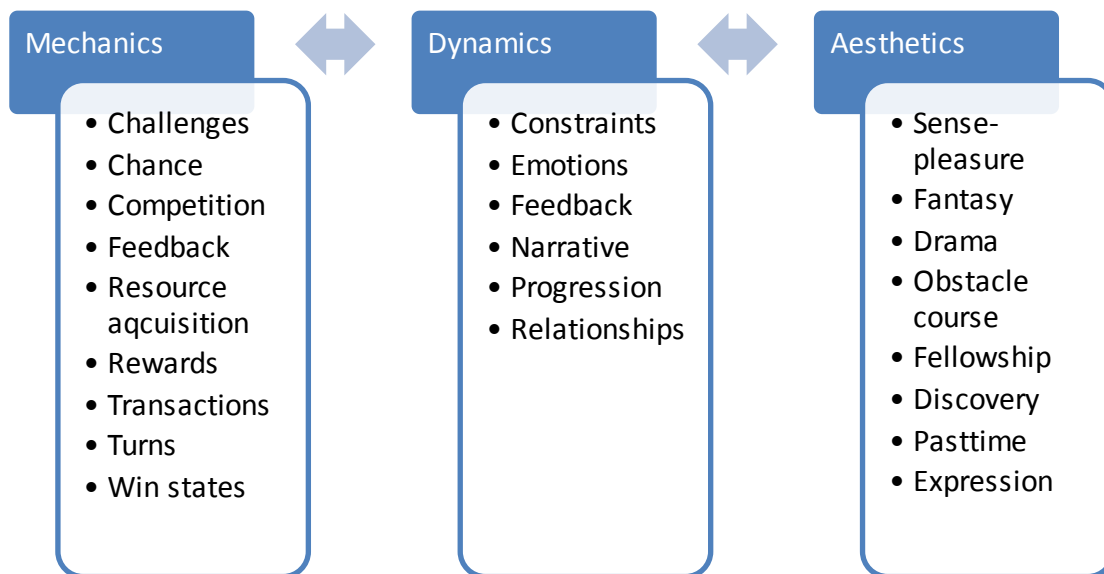


Figure 5.1 Possible elements in MDA framework

5.1 Game mechanics

Game mechanics are defined below (Hunicke, LeBlanc, & Zubek, 2004):

“Mechanics are the various actions, behaviors and control mechanisms afforded to the player

within a game context. Together with the game's content (levels, assets and so on) the mechanics support overall gameplay dynamics.”

Specific game mechanics are described below.

Challenge & Turns. The primary game mechanic of the solution is challenge. The user journey is constructed by puzzle challenges, which are designed specifically for different local attractions in Nanjing. The unique cultural experience each local attraction offers can be enhanced with an approach that fits best. As for the flow of the game, there will be no level up mechanism implemented in the solution, which means the user can choose whatever puzzle challenge to play with, based on local attractions he/she wants to know more about. Each puzzle challenge is independent, without any level up mechanic in the solution. Thus, endless turns are provided to as long as the user would like to play with the puzzle challenges. Available puzzle challenges are presented in categories, named after corresponding local attractions.

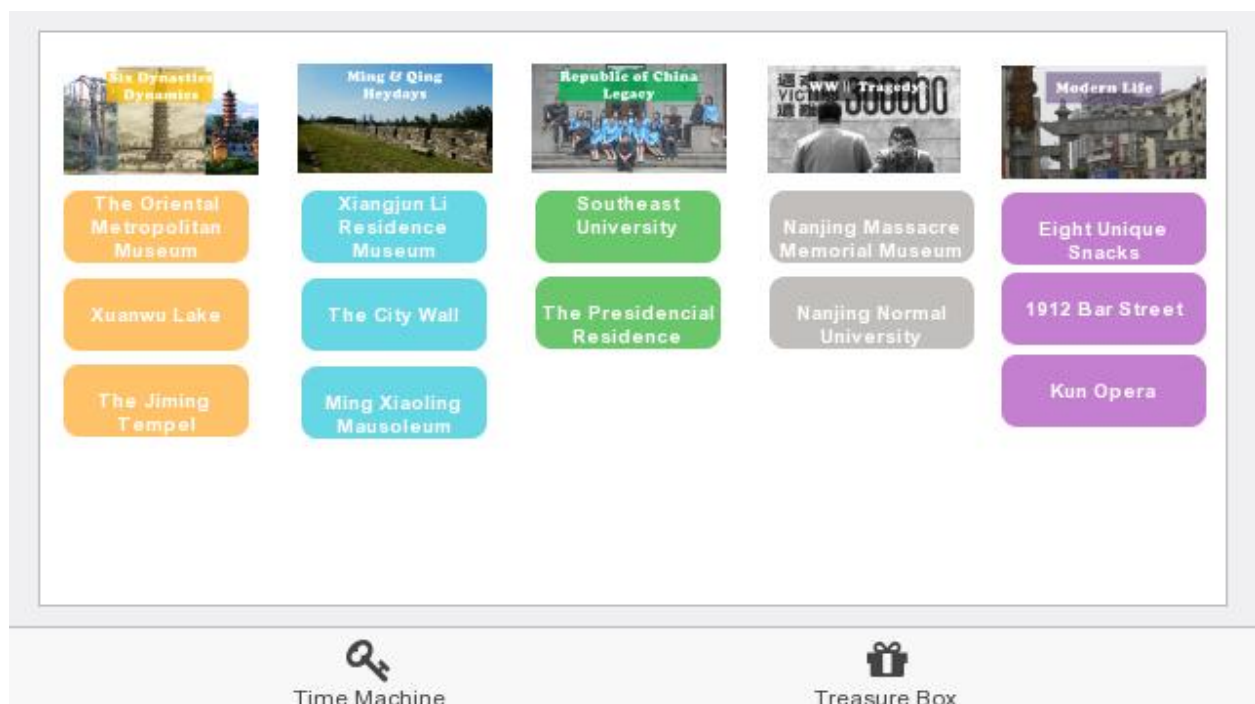


Figure 5.2 Available puzzle challenges

Resource acquisition. The main resource the user could acquire is relevant background cultural information. Since the entire puzzle challenges are related to cultural knowledge of Nanjing, this background information would be provided along the user journey. The information is scattered, which means it is not provided all in one place in a structured manner. Instead, relevant piece of background information only appears when it is needed to solve the puzzle challenge. It distinguishes the solution from general mobile apps which provide touristic information in a structured way, as if they are e-guidebook for tourists. An example of how background scattered pieces of information are provided is depicted in Figure 5.3. In the puzzle challenge, background information about the phenomena “Double 11”, the online shopping mania on November 11th, is offered. Based on the background information, the user is asked to choose from three different exhibits in the museum, defining which exhibit fits best into the phenomena if it happened in the setting of the exhibition, namely the Six Dynasties period in ancient China. In Figure 5.4, the puzzle challenge is presented.

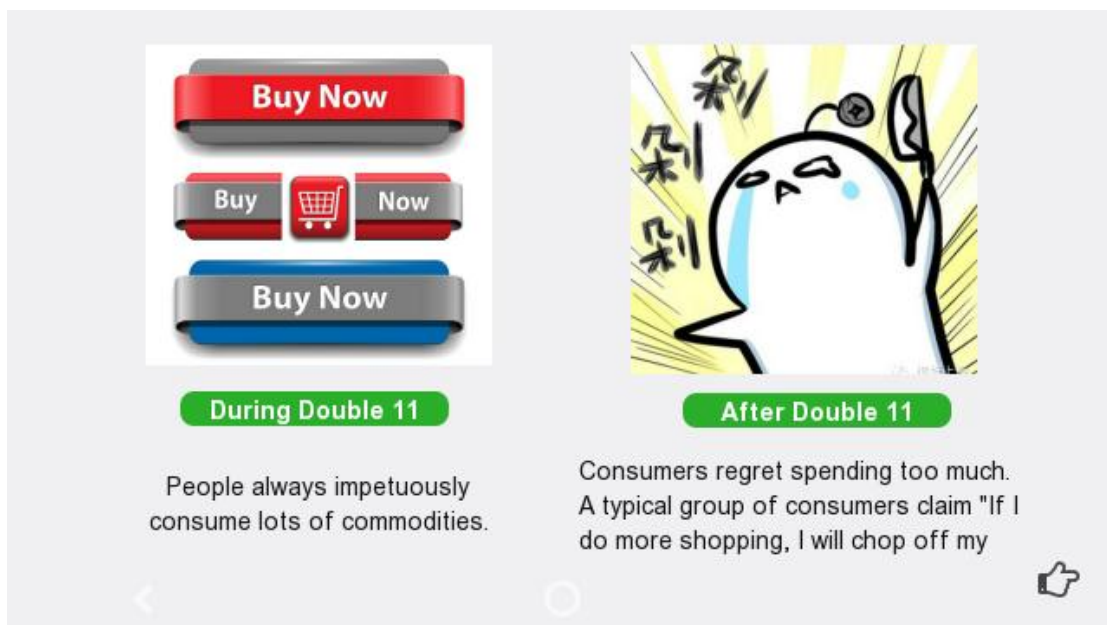


Figure 5.3 Background information regarding “Double 11” phenomena

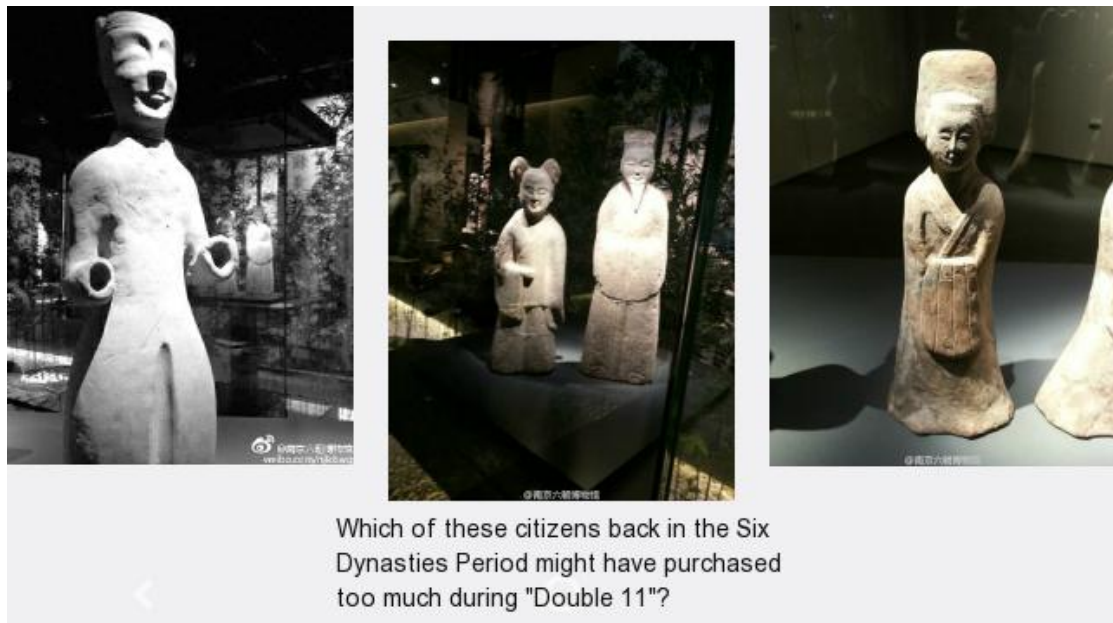


Figure 5.4 Puzzle challenge regarding “Double 11” phenomena

Rewards & Win states. Badges represent rewards and win states in the solution. When a puzzle challenge is completed successfully, the user will be rewarded with a badge. Badges are designed for highlighting the cultural values of corresponding local attraction. All the badges could be found in a section named “Treasure box”, where all available badges, no matter whether they have been acquired by the user yet, would be present. Badges are categorized into different theme based on the attributes of local attractions. Categories include local gallery, nature lover, history buff, architecture profession, antiquity, and leisure explorer, which reflect on different types of tourists. Badges acquired claim the range of exploration of cultural experience, motivating the user to explore more.

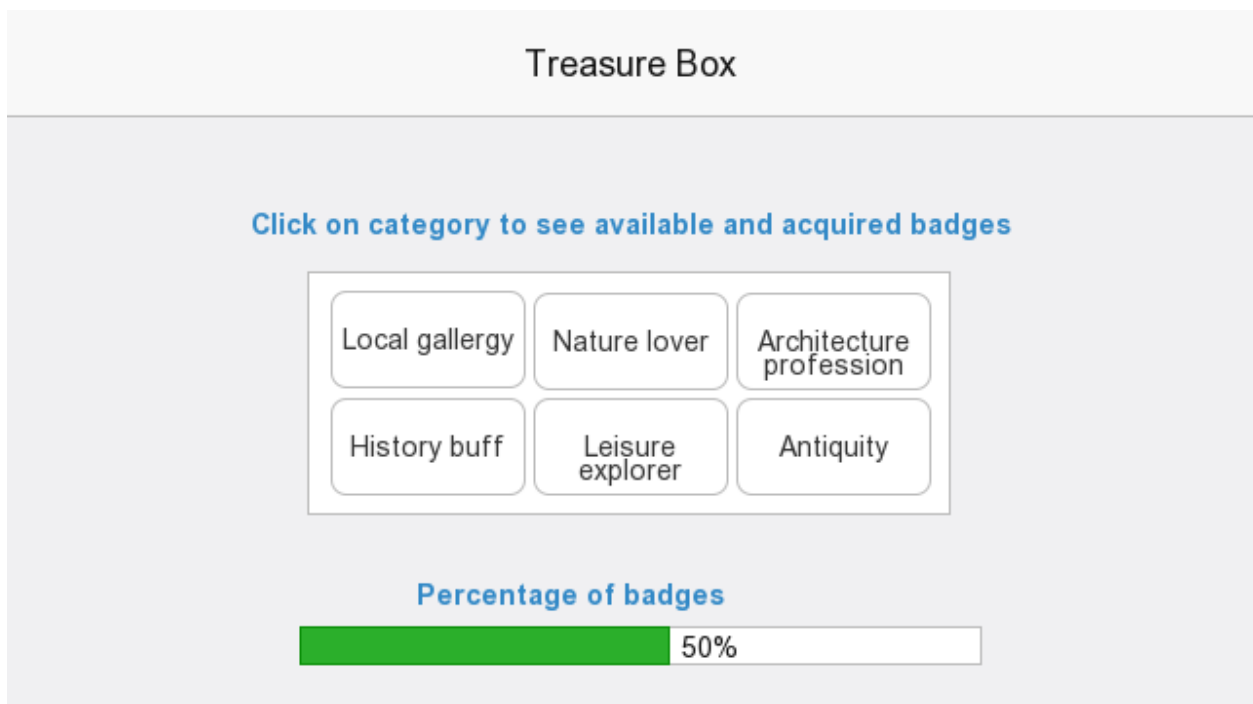


Figure 5.5 Categories of badges

5.2 Game dynamics

Dynamics are defined as follows:

“Dynamics describes the run-time behavior of the mechanics acting on player inputs and each other’s outputs over time.”

Narrative & Emotion. The solution will construct a narrative of a time transcending journey. The user is defined as a treasure hunter, exploring and hunting for cultural treasures in Nanjing, across different dynasties. In respective local attractions, except for user onboarding information, the user finds hidden cultural assets by using scattered pieces of background information offered along the user journey, integrating into the historical context of correspondent dynasty, and winning over challenges. The user collects the treasures, namely badges, and stores them in the treasure box, which contains various grids. Each grid in the box stores treasures in specific category. The user is inducted into the narrative from the intro page.

The narrative aims to construct the emotion of fun of exploration for the user.

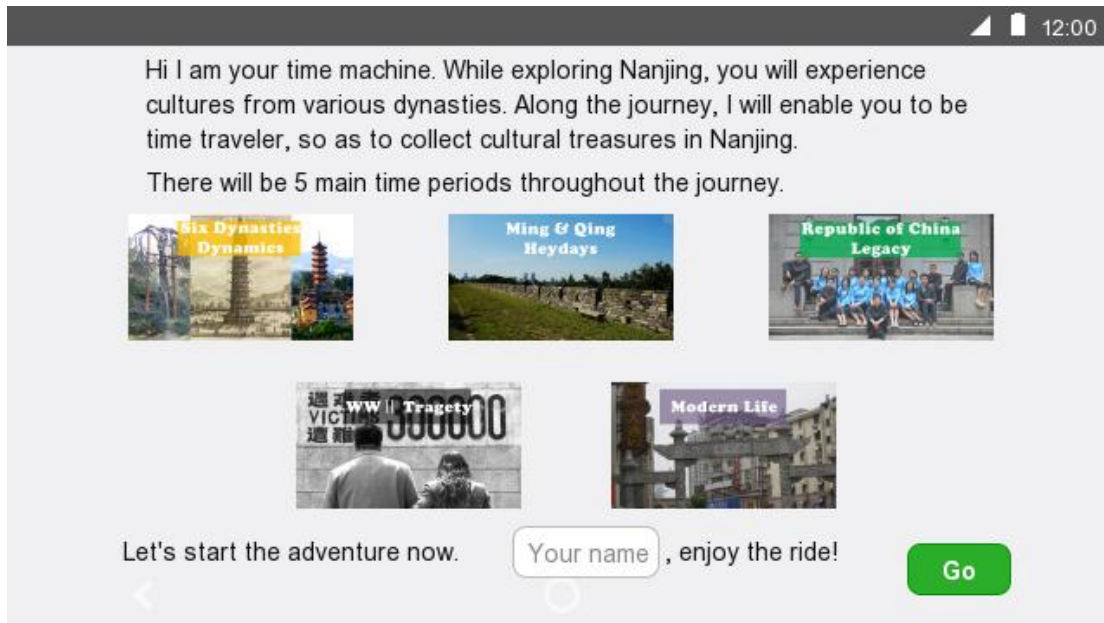


Figure 5.6 Intro page - Inducing the user into the narrative

Feedback. The feedback system in the solution, when the user fails to complete the puzzle challenge, can be identified. Since no level up mechanism exists in the solution, completing the puzzle challenges will enable the user to collect more badges, which will be used to trigger more physical interaction between the local attractions and the user. If the user fails to complete a puzzle challenge, hints and other trial chances would be given.

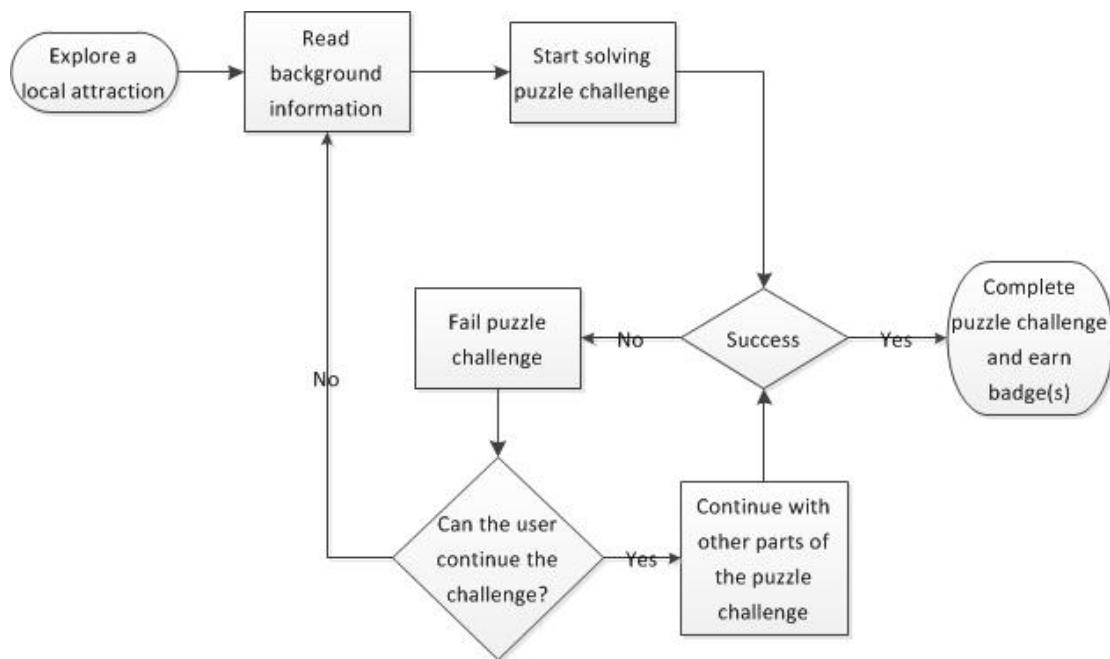


Figure 5.7 Feedback system for failing a puzzle challenge

Experience enhancement. Since the general goal of the user is to collect badges and to explore, the experience enhancement system is based on badge collections. The badges collected are not just virtual rewards. Designed to highlight the cultural values of corresponding local attraction, the badges are to trigger physical presence in the local attraction, enabling the user to enhance on-the-tour physical and interactive experience. While a badge system can be vague in the user experience considering the target user would be tourist, enhancing the connection between achievement in the solution and physical tourist experience is necessary. The badges can further boost physical travel experience for the user, by forming theme tour travel plans, offering tips regarding local integration, souvenir consumption, and so on.

There are three types of enhancement that badges provide. Local exploration & souvenir consumption, social sharing, and theme tour planning.

a) Local exploration & souvenir consumption. Along with badge description, relevant local attractions, or points of interest within the same local attraction are recommended. This kind of

recommendation doesn't entail massive text descriptions, which is easy to read and to notice. In the same time, recommendations motivate the user to have more interactions with the surroundings while traveling, not only in terms of visiting more points of interest, but also interacting with local citizens.

Some badges are connected with featured souvenirs of Nanjing, in terms of badge name, visual identity, description, etc. Usually badges which enhance souvenir consumption come along with further travel suggestions regarding what souvenirs are related and where to purchase them.

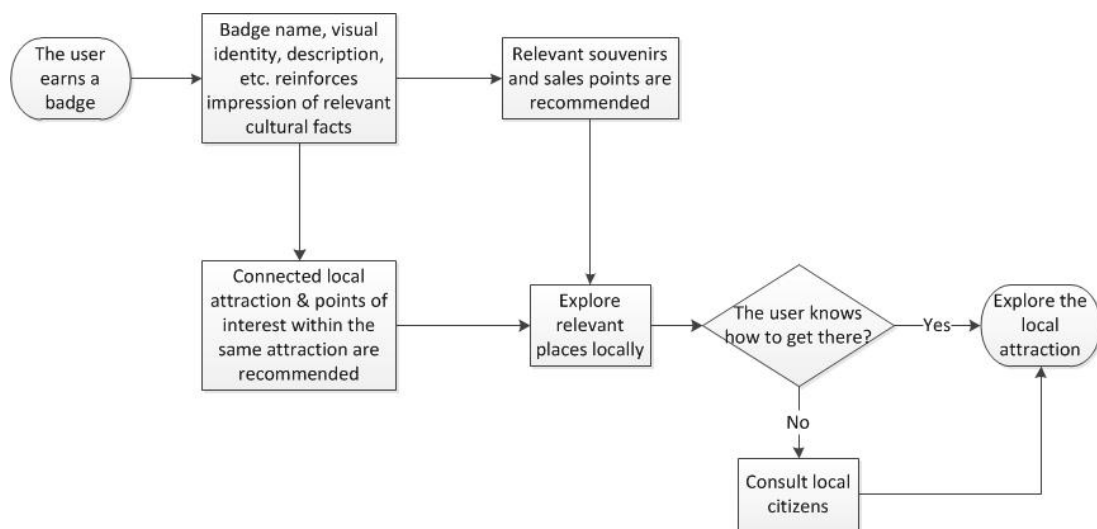


Figure 5.8 Badges' enhancing local exploration & souvenir consumption

b) Social sharing. The content for sharing is based on the semi-customizable image templates, and sample descriptions, taglines, text messages, etc. When the user customizes the template into a final image file, social sharing buttons become visible. Except for social media channels, email is also available for the user to share content through. The user can share the image as a social media post with descriptions on local cultural facts, or as an e-postcard for friends.

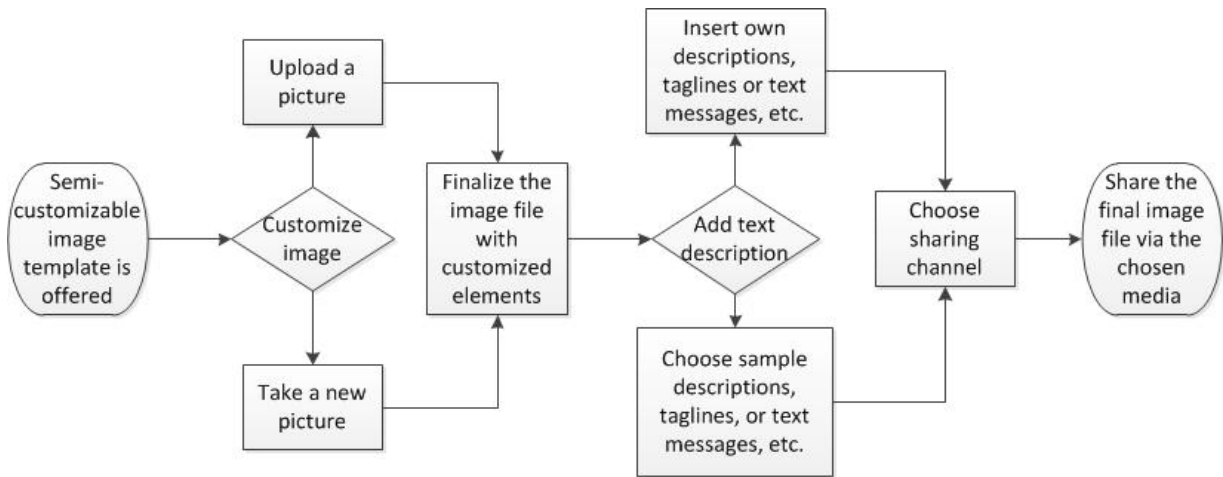


Figure 5.9 Badges enhancing social sharing

c) Theme tour planning. All badges are visible in the “treasure box”, with different “grids” within. Each “grid” represents a specific type of tourist based on interests. If a theme tour is desired by the user, available badges in the “grid” can form a theme tour itinerary, presenting the user relevant local attractions aligned with the theme. All available badges within the theme are presented in accordance with the sequence of the itinerary. This theme itinerary is presented in the first page of the “grid”, which also indicates all badges included in this category. The user can then play with corresponding puzzle challenges and gain more information, and customize the itinerary according to personal preference.

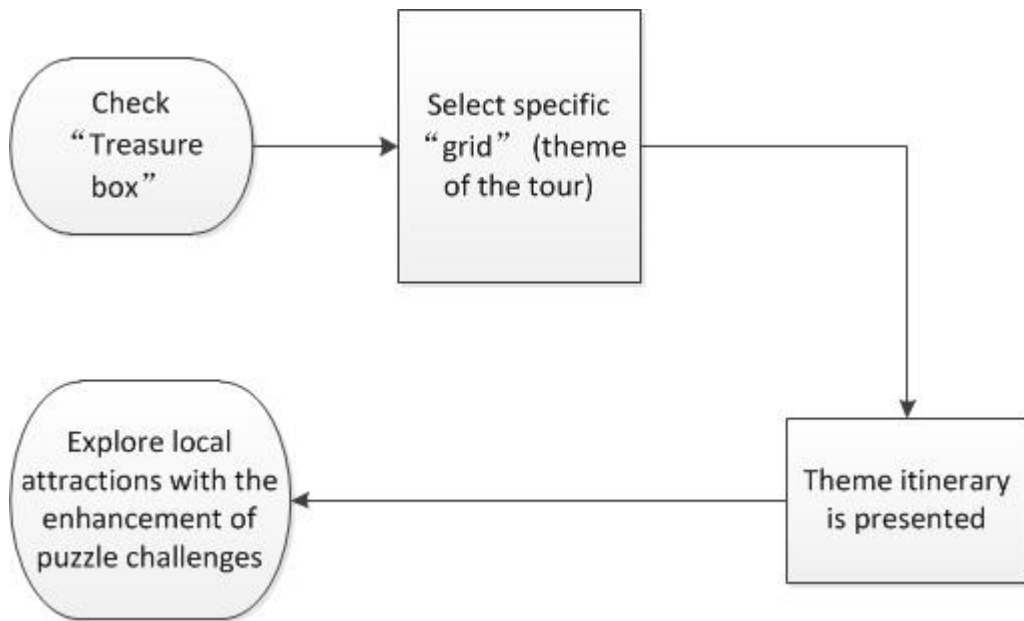


Figure 5.10 Badges enhancing theme tour planning

5.3 Game aesthetics

Game aesthetics, which rely heavily on game dynamics, define the unique game experience of the user. In this part the game aesthetics are described based on user journey.

The user journey begins with an entry page followed by a welcome screen, where players are informed about the narrative and goal of the game. The user starts with a quiz to find out the type of explorer, which would provide the user with customized suggestions on local attractions. Then a quiz about basic historical knowledge of Nanjing is presented to the user, after which the user is navigated to the time machine, where corresponding puzzle challenges of all the local attractions included in the solution are displayed. The puzzle challenges are categorized under different dynasties. This enhances the integration of the user into the cultural context that Nanjing represents cultural diversity of various dynasties.

Once the user clicks on a local attraction, descriptive content will be provided to offer background knowledge of the local attraction and of the puzzle game as well. Except for

plain-text description, audio and visual aids can be applied. The descriptive content is phrased as a node of the holistic user storyline as a time traveler. The user can also choose to skip the descriptive content.

There are three types of puzzle challenge, namely quiz, semi-customizable image template and text-based role play game.

Quiz. Purposes of using quizzes include the inherent fun, the functionality of categorizing users into specific groups, and the convenience of directing users to journeys where they find the most fun (Radoff, 2011). There are few types of quiz designed in the solution, namely quiz for general knowledge, and quiz for grouping.

Radoff indicates that “people enjoy becoming part of groups” (Radoff, 2011). The quiz for assessment will assess the user based on personal preferences, and eventually categorize the user into specific groups. Considering the design objective of simplifying travel planning, categorization could direct the user to explore local attractions which connect to personal interests most. History buff, architecture profession, nature lover, antiquity, and leisure explorer are the groups the user can be categorized into. Multiple choices are offered, but it is not a right or wrong decision making process. The user chooses the answer which fit them best, in order to gain a customized list of recommended local attractions. Sample question is presented in Figure 5.11. The quiz result is presented in Figure 5.12. The link for the quiz is offered in [Appendix A](#).

Question 1 / 8

I know the architect Ieoh Ming Pei, also known as I.M.Pei. I always want to visit architecture designed by him and his team (e.g the glass pyramid of Le Louvre Museum).

Yes

No, I prefer hanging out somewhere with snacks or drinks.

No. But I would be interested to visit, if there are some historic information offered to me within the architecture.

No. I prefer natural sights over architecture.

Figure 5.11 Sample question in quiz for assessment

Quiz for general knowledge comes in a format of multiple choices, with one single answer. The choices are presented in text or image formats, so as to offer multiple interactive approaches. The aim is to offer general background knowledge about Nanjing, and specific local attractions. The inherent fun would be provided through discovery, while the design objective to balance between fun and purpose is achieved. The user would get the background cultural knowledge easily with possible answers presented, while the process of choosing is engaging and challenging. For instance, a quiz in the start of user journey is triggered after the intro page. Three questions, regarding various pronunciations of the city's name, early history and reasons of Nanjing always being chosen as the capital, are asked. Each question offers three multiple choices. After choosing and clicking on the answer, the user will be directed to a page where the result and background information are provided. A sample question in this type of quiz is presented in Figure 5.13. Status where the user chooses the right or wrong answers is presented in Figure 5.14 and Figure 5.15.

Congratulations, you've completed Your Type as Nanjing Explorer



Based on your answers, you can see your score below

71%

Architecture profession

What Nanjing could offer you:

- The Oriental Metropolitan Museum - 3rd to 6th Century
- Sun Yatsen Mausoleum (Zhongshan Ling)
- Xiaoling Tomb of Ming Dynasty
- Nanjing City Wall (Ming City Wall)
- Jiming Temple
- Zheng He Treasure Ship Park

67%

History buff

What Nanjing could offer you:

- The Oriental Metropolitan Museum - 3rd to 6th Century
- The Memorial of the Nanjing Massacre
- John-Rabe House
- Nanjing Museum (Nanjing Bowuyuan)
- Nanjing Taicheng Wall (Ming City History Museum)

25%

Leisure explorer

What Nanjing could offer you:

- Confucian Temple Area (Fuzi Miao)
- Tangshan Mountain Hot Spring
- Eight Famous Snacks of the Qinhuai River
- Shiziqiao Food Street
- 1912 Bar Street

14%

Antiquity

What Nanjing could offer you:

- Jiangnan Gongyuan
- Jiangning Imperial Silk Manufacturing Museum
- Gan's Grand Courtyard
- Qixia Temple

13%

Nature lover

What Nanjing could offer you:

- Xiaoling Tomb of Ming Dynasty
- Xuanwu Lake
- Purple Mountain (Zijin Shan)
- Qin Huai River
- Qi Xia Mountain

Figure 5.12 Result of quiz for assessment

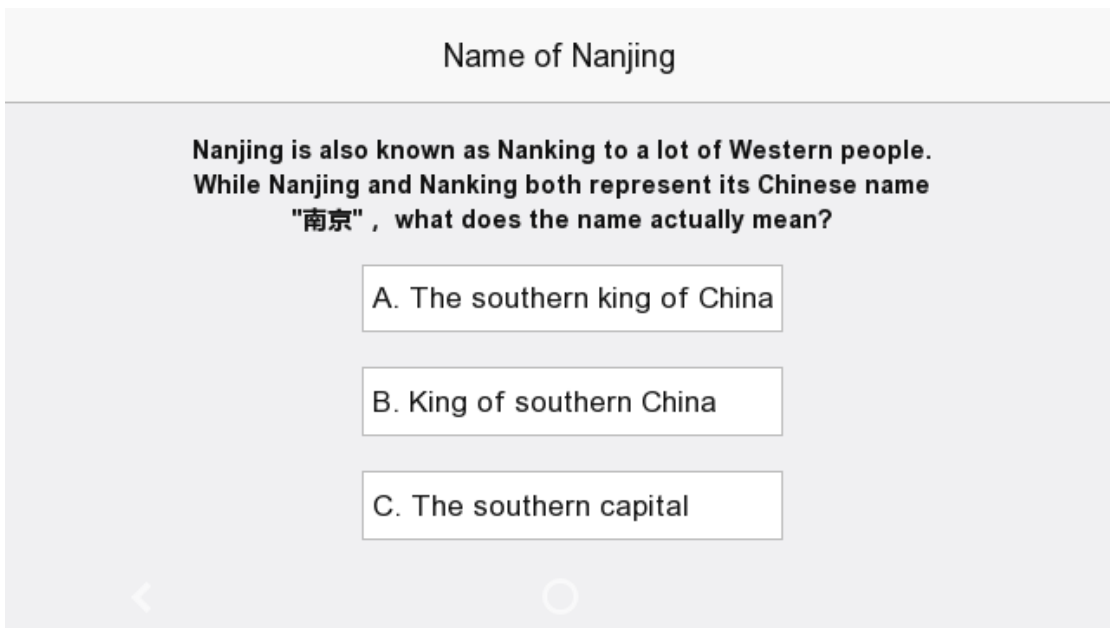


Figure 5.13 Sample question in quiz for general knowledge

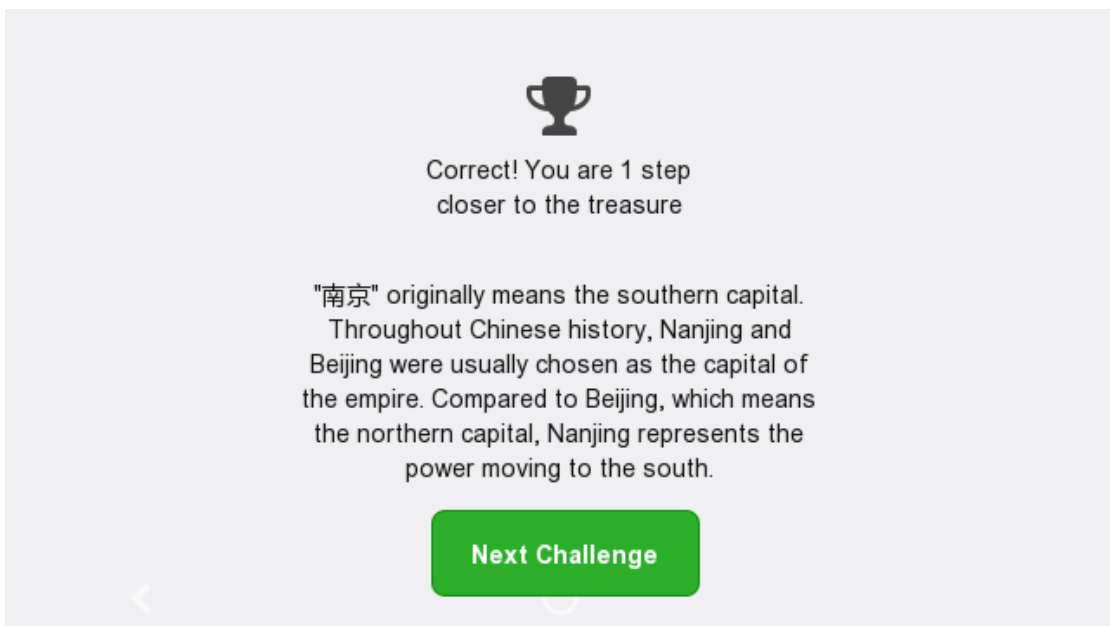


Figure 5.14 Status where the user chooses the right answer

Semi-customizable image template. To meet the demand of social sharing, as well as to event boost sharing behaviors, good contents with fun elements are needed. While practitioners have found that image contents increase reach of social media posts (Barilone, 2015), it is assumed

that semi-customized image template can help attain the design objective of enabling content sharing. Compared to fully user generated content, semi-customizable image templates provide easy and short user journey. The image template could be panoramic view of a local attraction, specific setting of storylines, etc. The user can customize the setting of the image, the text accompanying the picture, and change the avatars to personalized ones. When the user shares this type of content via social media channels, cultural facts embedded in the image template are spread in social network combined with real experience of the user. The user can also send the final image with customized text through email, as a virtual postcard to friends.

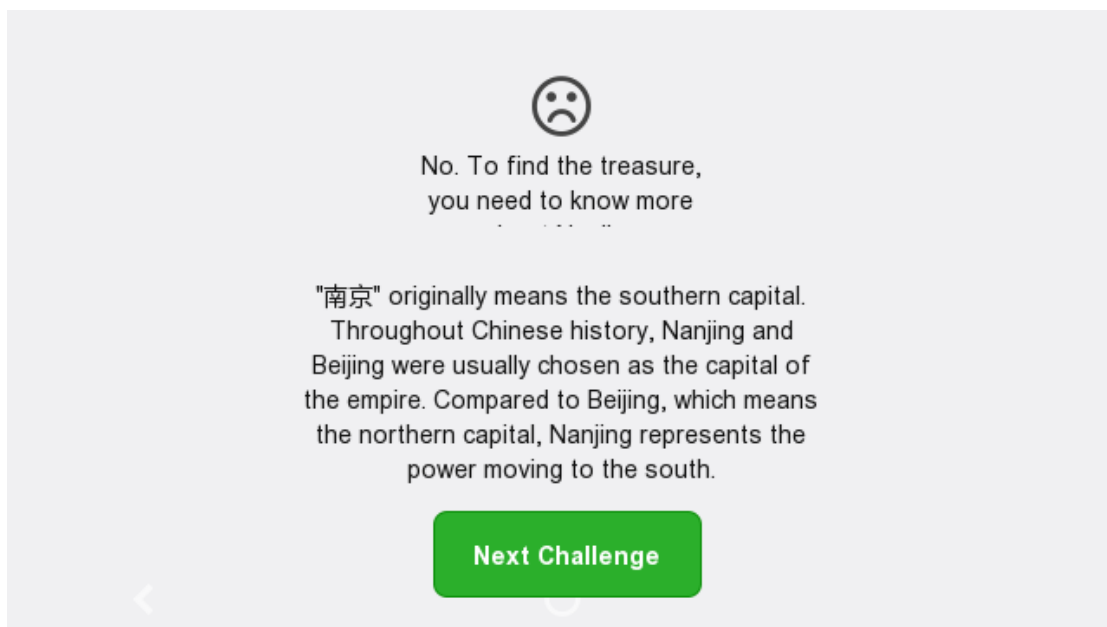


Figure 5.15 Status where the user chooses the wrong answer

An example is depicted in Figure 5.16. After the puzzle challenge related to “Double 11” phenomena, the user is directed to the page where the semi-customizable image template is offered. In this case, the user can customize the avatar in the image, with existing photo from local library, or a new photo taken on site. The user can also choose a tagline offered in the template, or customize it by generating new taglines. The prototype of the user interface is presented in Figure 5.16. After generating the image, the user can choose to save it to local

gallery, and to share it directly through various social media channels, as well as email.

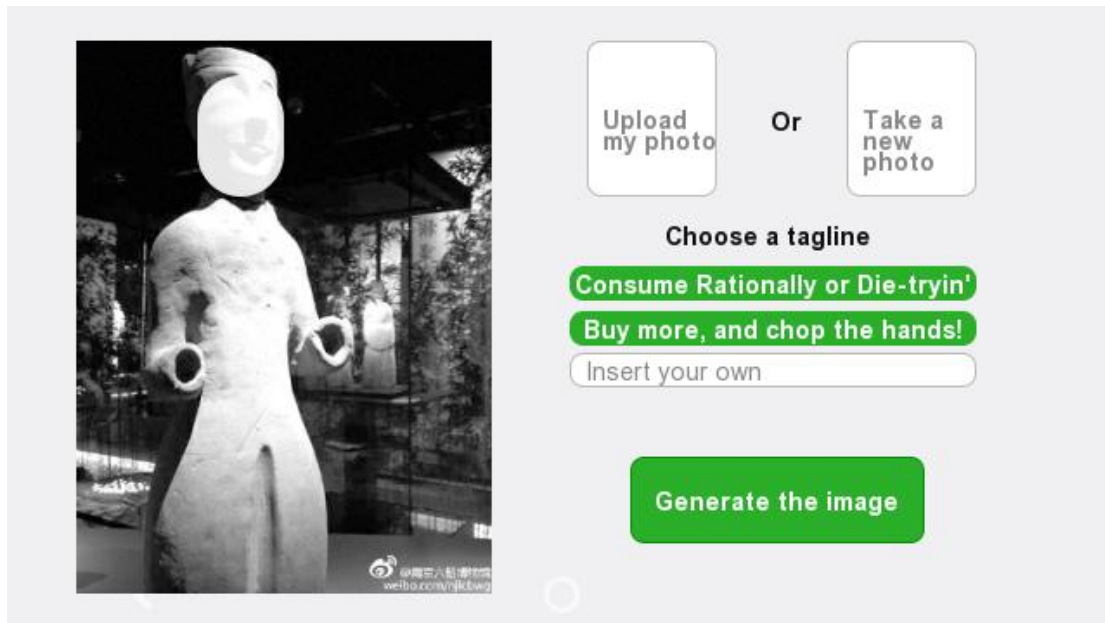


Figure 5.16 Prototype of user interface of the semi-customizable image template

Text based role play game. This type of puzzle challenge creates an experience through role play game, using solely text-based interface, together with images to nurture the context. The role play game context can stimulate the user’s intrinsic motivation of immersion, which is “a sense of forming an enduring emotional connection to a game by feeling as if you are actually part of something” (Radoff, 2011). The user is to explore and to immerse in the game context, as well as to reveal the stories.

By creating a totally new context for the user to immerse in, role play game could help the user to change from daily routine. The user needs to understand the background information and the storyline to fully gain the game experience. While the storyline is usually based on real history of Nanjing, role play game facilitates local integration of the user as well.

Even though role play game nurtures a new context, it doesn’t undermine the exploration

experience for local attractions. Usually local attractions have been renovated by relevant tourism management stakeholders, in order to simulate various senses of tourists to form integrated travel experience, simulating various senses of tourists. In comparison, the text-based role play game mainly simulates visual sense.


In the meantime, it is simple to start, to sustain and to finish the game experience if it's text-based role play game. This simplicity helps to incorporate this type of puzzle challenge into the solution. It also motivates the user to further explore the local attractions.

An example of the text-based role play game is the puzzle challenge of "Xiangjun Li Residence Museum". The puzzle challenge, in a text-based role play game format, would incorporate the user into the context of the transition period between Ming dynasty and Qing dynasty, and the setting in around Qinhuai River, which was the city center for night life and entertainments. The storyline is about the Eight Beauties of Qinhuai, who were the most famous courtesans. They are important in the history of Nanjing because they demonstrated national integrity and virtual, even though they possessed fairly low social status. The user would play as the character Xiangjun Li, who was among the eight famous courtesans.

Through the challenge, the user would make choices regarding her biography. By making choices from the character's perspective, the user can understand the context where Xiangjun Li was living in. The major plots include a) How Xiangjun Li became a courtesan; b) Her engagement and how she rejected support from the corrupt; c) Her refusal to be forced to marry a noble politician. Through these plots, the user lives the experience of Xiangjun Li, in order to understand why she represents the virtual and national identity among the Eight Beauties of Qinhuai.

As a text-based role play game, the puzzle challenge requires the user to make choices under

specific scenarios, which lead to significant plots of the storyline. The choices the user needs to make include: whether to accept being adopted by a courtesan; whether to accept financial support from a corrupt political; and how to react to a forced marriage arrangement. If the user's choice is aligned with history, then the storyline continues. If not, then the game comes to an end, but the user can still choose the alternative and to continue playing easily.



Accidentally, you realize that the financial support is not from Longyou Yang, but from Dacheng Ruan, who is known as despicable, corrupt politician. Ruan offered the support trying to court Hou into his political group, while Hou is still hesitating about joining him or not. What would you suggest Hou to do?

A. We accepted his support. Just join him so we can show our gratitude.

B. I am angry at Hou's hesitation. He should not give in to financial temptation.

Figure 5.17 Choice under specific scenario

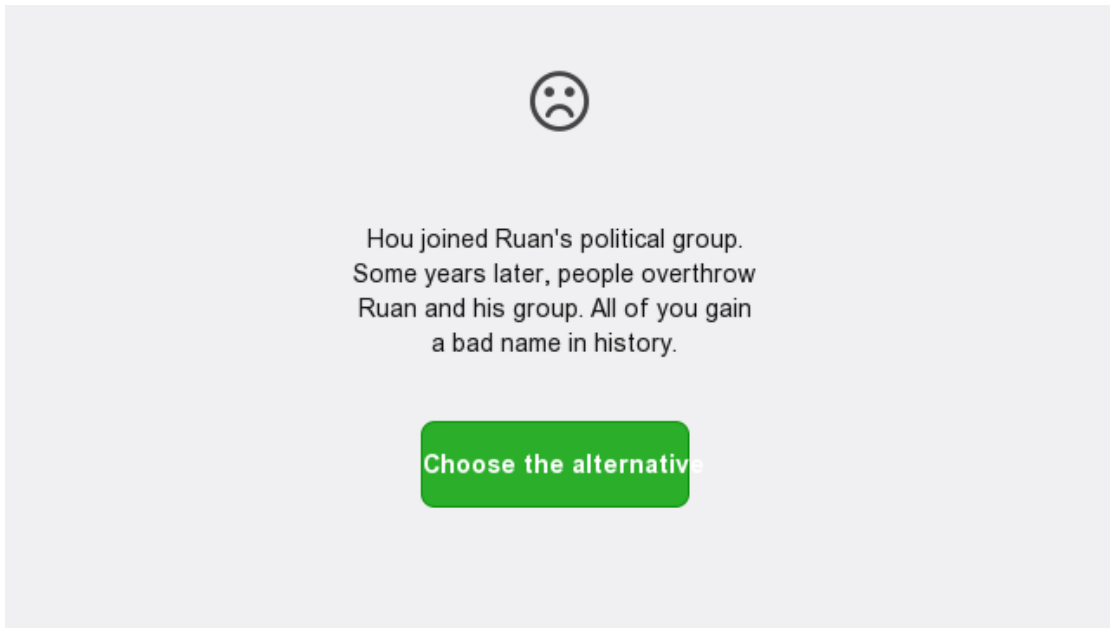


Figure 5.18 Choice not aligned with history

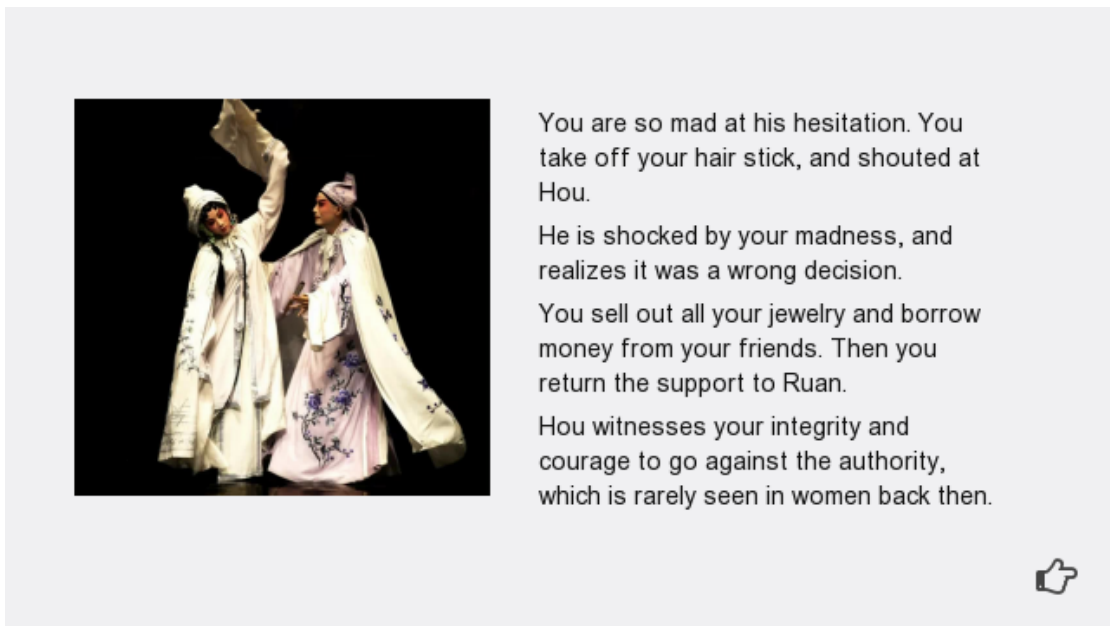


Figure 5.19 Choice aligned with history leads to significant plot

The major game components designed for the solution are summed up in Figure 5.20. The prototype of the solution can be found in Appendix B, which is used for evaluation as well.

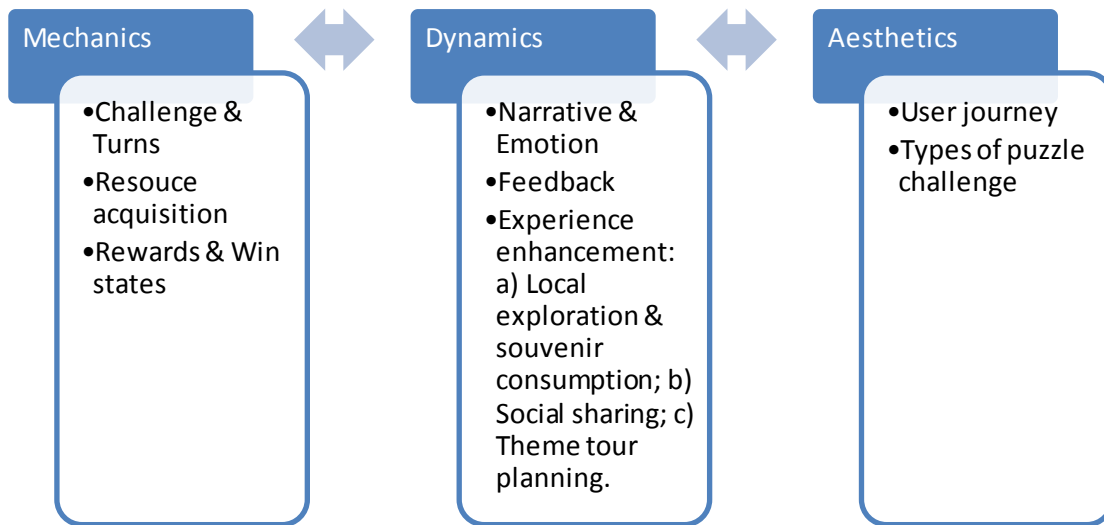


Figure 5.20 Game components of the solution in MDA framework

6. Evaluation of the solution

6.1 Evaluation method

The evaluation method is selected based on the ultimate goal of evaluation. There are five different types of evaluation methods in information system design research (Hevner, March, Park, & Ram, 2004), namely observational, analytical, experimental, testing and descriptive methods. Since the main goal is to validate the enhancement of foreign tourists' cultural experience in Nanjing through the solution, out of the five types of methods, observational field study is chosen.

One of the most popular formats of observational field study is focus group. It is usually used in design research for two major purposes: a) to propose improvements in the design; b) to establish the utility of the artifact in field use. These two purposes fit well with the evaluation goal. Due to the flexibility, direct interaction with respondents, large amount of rich data and the possibility for participants to build upon each other's ideas (Hevner & Chatterjee, 2010), focus group is widely used in design research.

After few trial observational field studies, it is found that it takes time to validate whether the participant could be a potential user, to gather their feedback as well as to validate the functionality and usability out of the participants' user experience. It is because individual participant has personalized travel behaviors. Considering that the solution is usually not used out of group behavior, instead of widely used focus group method, individual interviews were conducted.

6.2 Metrics for evaluation

The evaluation aims to measure the solution from various aspects. In terms of user persona

evaluation, motivation is the most important metric to be measured. Specifically, the motivation of potential target group towards cultural experience, and towards using mobile app, specifically the solution itself for traveling purpose, are evaluated. This can facilitate validation of the adjusted model of cultural experience motives. In particular, specific behavior such as sharing travel experience on social media, souvenir purchase, collecting badges in games are inquired in order to validate the design logic of the solution.

Table 6.2 Metrics for user persona evaluation

Category	Metric	Question(s) for interview
Target group validation	<ul style="list-style-type: none"> - Frequency of traveling; - Number of foreign countries the interviewee has been to; - Motivation to travel in general; - Motivation towards cultural experience to travel in China; 	<ul style="list-style-type: none"> - How often do you travel? - Where have you been? - Why do you travel? - Are you interested in traveling in China?
Behavior in gaining cultural experience via traveling	<ul style="list-style-type: none"> - Preparation behavior pre-travel experience; - Behavior during travel experience. 	<ul style="list-style-type: none"> - How do you get to know the local culture in your destination? E.g. souvenir, food, why the city is unique, etc.
Motivation to use the gamified solution	<ul style="list-style-type: none"> - Habit of using mobile app for traveling purpose; - Functionalities of mobile apps used; 	<ul style="list-style-type: none"> - Do you use mobile app to enhance your travel experience? - What functionalities are you using? Is it easy to use?

	<ul style="list-style-type: none"> - Reasons not to use mobile app; - Potential demand for mobile app for travel purpose. 	<ul style="list-style-type: none"> - If you don't use mobile app for traveling, why not? - What kind of problems do you have in traveling experience?
	<ul style="list-style-type: none"> - Motivation towards game components, especially badges and quizzes; - Tendency to form desired behavior driven by gamification. 	<ul style="list-style-type: none"> - Would you like to collect as many badges as possible? Why? - Would you explore more in specific local attractions once you see the details and tips on the badges?

As for evaluation of the solution, it aims to examine whether user perceived cultural experience as a foreign tourist in Nanjing can be enhanced after using the solution. Two main categories, namely functionality and usability of the solution are evaluated. Functionality is mainly evaluated based on the adjusted model of tourist cultural experience motives, inspecting level of enhancement towards different cultural experience dimensions. In terms of usability, ease of user onboarding is necessary to be evaluated, since it's an important factor for application of gamification. Other than that, ease of use and user acceptance are evaluated, in order to make sure the solution is user friendly and can be developed sustainably.

Table 6.3 Metrics for the solution evaluation

Category	Metric	Question(s) for interview
Functionality – Enhancing social	- Intention to share relevant contents on social media;	- Would you share through your social media when you get the badge, or the customizable templates?

consumption	<ul style="list-style-type: none"> - Intention to buy souvenir after using the solution. 	<ul style="list-style-type: none"> - What other contents offered in the solution would you like to share to your friends and relatives? - Would you like to buy recommended souvenirs? Why or why not?
<p>Functionality</p> <p>– Strengthen local integration</p>	<ul style="list-style-type: none"> - Enhanced convenience to integrate into the local context; - Enhanced convenience to travel planning. 	<ul style="list-style-type: none"> - Does the solution make it easier for you to understand the local attractions? Can you give an example? - Would you talk to the local citizens more after using the solution? In what scenarios? - Does it make your travel planning easier?
<p>Functionality</p> <p>– Learn local culture</p>	<ul style="list-style-type: none"> - Enhanced learning about local lifestyle; - Enhanced learning about local history. 	<ul style="list-style-type: none"> - Is it more convenient for you to know featured local food, leisure activities after using the app? - Have you read any background story during usage of the solution? - How does the solution help you to understand the local history better? - What would you like to know more about Nanjing after using the solution?
<p>Functionality</p> <p>- Relaxation</p>	<ul style="list-style-type: none"> - Enhanced relaxation mentally 	<ul style="list-style-type: none"> - Do you feel fun while using the solution? - What kind of fun? Does it help you relax?

Usability	<ul style="list-style-type: none"> - Ease of user onboarding; - Ease of use; - User acceptance. 	<ul style="list-style-type: none"> - Is it easy to start using the solution? - Do you feel anything is lacking for you to know how to use the solution? - Would you like to use similar solution for other travel destinations?
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6.3 Data collection

The data is collected from the youth from Copenhagen Business School and AIESEC in Denmark. Copenhagen Business School is a top international business school, providing higher business education combining cultural and political studies. AIESEC is the world's largest youth-led network creating positive impact through personal development and shared global experiences. The youth are chosen for various reasons. Firstly, students in Copenhagen Business School are either educated with cultural knowledge, or surrounded with diversity and international environment in university life. Meanwhile, members of AIESEC in Denmark are concerned with cross-cultural understanding. With their global mindset and openness, they will understand the background better. Secondly, most of the youth have had experience traveling abroad, which indicates that they have the motivation to travel in China for cultural experience. Thirdly, the youth are accustomed to utilizing mobile apps for varying purposes, including traveling. Hence the application context is practical for them.

There are two types of data collected, persona data regarding the sample and evaluation data for the solution designed. The persona data is used to validate the assumptions of target users, their motivation towards cultural experience and utilization of mobile apps alike. It is also used for inquiry into general demand of tourists for mobile apps, which is exploratory in order to propose improvements in design of the solution. The evaluation data is used to measure the design objectives, which is mainly regarding whether the solution can enhance cultural experience of tourists, based on the adjusted model of cultural experience motives.

The persona data was collected first, in order to validate motivation factors of the gamification design, as well as to improve game mechanics and dynamics. Through analysis of persona data, various fun approaches could be identified and incorporated into the design. Individual interviews were conducted from the sample group.

The evaluation data was collected after prototyping of the solution. The same sample was invited to test the prototype, in terms of its functionality and usability. Through analysis of evaluation data, the main question, that whether gamified mobile app can enhance the cultural experience of foreign tourists, was justified. The proper application of game elements in this non-game context was also evaluated, shedding light on iteration for the solution design.

6.4 Persona data analysis

From May 2015 to June 2015, 30 people were invited to the interviews, while 10 people responded and attended the interviews. All the interviewees are frequent travelers, on average they travel to a foreign country every 4.32 month. 90% of them have been to more than 10 foreign countries as tourist. Their main motivations to travel are mainly to experience different cultures (70%), to change from daily routines and explore new things (80%). Also 30% of the sample indicated that they travel for relaxation. This reflects the tourists' cultural experience motives, thus the sample could be identified as cultural tourists. The sample is then considered valid in general since all the interviewees are frequently traveling to foreign countries and are interested in cultural experience via traveling.

In combination with the adjusted model of cultural experience motives, except for "1.Social consumption", "2.Novelty" (80%), "3.Learn local culture" (70%) and "4.Relaxation" (30%) are reflected through interviewees' elaboration on motivation towards traveling. Only when they were inquired specifically about social consumption, would they share about their personalized

behavior in social sharing about travel experience and souvenir consumption. For the sample we interviewed, “1.Social consumption” is just a side-effect of traveling, not a primary motive to travel and gain cultural experience.

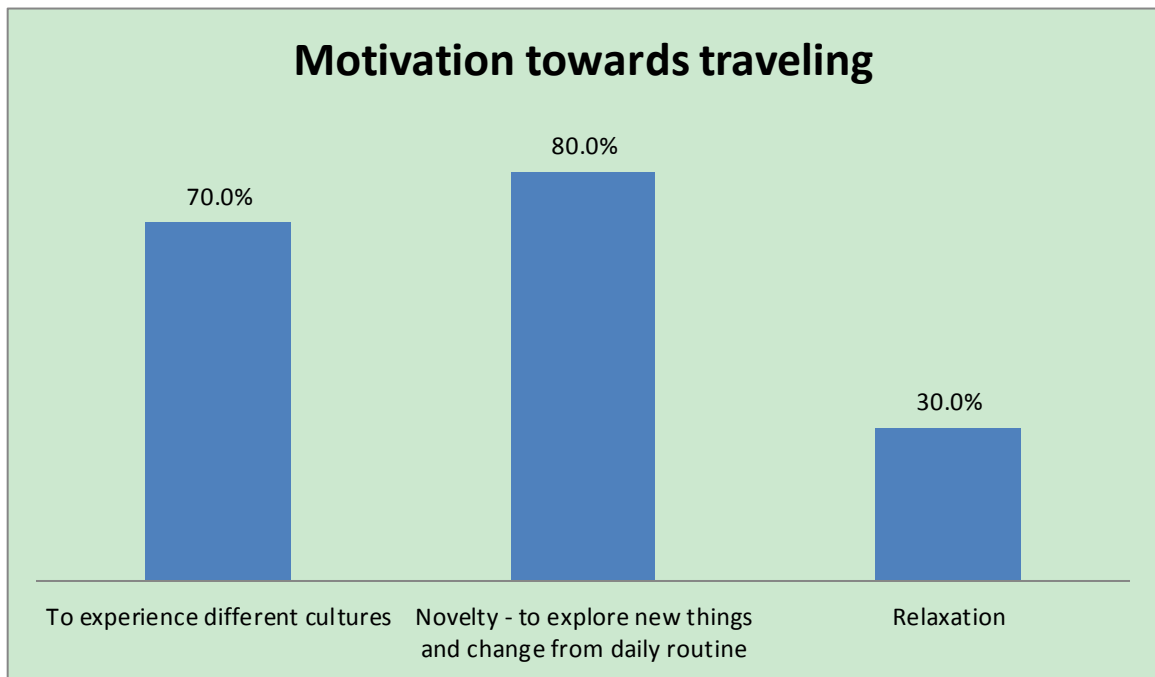


Figure 6.1 Motivation towards traveling

Target group validation

70% of the interviewees haven't been to China before, but all of them are interested in visiting China, with varying motivations. They usually have personal connection with Chinese people (50%), through which they get to know some local customs and identify the cultural difference from their own cultures. 50% of the interviewees indicated that they are motivated to travel in China due to the rich cultural diversity within the country. 40% of them know about China through media or reading materials and have knowledge in terms of brief history, cultural uniqueness, etc.

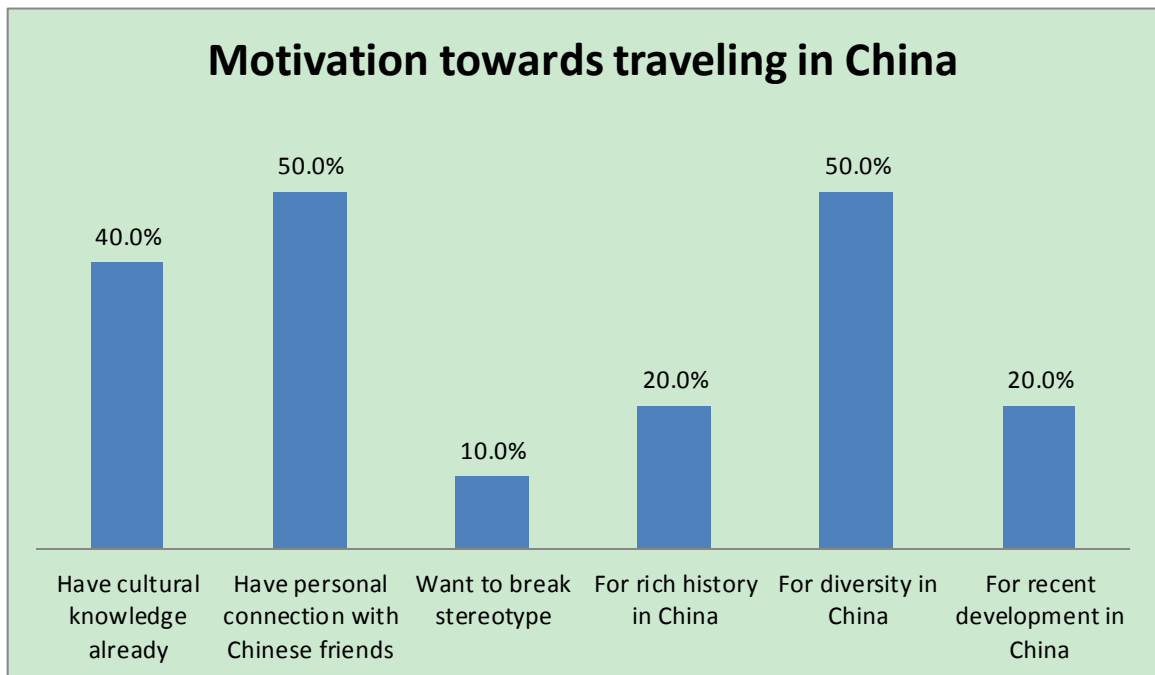


Figure 6.2 Motivation towards traveling in China

Even though most of the sample hasn't been to China, or even Asia before, the sample is still considered as valid target group for the solution designed in this study, since all the interviewees have the interest to visit China and they actually travel a lot to foreign countries.

Behavior in gaining cultural experience via traveling

In order to gain valuable cultural experience, the interviewees usually prepare themselves for cultural knowledge. The preparation could be divided into two parts: a) Pre-tour preparation and b) On-the-tour preparation.

As for a) Pre-tour preparation, 80% of the sample read structured information, which organizes relevant information in a structured way, with categories such as weather, history, accommodation, currency, sightseeing, food and restaurant, transportation, etc. Examples of structured information sources are Wikipedia.com, Lonely Planet and tour guides alike. 70% of the sample read unstructured information, which might come from online comments from other tourists, news, articles and blogs relevant to destinations but not necessarily targeting

tourists. 20% of the sample also asks friends who have experience in the destinations for advice. In terms of b) On-the-tour preparation, 90% of the sample would talk to the locals. Other approaches include connect with literatures, artworks and movies, and observe how people behave locally.

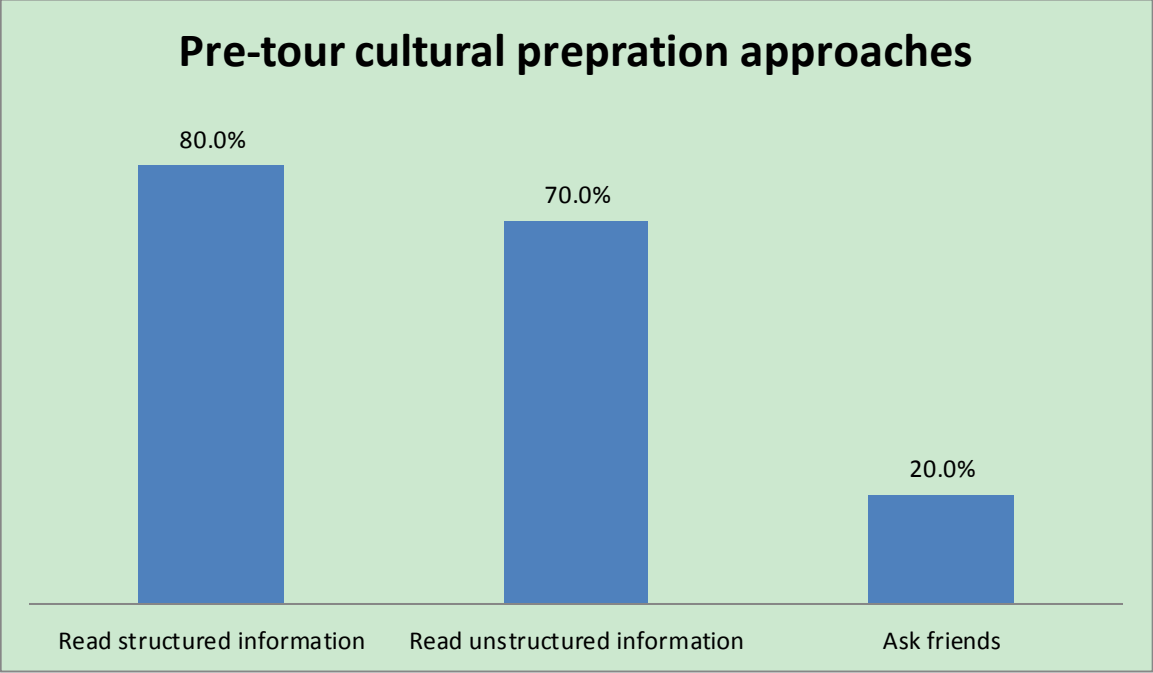


Figure 6.3 Pre-tour cultural preparation approaches

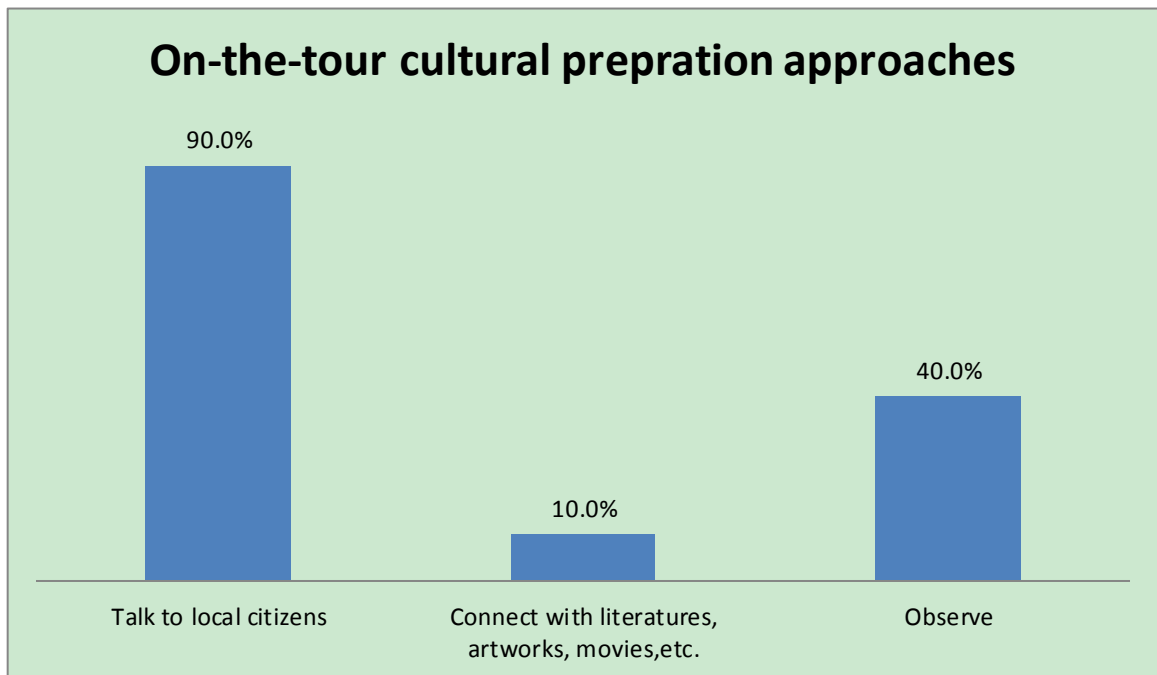


Figure 6.3 On-the-tour cultural preparation approaches

Based on these feedbacks, it could be concluded that reading is still the most popular ways to prepare for cultural knowledge and experience before the journey begins, while other approaches of interaction, such as observing and talking, mostly happen on-the-tour.

Motivation to use the gamified solution

60% of the sample doesn't use mobile apps for traveling purpose. Among the other part of the sample that uses mobile apps for traveling purpose, 75% are using it mainly to obtain basic information such as accommodation, flight tickets, etc. This kind of usage of mobile app offers little help towards cultural experience.

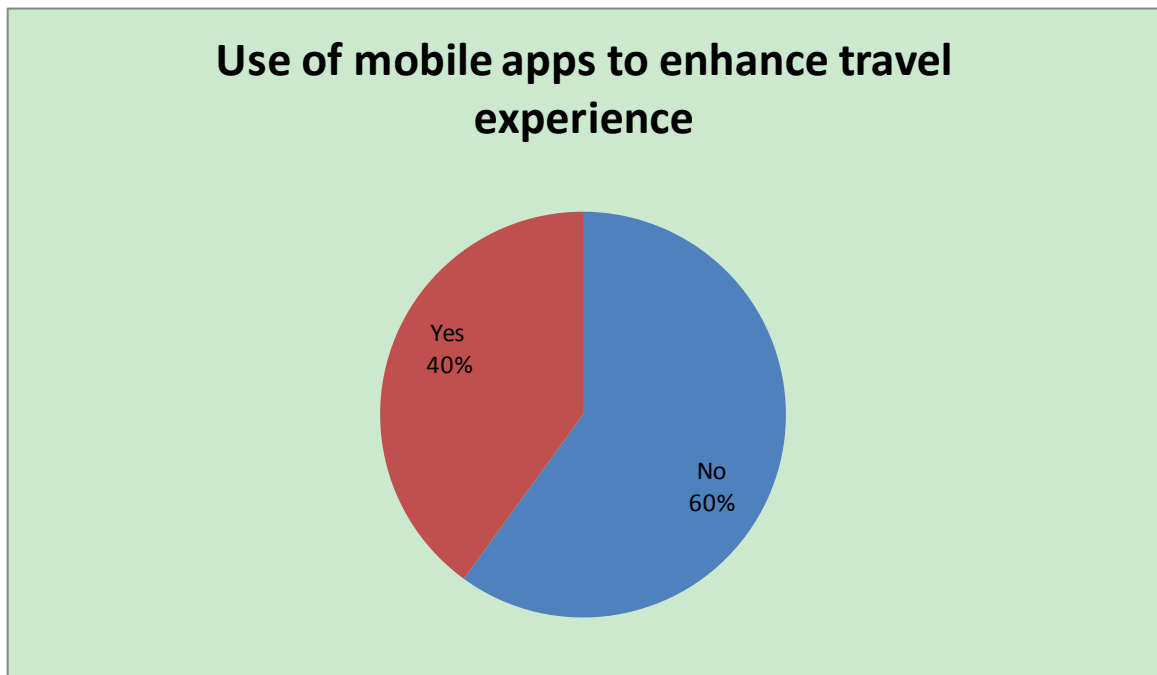


Figure 6.4 Use of mobile apps to enhance travel experience

When asked why not using mobile app for traveling purpose, 50% of the sample responded that they don't know what mobile apps can be used. Nevertheless, considering the functionalities of mobile app used by the sample were mainly basic information oriented, the sample might have low recognition for relevant tourism mobile app, which indicates that the solution designed has a fairly high potential to be used if a strong marketing and promotion strategy is created and executed.

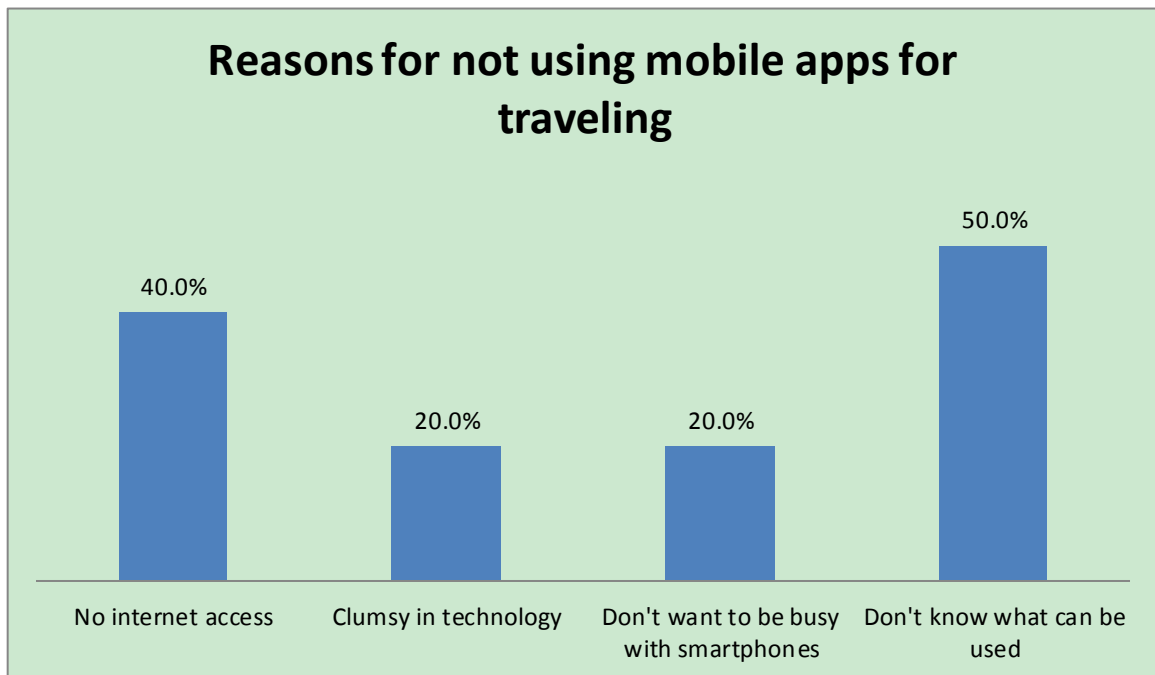


Figure 6.5 Reasons for not using mobile apps for traveling

When asked “What kind of problems or complexity is there during your travel experience, which you wish to be tackled by mobile technology”, information overload and decentralized information are the main concerns from the sample. According to interviewees’ feedback, information overload is defined here as “The complexity of picking up a lot of information, while not sure what is useful and relevant. This also leads to difficulty in retrieving the right pieces of information when needed”. Decentralized information here is defined as “The difficulty to find all relevant information from centralized and structured information sources”. Other than that, to identify really featured local attractions, food, and lifestyles, to learn local languages, and to have access to internet were also mentioned. Apparently, to offer the right pieces of information in the right time would be a challenge for achieving user satisfaction towards tourism mobile app.

When it comes to motivation level towards collecting badge, which is one of the most important game component in the solution designed, 90% of the sample showed a high level of interest. They were motivated because of the feeling of achievement, exploration and relevance

of badges to provide valuable information. 10% of the sample indicated a medium level of motivation to collect badge, mainly due to the concern of relevance of the badge, such as what kind of information is offered together with the badge, and whether the badge can be used for some practical purposes.

Then the tendency of the sample to form desired behavior driven by gamification was evaluated. When the idea of how badge would provide information in specific cultural aspects, offer recommendations on relevant local attractions or activities, and enhance the cultural experience alike was introduced to the interviewees, 60% of which indicated that they would definitely like to follow the recommendations to explore the destination more. 40% of the interviewees said it depends on how convenient it would be, since China is a fairly huge country and has big cities. If it is not easy to find the suggested local attractions and to incorporate them into their travel plan, they would not follow the recommendations in the badge descriptions. Since most of the interviewees already have the habit of talking to the locals while traveling, they would also like to have conversations with locals, to validate whether the suggested local attractions are worth visiting.

Findings

Based on the motivations of interviewees towards traveling and cultural experience in China, it could be concluded that these interviewees are cultural tourists, who are interested in cultural experience through traveling, and not only for solely relaxation purposes. It is worth consulting the sample for feedback and evaluation towards the solution designed.

Even though tourism mobile app market is booming in recent years, the potential users still use mobile app mainly for obtaining basic information. The influence of mobile app in enhancing cultural experience for tourists is limited. While relevant pieces of information provided in the right time during a travel experience is desired by the sample, gamification applied in the

solution designed would offer easy interaction to the user, and provide relevant pieces of information since information offered is attraction-based.

The sample also showed tendency to form the desired behavior through specific game components incorporated in the solution designed. In the meantime, the practical usage of game components, relevance and convenience are concerned by the sample.

In general, the persona data collected shows the sample is valid for the evaluation. Meanwhile, the cultural experience motives of tourists might need to adjust in terms of “1.Social consumption”, which is more a side-effect of tourists’ cultural experience instead of a primary motive.

6.5 Evaluation data analysis

Functionality – Enhancing social consumption

The evaluation of the functionality of enhancing social consumption is to validate whether the design objective 1 “Enable content sharing and rational consumption decisions” is fulfilled. The evaluation examines the intention of the user to share contents from the solution, and to purchase recommended souvenirs. The intention is evaluated among three levels, low, medium and high.

The intention of sharing contents is on medium level. Combined with their motivation to travel, it could be found that social consumption is in general a side-effect of traveling, not a primary motivation for the sample. The sample would only share specific types of content, not all of them. Besides, social media channels were not the prior choice to share. Private channels would be more applicable in this case. The intention to purchase recommended souvenirs varies from person to person.

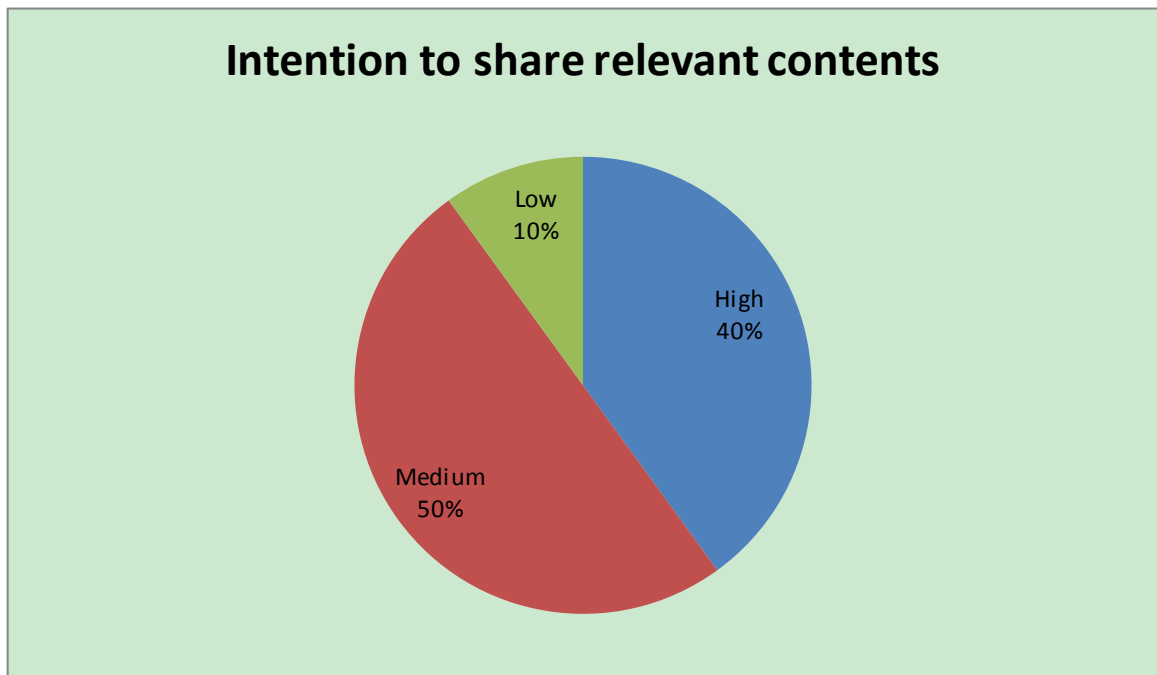


Figure 6.6 The sample's intention to share relevant contents

Regarding the content of sharing, the tendency to share user generated content, namely the customizable image template, is fairly high. The sample indicated that the image templates offered much fun and would be nice to share with friends. Some of them would be willing to share some quizzed connected to general cultural knowledge, such as sequence of reading in ancient China, the whole storyline of text-based RPG game, and so on.

Nevertheless, sharing through social media channels doesn't seem to be popular. All the interviewees in the sample indicated that they would not share contents except for photos through social media channels while traveling. Sharing through private channels is preferred, such as instant messaging tools, e-mail, and so on.

The intention to purchase recommended souvenirs varies from person to person, mainly due to strong personal preference for souvenirs. 40% of the sample showed medium intention, since it depends a lot on what kind of commodities are recommended in the solution. Connecting with their persona data, it is found that they all indicated specific preference of souvenirs, and they

only purchase souvenirs in specific types, or which really connect to their emotional feelings. Their intention to purchase depends a lot on specific commodity being recommended. As long as the recommended commodity is locally featured and connects to the personal preference, they would be willing to search for it and purchase.

Another 50% of the sample indicated high intention to purchase recommended commodity. Since the recommended commodity is connected to specific local attraction, it is easier for the interviewees to see the relevance of the commodity. It is also easier for them to identify the value of the commodity. 10% of the sample indicated low intention to purchase recommended commodity, due to the fact that she never purchases souvenirs during traveling.

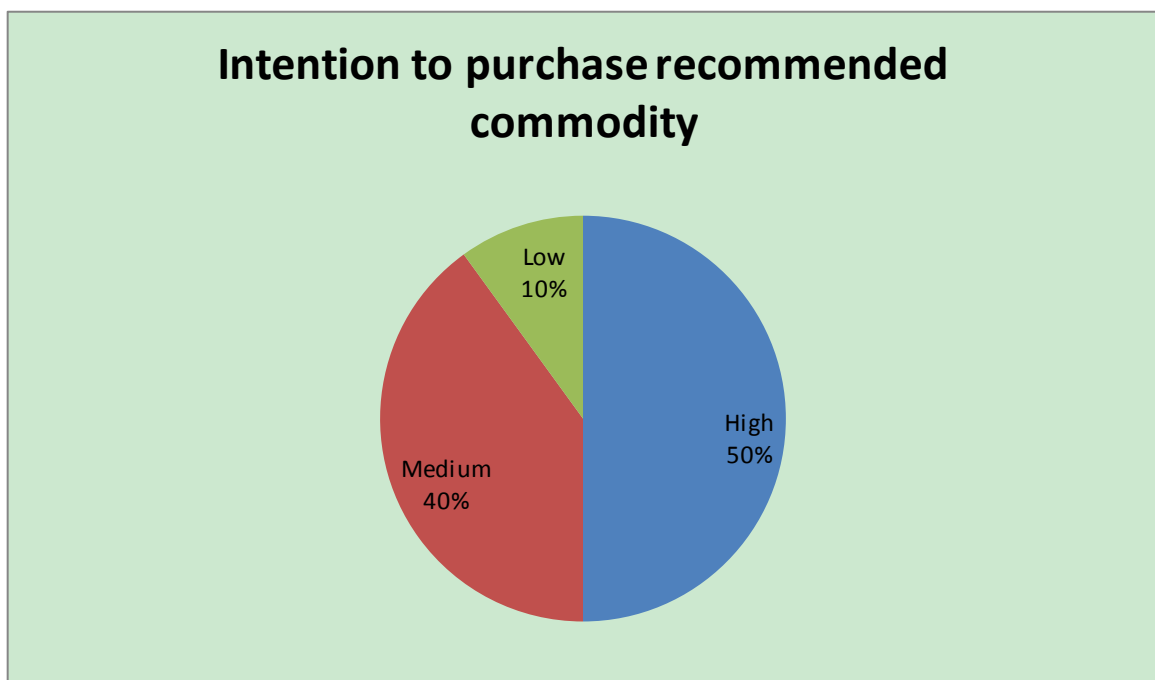


Figure 6.7 The sample's intention to purchase recommended commodity

In general, the functionality of enhancing social consumption is fulfilled, but to a limited level. The major influence of the functionality would be the provision of information, either interesting contents to be shared, or on local commodities to be purchased. But it is difficult to drive for actual sharing or purchase behavior through the solution.

Functionality – Strengthen local integration

The evaluation of the functionality of enhancing social consumption is to validate whether the design objective 2 “Strengthen integration and simplify travel planning” is fulfilled. The evaluation examines the perceived enhancement of convenience to integrate into local context, and to do travel planning. The perceived enhancement of convenience is evaluated among three levels, low, medium and high.

The majority of the sample indicated a high level of enhanced convenience to integrate into local context. First of all, since the solution is local attraction based, the cultural information offered in the solution has been broke down into pieces. Relevant information is offered only when relevant local attraction puzzle challenge is solved by the user. This ensures the user doesn't need to suffer from information overload, which is indicated by the sample as one of the biggest problems in traveling experience. With various gamification components and puzzle challenges, the solution requires higher level of interaction, which helps the user to remember relevant cultural information better, as indicated by some interviewees. Secondly, the cultural context is understood better by the sample after using the solution. By connecting various cultural aspects (such as architectural style, major historical events happened, relevant opera, etc.) for specific local attractions, the solution could provide a cultural overview for foreign tourists. With the information provided by the solution, the sample also indicated high intention to interact and talk with local citizens. 10% of the sample indicated low level of enhanced convenience to integrate into local context, since she didn't get useful information on how to start talking to local citizens. She also suggested that the solution should suggest on who to talk to, which would enhance more local interaction activities.

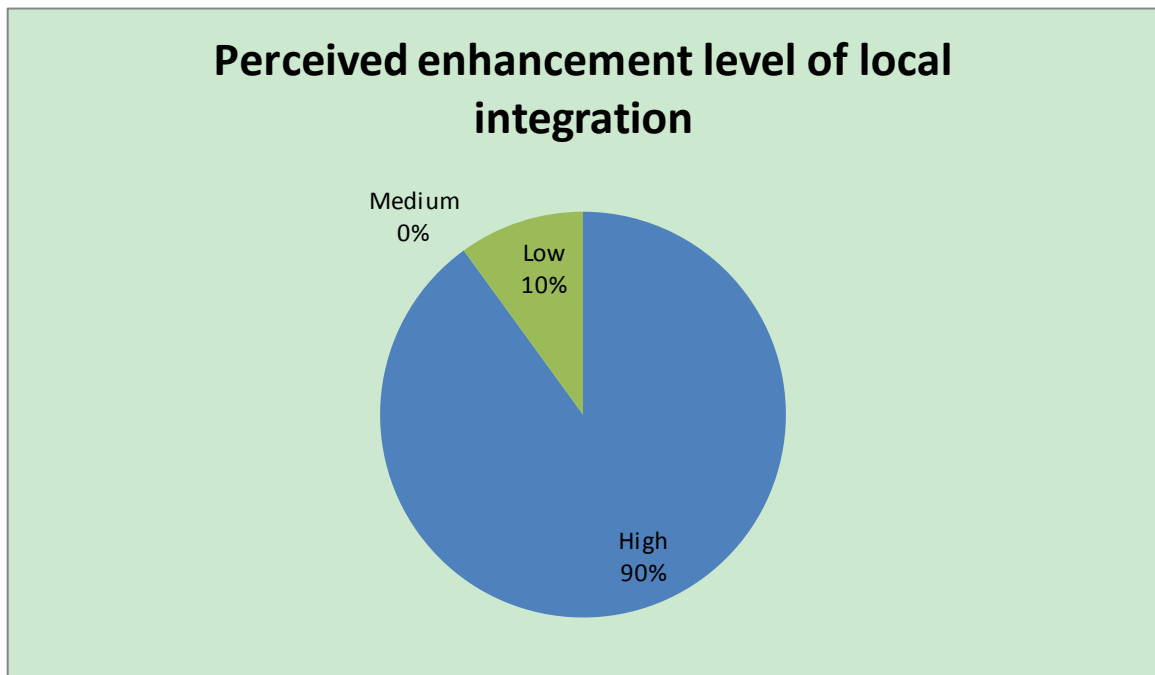


Figure 6.8 The sample's perceived enhancement level of local integration

90% of the sample indicated a high level of enhancement of convenience towards travel planning. However, it doesn't work as designed. The sample didn't realize that the solution could facilitate travel planning. The designed approach is that the user would check the list of local attractions, categorized by different dynasties. In practice, the majority of the sample indicated that the recommendation of local attractions provided based on the user's personal tourist type is more helpful, which is not reflected in the list of local attractions, but in the categories of badges instead. In order to fulfill the design objective, clearer user instruction should be offered. 10% of the sample indicated medium level, since she felt that there are a lot of local attractions to choose from, and she always have her own to do list, so she doesn't want the solution to interfere with her original plan.

To sum up, the solution could enhance local integration of foreign tourists, while the enhancement of convenience towards travel planning is not yet validated in practice. However, optimization could be made to achieve enhancement of convenience towards travel planning.

Functionality – Learn local culture

The evaluation of the functionality of enhancing social consumption is to validate whether the design objective 3 “offer multiple interaction approaches for learning” is fulfilled. The evaluation examines the perceived enhancement of learning of local lifestyle and history. The perceived enhancement of learning is evaluated among three levels, low, medium and high.

With the specific puzzle challenge types, the solution mainly provides interaction approaches through text and visualization, in gamified puzzle challenge format as described in part 5.

All the interviewees indicated a high level of perceived enhancement of learning of local lifestyle. The enhancement was achieved by the solution through offering recommendations on local featured food and activities, connecting different cultural aspects in a puzzle challenge, as well as leading the user into specific game context related to lifestyle of Nanjing.

In comparison, the perceived level of enhancement of learning of local history varies. 90% of the sample indicated high level, while 10% of the sample indicated that little information had been remembered, which is resulted from various reasons. Personal learning type, personal interest in history and English level are major influence factors.

In general, the design objective to “offer multiple interaction approaches for learning” has been fulfilled. However, the demand for learning local history varies from person to person. Since the solution were designed to focus on specific local attractions, reconstructing and reproducing the historic context for local attractions were appreciated more by the sample, instead of providing general historic knowledge. From another perspective, the level of enhanced learning of local lifestyle was highly recognized by the sample.

Functionality – Relaxation

The evaluation of the functionality of relaxation is to validate whether the design objective 4 “Balance between fun and purpose” is fulfilled. The evaluation examines the perceived fun throughout the user journey. The perceived fun is evaluated among three levels, low, medium and high.

Even though puzzle challenges are designed to provide fun experience to the user, they are aimed for serious purpose which is to raise awareness of local culture. It is easier for the user to sense the purpose than the fun itself. Thus, perceived fun becomes an important metric to evaluate. Through perceived fun, the mental relaxation could be offered, thus emergence of cultural context would not only be a serious process, but with mental relaxation and multiple interactions, which is one of the motives towards cultural experience.

Little guidance towards reflecting on perceived fun was provided to the sample. 90% of the sample indicated high level of perceived fun. The experience of puzzle challenges was overall satisfactory. The format of text-based role play game was the most popular perceived approach of fun. The cultural context emerges naturally from storyline in the text-based role play game. This offers the user a chance to explore the story, which was indicated by the sample as a more interactive way to understand the local context. The semi-customizable image template provides direct fun as well.

Nevertheless, 10% of the sample pointed out, that long pieces of information are boring to read, especially when the user is not a native English speaker. Thus they rated medium level for perceived fun. For them, the solution could offer rich cultural background information, but would also alleviate the level of perceived fun.

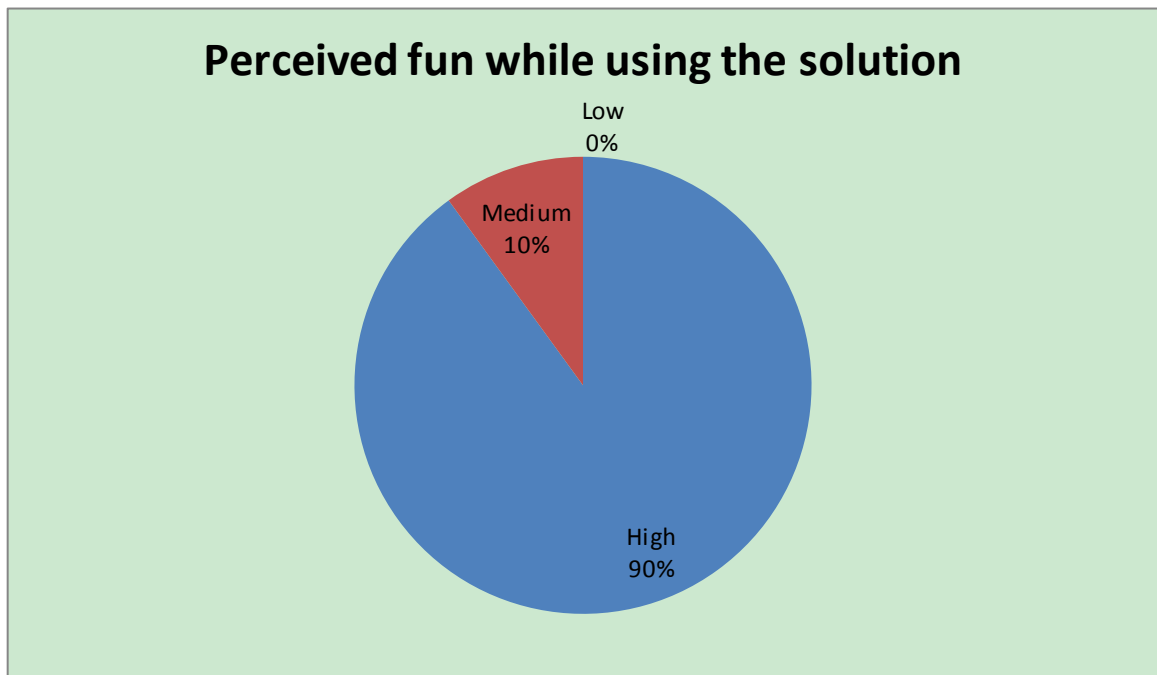


Figure 6.9 The sample’s perceived fun while using the solution

The contents were in general considered fun enough to help the sample emerge into the new cultural context. Other than that, specific game components such as quiz and badge were mentioned by the sample as sources of fun. All the perceived sources of fun helped the sample to relax mentally.

Usability

The evaluation of the functionality of relaxation is to validate whether the design objective 4 “Balance between fun and purpose” is fulfilled. Ease of user onboarding, perceived ease of use, and user acceptance levels are evaluated among three levels, low, medium and high.

User onboarding refers to the process of orienting new users to a system. Since user onboarding has huge influence on leading the user into the context of specific gamified system, the ease of user onboarding would potentially help retain the user for further user journey.

60% of the sample perceived high level of ease of user onboarding. Some of the interviewees

even indicated that it was quite easy, even they are in general clumsy in using mobile apps. The navigation structure was not complicated, while the user doesn't need to understand the logical structure of navigation. Some interviewees indicated that they just "followed the flow". Other 20% of the sample perceived low level of ease of user onboarding. They indicated that it was confusing in the beginning to figure out what would be the mastery status for the user. They suggested that all the buttons could come with more explanation when they appear for the first time.

The rest of the sample indicated medium level of perceived ease of user onboarding, since they suggested better approaches to orient the user, to interact with the user and to introduce the emerging game context. The designed approach of user onboarding is mainly with information in text and introductory quizzes. Based on feedback from the sample, text-based role play games and videos are preferred as the interactive approach for user onboarding.

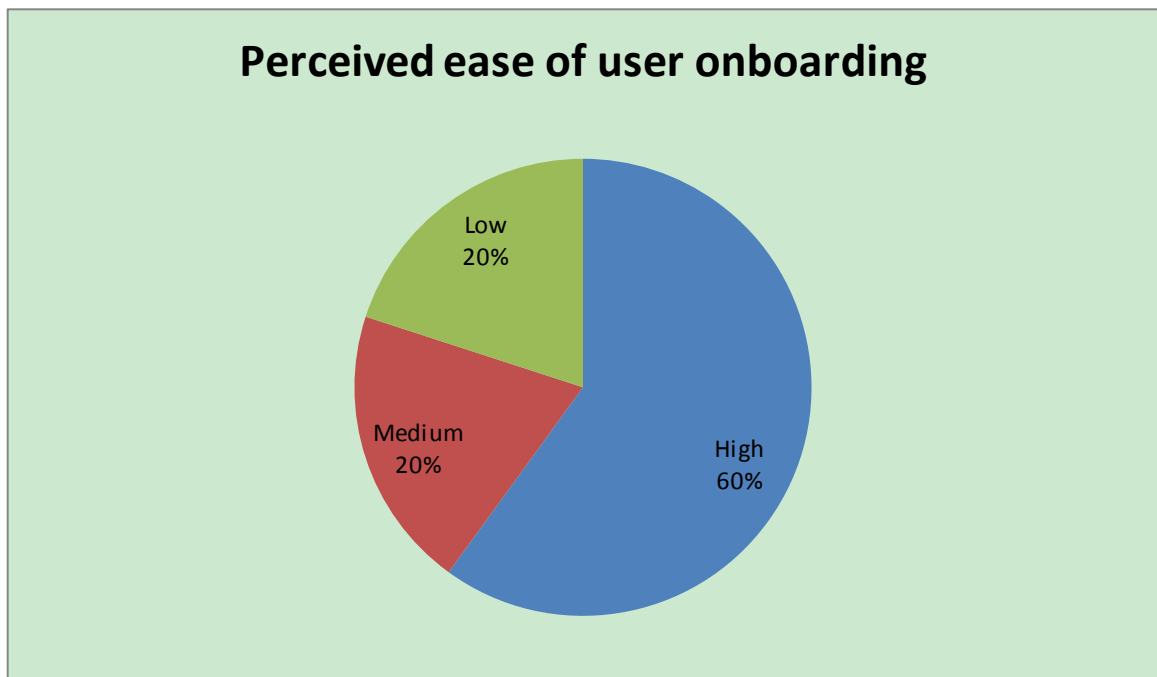


Figure 6.10 The sample's perceived ease of user onboarding

None perceived low level of ease of use of the solution. 30% of the sample indicated medium

level of perceived ease of use, reasons including: a) Level of understanding of the contents. English might not be native language for the user, thus it might be a bit challenging to absorb relevant information throughout the user journey; b) Available interactive approach. Since different people have different learning style and utilize different senses for learning, a variety of interactive approach is lacking in the solution. Audio and visual aids are desired.

User acceptance is evaluated by the user's willingness to use similar solutions for other travel destinations. All interviewees indicated high level of willingness to use similar solutions. It is thus concluded that the solution, along with the concept of applying gamification in tourists' cultural experience is well accepted.

In summary, there exists space for improvement for usability of the solution. A variety of interaction approaches are needed, so that the user can absorb information not only by reading, but also by hearing and seeing. In general, the solution is well-accepted.

Findings

Based on feedback from the sample after trying out the solution, it could be concluded that the design objectives have been fulfilled. The cultural experience of foreign tourists, measured by cultural experience motives model, could be enhanced by the solution, but to different levels.

The solution mainly enhances local integration, since the appearance and presence of local context takes place gradually, based on specific local attractions. Information overload is prevented. Scattered cultural information instead of structured and enriched information is provided to the user, piece by piece along the user journey. In the meantime, different cultural aspects are connected and incorporated.

Since there exists a variety of cultural experience motives, incorporating enhancement for

different motives becomes significant yet challenging. The motive of “social consumption” doesn’t seem to need enhancement, since it is highly dependent on individual preference. It is hard to define and measure successful enhancement for social consumption.

6.6 Limitations

Results from the evaluation have been presented in previous sections. Thus, it is then important to discuss limitations of the evaluation.

The sample size is proper but still fairly small. The goal was to have 30 interviewees, while only 10 attended. Nevertheless, all the interviewees were the right target group, who are interested in or motivated to travel in China for cultural experience, thus the evaluation is credible.

Only three types of puzzle challenge have been evaluated by the sample, namely the quiz, semi-customizable image template, and text-based role play game. Jigsaw puzzle was not evaluated, since prototype was not developed.

Besides, few interviewees in the sample have been to China, not even Asia. With their limited knowledge, it is hard to validate that the solution can enhance tourists’ cultural experience even when they are knowledgeable enough in regards to local culture.

7. Conclusion

In this study, a concept prototype of applying gamification in mobile app to enhance foreign tourists' cultural experience has been examined. Tourism industry is heavily based on experience.

The value of cultural experience, which is one of the most important factors influencing tourists' satisfaction, has been undermined. Cultural experience has been consumed passively, as traveling contains cultural experience by default. Nowadays basic cultural information can be obtained without physically traveling. Thus constructing or enhancing cultural experience for tourists, especially foreign tourists becomes even more important. In conjunction with ubiquitous application of mobile app, cultural experience could be shifted with more interactive and engaging approaches. In particular, foreign tourists face more challenges to understand, perceive and integrate into local context of the destination.

Gamification, the application of typical game elements in non-game context, gains its popularity in various industries, but not so much in tourism industry yet. Gamification could facilitate driving desired behaviors and offer fun experience along the journey to achieve specific purpose. Under this circumstance, applying gamification in mobile app to enhance tourists' experience would be appealing and promising.

The innovative design of a gamified mobile app for foreign tourists in Nanjing, China showcases that application of gamification in tourist industry, which emphasizes on and enhances cultural experience is promising and viable, and can be achieved through simple interactions and game components. Nevertheless, thorough considerations are needed while designing the solution, in order to construct a consistent game context which steers the user towards deeper understanding and integration into local destinations. Furthermore, the concept model is

showcased through online platform which enables quick prototyping, in a practical manner to develop ideas into validated concept model.

A thorough evaluation validated the effectiveness of the solution's enhancement on foreign tourists' cultural experience. Different levels of enhancement towards different cultural experience motives are showcased, with potential variables communicated. A high level of user acceptance is presented, which validates the values of further developing and implementing the solution.

7.1 Outlook

This study presented a gamified mobile app solution for foreign tourists in Nanjing, China. As Nanjing is only one of the top cities in China for foreign tourists, the solution could be expanded to target more popular destinations for foreign tourists in China.

All the contents in the solution are communicated and presented in English, with few Chinese local words which exist to facilitate communication with local citizens. While foreign tourists don't necessarily come from countries and territories where popularity of English is high, various languages could be offered for the user to choose from.

One attribute of the solution has been highly appreciated by potential users, namely the integration and consistency of the game context. To identify outstanding features for a specific city or area requires more attention and effort, whereas connecting different cultural aspects of a destination is fairly difficult. Hence, except for defining an overarching game context, setting a biased game context which highlights specific cultural aspects of the destination could be an alternative.

The solution designed implements mainly simple interactions, which don't require complicated

decision making or thinking activities from the user. Yet various user segments could be identified and customized. Deep interactions could further be designed, developed and implemented targeting different user segments. Advanced technology such as augmented reality could also be capitalized on in order to enhance cultural experience to a higher level.

Besides, the solution designed in this study is based on tourists' cultural experience motives model. In the evaluation phase, the sample indicated lower motivation level towards certain motives among others. Considering that the majority of sample who validated tourists' cultural experience motives model aged between 45 – 55 years old, the model could be adjusted towards different target groups with various age ranges. Accordingly, the different design objectives could have different priority levels.

Since cultural experience is highly dependent on specific local attractions, the solution could be continuously developed to cover more local attractions.

7.2 Future work

Develop and implement the prototype into final solution. The enhancement of foreign tourists' cultural experience via the solution has been validated by the sample, through testing the interactive prototype. Even it's a fairly efficient way of testing the concept of design, it is necessary to develop and implement the final solution, which would be a working mobile app, in order to consolidate the practical usage of the gamified mobile app.

Incorporate various types of puzzle challenges. From the user's perspective, different people enjoy different types of fun, which couldn't be constructed in the same way. In the context of tourism, gamification should not be applied through the same format. Adding different types of puzzle challenges is necessary in order to highlight diverse features of local attractions, as well as to offer various options of fun to target users.

Conduct continuous evaluation and iteration of the solution. The evaluation presented in this study was conducted in Denmark, targeting limited groups. This specific cultural background would definitely influence the effectiveness of evaluation. Besides, top foreign tourists in China come mainly from Germany and the United States, while they were not presented in the evaluation sample. Additionally, only one relevant social group has been consulted. Tourists' cultural experience is constructed and influenced by various relevant social groups, such as tourism administrative organizations, tourists who have been to China, even online review system for tourism destinations. It is thus valuable to consult a wider range of relevant social groups regarding specific functionalities of the solution. Valuable feedback is always offered by interviewees during evaluation phase, on which the iteration of the solution could be based.

Application of the solution to further research and broader range. This includes adjusting the solution to other travel destinations, extending focus to short-term cultural assets, and developing business model for the solution to be sustainable. This study offers a design concept and prototype of a potential solution to apply gamification in enhancing cultural experience in Nanjing, while the concept could be implemented to other travel destinations and be evaluated based on different local realities. Since the solution highlights local attractions which generate long-term cultural values, short-term cultural assets such as cultural events are not touched upon. While short-term cultural assets help to attract attention to the tourism destination, with development of facilities leading to long-term cultural assets, they deserve attention as well. Last but not least, a business model for the solution is needed to support the sustainable development and implementation of the solution, so as to achieve enhancement of foreign tourists' cultural experience in practice.

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Appendices

A. Quiz for assessment

The quiz for assessment is designed for grouping the user into specific type of explorer while traveling in Nanjing. It is implemented on the platform Quizworks, the online quiz creator. The quiz is then incorporated through external link into the solution.

The quiz can be found through this link:

<https://www.onlineassessmenttool.com/your-type-as-nanjing-explorer/assessment-23701>

B. Prototype of the solution

The prototype is built on the platform modao.io. The prototype can be tested online directly through the link <http://modao.io/app/Q1Ewn3q1Kwh6xEZbCoOT>. It can also be downloaded onto iOS or Android devices for testing.

C. Interview transcription

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- **How often do you travel?** Every second month. To a foreign country.
- **Where have you been?** Latvia, Lithuania, Poland, Germany, Finland, Sweden, Denmark, Norway, Burkina Faso, UK, France, Spain, Italy, Greece, Malta, US, Canada.
- **Why do you travel?** It's exciting. At the end of the day, we are the same human being. But it's interesting to see how cultures are shaped and how people are in it.
- **Are you interested in traveling in China?** Yes. I want to go to Tibet. The religion itself, the people, and the monks are interested. I know about a lot of history in Tibet. I only know some customs, like they drink tea with butter. But I don't know much other than religions. I met a Chinese girl who is from China, and she changed my perspectives about the country. Now I also want to visit China because of China itself (not only because of Tibet). I am also interested in panda bears.
- **How do you get to know the local culture in your destination? E.g. souvenir, food, why the city is unique,**

etc. I read a lot. During my trip I aim to talk as much as I can to locals and go to places where locals are going to.

- Do you use mobile app to enhance your travel experience? No.

- What functionalities are you using? Is it easy to use? I usually only use Google map if I have internet.

- If you don't use mobile app for traveling, why not? I am technological retarded.

- What kind of problems do you have in traveling experience? It is a bit annoying to pre-research everything, and then I forgot about all the details and information.

- Would you like to collect as many badges as possible? Why? Yes especially when the badge highlights little gems in the destination, not only typical travelers' places.

- Would you explore more in specific local attractions once you see the details and tips on the badges?
Yes definitely.

- Would you share through your social media when you get the badge, or the customizable templates?

No. I don't usually share on social media. I would rather download them or send them via email.

- What other contents offered in the solution would you like to share to your friends and relatives? The historical facts in the story and quiz, through storyline and guidance information.

- Would you like to buy recommended souvenirs? Why or why not?

It depends on what kind of souvenirs are recommended. In terms of souvenir, most of the time I only buy postcards. I only buy practical stuff, something I connect personally with. As for postcards, I prefer those ones with multiple pictures on.

- Does the solution make it easier for you to understand the local attractions? Can you give an example?

Yes, it makes me more fascinated. I am inspired to read more.

- Would you talk to the local citizens more after using the solution? In what scenarios?

Yes to talk to them about directions and to ask random questions.

- What cultural aspects would you explore more if you travel to Nanjing, after using the app?

I would like to explore more the historical places and the places the locals love most.

- Is it more convenient for you to know featured local food, leisure activities after using the app?

Yes. The recommendations have given a good insight into what the locals like to eat. Also there

is a leisure activity kind of category.

- **Have you read any background story during usage of the solution?** Yes.

- **How does the solution help you to understand the local history better?**

It provides not only boring facts in statement, but also special and interesting way.

- **Do you feel fun while using the solution?** Yes.

- **What kind of fun? Does it help you relax?**

It was exciting and unexpected. It's fun of unknown and exploration.

- **Is it easy to start using the solution?** Yeah, I think so.

- **Do you feel anything is lacking for you to know how to use the solution?** Visually it could be better.

- **Would you like to use similar solution for other travel destinations?** Yes.

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- **How often do you travel?** Every three month. To a foreign country.

- **Where have you been?** South America, Europe, Balkan countries. 18 in total.

- **Why do you travel?** I can run (away) from daily routines. I like to go to places where I can see and do a lot of things, not only lying on the bed. Meeting new people, seeing famous places and stuff that are not too touristic. And to experience a lot of cultures.

- **How do you get to know the local culture in your destination? E.g. souvenir, food, why the city is unique, etc.**

I read Lonely Planet, webpages similar to "visitdenmark". I talk to people who have been there, and ask local people and meet up with them to get more perspectives. Once I am there, I don't refer to more reference. Just talk to people. I consult local people (if I have any problems), and decide on-site.

- **Do you use mobile app to enhance your travel experience?** Yes.

- **What functionalities are you using? Is it easy to use?** Booking accommodation. Yes.

- **If you don't use mobile app for traveling, why not?** I don't use mobile app for other functionalities. Instead I use laptop/website. I don't like to search for information when I am already there.

- **What kind of problems do you have in traveling experience?**

a) It is hard to figure out theme trip, since locals don't think the same (as travel guide), but it is okay for me.

b) Lonely Planet is quite broad, so it is hard to find some information.

c) As for food, online recommendations are always big restaurants, which are not locals' favorite.

- Would you like to collect as many badges as possible? Why?

- Would you explore more in specific local attractions once you see the details and tips on the badges?

If they are some places close to where I am, it would be fine.

- Would you share through your social media when you get the badge, or the customizable templates?

I usually don't share (contents from mobile app). Only if I am actually in the place I might share relevant stuff.

- Would you like to buy recommended souvenirs? Why or why not?

I collect magnets and usually buy souvenir for other people. Most exciting souvenirs are usually food. I bought paprika powder from Hungary, lavender shower gel from Croatia and key chains for friends. They are usually practical stuff. So if recommended ones are popular in the local area and practical, I will buy.

- Does the solution make it easier for you to understand the local attractions? Can you give an example?

Yes definitely. I love buildings in general, so the solution actually offered me an idea of thoughts behind architecture design, e.g. the Oriental Metropolitan Museum. I had no previous knowledge and now I know some things :)

- Would you talk to the local citizens more after using the solution? In what scenarios?

Yes I guess so. But maybe not due to the solution itself. I like to talk to them in general.

- What cultural aspects would you explore more if you travel to Nanjing, after using the app?

Architecture. There were some suggestions given by the quiz in the beginning, but I can't really connect all of them inside the solution. So I would like to have a look at them.

- Is it more convenient for you to know featured local food, leisure activities after using the app?

I guess I would not explore the part regarding local food, if you don't ask me to do so. I would just try different things as I come across them.

- Have you read any background story during usage of the solution? Yes. They are a bit long but still very interesting. Not just a brief introduction. They are actually starting a story.

- How does the solution help you to understand the local history better? Definitely the background story. It actually brings life to the local attractions, not only introduction for tourists.

- What would you like to know more about Nanjing after using the solution?

Yes. I am interested in the dynamic of the city.

- Do you feel fun while using the solution? What kind of fun? Does it help you relax?

Yeah, I liked the way the personal stories were told. And getting points

- Is it easy to start using the solution? Yes I managed to navigate myself to everything.

- Do you feel anything is lacking for you to know how to use the solution?

Some elements are lacking, such as the map view for the time machine.

- Would you like to use similar solution for other travel destinations? Yes. Looking forward.

DMHAT

- Where have you been?

- Why do you travel?

I love traveling. It's a passion of mine. But I travel to extend my knowledge. And I love to see cultures, (and) how other societies are built. And I love histories, especially visual history like architectures.

- Are you interested in traveling in China?

- Do you use mobile app to enhance your travel experience?

Yes. I haven't lately, but I used to download apps like public transportation information. But normally I check all the websites and gather everything together before I go.

- What functionalities are you using? Is it easy to use? Apps for general information.

- If you don't use mobile app for traveling, why not? Because I don't like to use my phone too much.

- Would you like to collect as many badges as possible? Why?

- Would you explore more in specific local attractions once you see the details and tips on the badges?

- Would you share through your social media when you get the badge, or the customizable templates?

I usually don't share (contents from mobile app). Only if I am actually in the place I might share relevant stuff.

To be honest I am not a big fan of social media, so if I find it really interesting I probably will send it to people who think it's interesting. I might share through private circles.

- Would you like to buy recommended souvenirs? Why or why not? Sometimes. Depends on the countries and what are the signatures for that. Like in Istanbul I bought specific candle holders that are

popular there. I also bought key chains. In London I bought a hat which Joey had in <Friends>. So it depends on countries. So if I find recommended souvenirs interesting then I probably will buy.

- Does the solution make it easier for you to understand the local attractions? Can you give an example? Yes. I can connect the story and the architecture. (In general) it connects various aspects.

- Would you talk to the local citizens more after using the solution? In what scenarios?

I think it's always important to ask locals because they know the good places which are not just popular places. It's a must if you travel. Obviously if they don't like it then you should not (talk to them). But if they like it you should. Because I think they have more interesting stories.

- What cultural aspects would you explore more if you travel to Nanjing, after using the app?

I don't think I need more since it includes architecture, and stories, nature and opera things. I think it has an effect. I can't think of anything that I need more.

- Is it more convenient for you to know featured local food, leisure activities after using the app?

Yes. I know what are relevant to what I have visited.

- Have you read any background story during usage of the solution? Yes. I read all.

- How does the solution help you to understand the local history better? It connects different aspects.

- What would you like to know more about Nanjing after using the solution?

I don't think I need more since it includes architecture, and stories, nature and opera things. I think it has an effect. I can't think of anything that I need more.

- Do you feel fun while using the solution? Yes

- What kind of fun? Does it help you relax? It's fun to read the stories. And you actually can explore the stories. It might be a simple story, but I think a story could play a part in shaping that culture. Also the mix of myth and architectures and how they relate, that is interesting.

- Is it easy to start using the solution?

Yes it's quite easy. But in the beginning I was confused about the structure of the app.

- Do you feel anything is lacking for you to know how to use the solution?

An introduction to how it works might lack in the beginning.

- **Would you like to use similar solution for other travel destinations?** Yes it would be fun.

HS

- **Why do you travel?**

I would like to explore new places. (Follow up question: How do you identify new places? Do you go to the same places again and again?) Yes I do. Just not stay in the country where I am living in. And to relax.

- **Do you use mobile app to enhance your travel experience?**

Not really. I haven't thought about using mobile app for traveling.

- **If you don't use mobile app for traveling, why not?** I haven't thought about that.

To find ways around. To know or learn a bit about the language. And usually there is information overload when you read a lot before traveling. It is annoying.

Yes. It is fun to win something if you know what to use it for.

- **Would you explore more in specific local attractions once you see the details and tips on the badges?**

- **Would you share through your social media when you get the badge, or the customizable templates?**

No I think I would only share to friends who might think it's interesting. I don't like to share on social media. In general I never share stuff on social media.

- **What other contents offered in the solution would you like to share to your friends and relatives?**

The simple fact that in ancient time Chinese people read from the right to the left. I would like to share that with my friends.

- **Would you like to buy recommended souvenirs? Why or why not?**

Yes. I usually buy figures as souvenirs when I travel. I would like to buy recommended ones especially food which is nice and traditional.

- **Does the solution make it easier for you to understand the local attractions? Can you give an example?**

Yes. It's a nice way to learn. To get through the game, you have to remember what you have read. So the information provided is relevant and useful.

- **Would you talk to the local citizens more after using the solution? In what scenarios?**

Yes to ask about the recommendations in the app.

- **What cultural aspects would you explore more if you travel to Nanjing, after using the app?**

I would follow my traveler's type and the recommendations offered. And I would like to know and explore more in other categories as well.

- **Is it more convenient for you to know featured local food, leisure activities after using the app?** Yes.

- **Have you read any background story during usage of the solution?**

Yes. I read all. I need it for the game.

- **How does the solution help you to understand the local history better?**

The interactive way of learning.

- **What would you like to know more about Nanjing after using the solution?**

To know more about the recommendations.

- **Do you feel fun while using the solution?**

Yes. However, the descriptions are too long. For some people who don't learn through reading, other approaches might be better. Instead of reading, they might prefer listening to it.

- **What kind of fun? Does it help you relax?** All the customizable picture templates are fun.

- **Is it easy to start using the solution?**

Yes it's quite easy. But in the beginning the buttons should be more clear.

- **Do you feel anything is lacking for you to know how to use the solution?**

It would be nice to remind people what you have learnt in the solution, and to sum up. People who are bad in English can't really digest so many things.

- **Would you like to use similar solution for other travel destinations?** Yes.

HB

- **Where have you been?** 27-30 countries.

- **Why do you travel?** Experience and adventure. In terms of culture. I just love traveling.

- **Are you interested in traveling in China?**

- **Do you use mobile app to enhance your travel experience?** Yes.

- **If you don't use mobile app for traveling, why not?**

I haven't thought about that. I AM FAIRLY NEW TO SMARTPHONE that actually works.

- **Would you explore more in specific local attractions once you see the details and tips on the badges?**

- **Would you share through your social media when you get the badge, or the customizable templates?**

Definitely. When I am traveling, I share some photos, but I usually don't write.

- **What other contents offered in the solution would you like to share to your friends and relatives?**

The quiz. I love quiz.

- **Would you like to buy recommended souvenirs? Why or why not?** I am not sure. I would buy food. I

usually buy one thing in destination. Usually I buy what gives me the biggest impression.

- **Does the solution make it easier for you to understand the local attractions? Can you give an example?**

Definitely. When it is written in a history way (story), makes it easier to remember.

- **Would you talk to the local citizens more after using the solution? In what scenarios?**

Where they recommend to go to eat. Also ask for leisure activities. I want to do.

- **What cultural aspects would you explore more if you travel to Nanjing, after using the app?**

I don't know. I can't think about anything.

- **Is it more convenient for you to know featured local food, leisure activities after using the app?** Yes.

- **Have you read any background story during usage of the solution?**

Yes. I read all. I need it for the game.

- **How does the solution help you to understand the local history better?**

The stories make it easy to understand how the history is constructed.

- **What would you like to know more about Nanjing after using the solution?**

To know more about the recommendations.

- **Do you feel fun while using the solution?**

Yes. It's catchy especially with the story. It puts different perspectives.

- **What kind of fun? Does it help you relax?** All the customizable picture templates are fun.

- **Is it easy to start using the solution?** Yes. It's fairly easy even for me who barely use apps.

- **Do you feel anything is lacking for you to know how to use the solution?** No.

- **Would you like to use similar solution for other travel destinations?** Yes.

GG

- **Are you interested in traveling in China?**

- **How do you get to know the local culture in your destination? E.g. souvenir, food, why the city is unique,**

etc.

- Do you use mobile app to enhance your travel experience?

Once in CYPRUS to find hostels. But it is just because we don't have laptop.

- If you don't use mobile app for traveling, why not? I don't know about what apps do. I need other people to tell me what information is offered. Also because I don't plan!

- Would you explore more in specific local attractions once you see the details and tips on the badges?

- Would you share through your social media when you get the badge, or the customizable templates?

Yes. On Facebook. The image template is just so funny.

- What other contents offered in the solution would you like to share to your friends and relatives?

Knowledge gained that I will take with me while I am there. And tell my friends. But I would not tell on social media.

- Would you like to buy recommended souvenirs? Why or why not?

Yes. I would like to know what is a must there and what would be nice. I usually buy something that is rare and I can't get in Denmark. Or things that are cheaper.

- Does the solution make it easier for you to understand the local attractions? Can you give an example?

I think it would be easier if it can refer to specific local people so that I can talk with them in the beginning. For people who know nothing, it's a lot of information. The north and south capitals.

- Would you talk to the local citizens more after using the solution? In what scenarios?

I would ask general basic information. Then ask for recommendations.

- What cultural aspects would you explore more if you travel to Nanjing, after using the app?

The local food and unique snacks.

- Is it more convenient for you to know featured local food, leisure activities after using the app?

Yes. For people like me who don't plan. So it helps.

- Have you read any background story during usage of the solution?

Yes. I read all. I need it for the game.

- How does the solution help you to understand the local history better?

It provides me with background information to understand what is special of the city.

- What would you like to know more about Nanjing after using the solution?

To know more about the recommendations.

- Do you feel fun while using the solution?

Fun with the badge and customizable image template. I am not really history minded. For me I value more being there and experience. I would have more use of the app after traveling in the city.

- What kind of fun? Does it help you relax? The content. Yes it made me laugh.

- Is it easy to start using the solution? Not so logical for me to use apps in general

- Do you feel anything is lacking for you to know how to use the solution?

- Would you like to use similar solution for other travel destinations?

Yes. Not use it mainly if the information is there, then I would not use it.

BP

- Do you use mobile app to enhance your travel experience?

Sometimes. App for transportation mostly. Momondo for flight tickets.

- If you don't use mobile app for traveling, why not?

To find relevant apps. Easier for me to check everything on my phone.

- What kind of problems do you have in traveling experience? No app to contain all the information you need. Hard to find info in English. Like if you go to Russia, it's impossible to get through. Difficult to get from one place to another. In some other countries, it's not safe to go alone. A lot of risks. There are ?

- Would you like to collect as many badges as possible? Why?

- Would you explore more in specific local attractions once you see the details and tips on the badges?

- Would you share through your social media when you get the badge, or the customizable templates?

Not really on social media. But more in private channels.

- What other contents offered in the solution would you like to share to your friends and relatives?

The story. (Text-based role play game)

- Would you like to buy recommended souvenirs? Why or why not?

Yes if it's interesting. Magnets, small things (locally featured), paintings or postcard. Not sth. Huge.

- Does the solution make it easier for you to understand the local attractions? Can you give an example?

Tells history, but the things are short. They don't fill you with information that in other things would not remember. I don't like history, so it is perfect for me.

- Would you talk to the local citizens more after using the solution? In what scenarios?

I have people around usually when I am traveling, I am usually travel with a purpose.

- What cultural aspects would you explore more if you travel to Nanjing, after using the app?

Different areas within the town, with specific features.

- Is it more convenient for you to know featured local food, leisure activities after using the app?

Yes. For people like me who don't plan. So it helps.

- Have you read any background story during usage of the solution?

Interesting. The story is more interesting.

- How does the solution help you to understand the local history better?

To a certain extent. It could be more background information. The info is a bit separated.

- What would you like to know more about Nanjing after using the solution?

To know more about the recommendations.

- Do you feel fun while using the solution? Yes.

- What kind of fun? Does it help you relax? The badges and quiz, role play.

- Is it easy to start using the solution?

Yeah I think so. In the beginning it would be fun to engage with role play.

- Would you like to use similar solution for other travel destinations? Yes.

GK

- Are you interested in traveling in China?

- Do you use mobile app to enhance your travel experience? No.

- If you don't use mobile app for traveling, why not?

I am new in smartphone area. I don't know what I can use it for.

- What kind of problems do you have in traveling experience? Finding good places to eat and to go out.

Finding open times. Especially when I am in a country where nothing is in English.

- Would you explore more in specific local attractions once you see the details and tips on the badges?

- Would you share through your social media when you get the badge, or the customizable templates?

I share only my photos. I would not share those templates. I don't share any photos of people.

- What other contents offered in the solution would you like to share to your friends and relatives?

Facts and the story about Xiangjun Li. Small cultural knowledge like people read from right to left.

- Would you like to buy recommended souvenirs? Why or why not? Yes. Magnets and I always buy postcards and a pin. Not that much. If I buy other things, they must be very special.

- Does the solution make it easier for you to understand the local attractions? Can you give an example?

Yes indeed. It connects the story to the place. And the recommendations are good.

- Would you talk to the local citizens more after using the solution? In what scenarios?

I want to. If I really find it interesting.

- What cultural aspects would you explore more if you travel to Nanjing, after using the app?

Mainly the food! The treasure hunt for food would be a good idea. I also want to know more about the famous buildings.

- Is it more convenient for you to know featured local food, leisure activities after using the app?

Yes. In a pretty interactive way.

- Have you read any background story during usage of the solution?

Yes. It is useful to finish the quiz and I love to have a clue instead of just guessing.

- How does the solution help you to understand the local history better? Interactive. Information and facts in a concise and quick way. Good combination of information and something to play with.

- What would you like to know more about Nanjing after using the solution?

To know more about the recommendations.

- Do you feel fun while using the solution? Yes.

- What kind of fun? Does it help you relax? The fun of exploring things.

- Is it easy to start using the solution?

Maybe the introduction of what page you are going to now. A brief information about what to

do and how you can navigate yourself to the next page?

- **Do you feel anything is lacking for you to know how to use the solution?**

- **Would you like to use similar solution for other travel destinations?** Yes.

LD

- **Do you use mobile app to enhance your travel experience?** No.

- **If you don't use mobile app for traveling, why not?** I am concerned about internet connections.

- **What kind of problems do you have in traveling experience?** The language barrier. We expected more young people speaking English. So ordering food and asking directions are complicated.

- **Would you explore more in specific local attractions once you see the details and tips on the badges?**

- **Would you share through your social media when you get the badge, or the customizable templates?**

Not that much in general. But I will share this specifically targeting friends.

- **What other contents offered in the solution would you like to share to your friends and relatives?**

The pictures and the questions with options. It challenges you a bit and offers more information.

- **Would you like to buy recommended souvenirs? Why or why not?** Yes. Key chains. Usually I buy small stuff that is easy to carry with. I am a very curious person, so I think I would check out the recommended souvenirs. But if it's easy to bring back, then I would probably check out and buy.

- **Does the solution make it easier for you to understand the local attractions? Can you give an example?**

Yes I think so. It's nice it combines history knowledge with local attractions.

- **Would you talk to the local citizens more after using the solution? In what scenarios?**

I want to. If I really find it interesting.

- **What cultural aspects would you explore more if you travel to Nanjing, after using the app?**

I don't remember very much about details in the app. I would like to check buildings and gardens.

- **Is it more convenient for you to know featured local food, leisure activities after using the app?**

Yes. In a pretty interactive way.

- **Have you read any background story during usage of the solution?**

Yes. It gives you more details about what you are looking at.

- How does the solution help you to understand the local history better?

It's good to have all the information in one place instead of googling in different websites.

- What would you like to know more about Nanjing after using the solution?

To know more about the recommendations.

- Do you feel fun while using the solution? Yes.

- What kind of fun? Does it help you relax?

It's pretty fun especially with the personalized pictures and taglines.

- Is it easy to start using the solution? Yes I think its very easy and intuitive.

- Would you like to use similar solution for other travel destinations?

Yes. It could be interesting if it is classified by region.

VC

- Why do you travel?

- How do you get to know the local culture in your destination? E.g. souvenir, food, why the city is unique, etc.

- Do you use mobile app to enhance your travel experience? No.

- If you don't use mobile app for traveling, why not? It's for internet reasons.

- What kind of problems do you have in traveling experience?

If emergency happens I don't know what to do. It is very stressful. Like where to go.

- Would you explore more in specific local attractions once you see the details and tips on the badges?

- Would you share through your social media when you get the badge, or the customizable templates?

Yes I would like to share. But not while traveling. I share after traveling.

- What other contents offered in the solution would you like to share to your friends and relatives?

The story for Xiangjun Li. You get cultural knowledge, without knowing that is "learning"

- Would you like to buy recommended souvenirs? Why or why not?

Not much buying souvenirs. I only buy magnates because my mom collects.

- Does the solution make it easier for you to understand the local attractions? Can you give an example?

Yes, it's pretty clear what you can see and do.

- Would you talk to the local citizens more after using the solution? In what scenarios? It depends a lot on whether people are open to conversation. Usually I talk to stuff who are offering service.

- What cultural aspects would you explore more if you travel to Nanjing, after using the app?

I don't know. I think I am more towards architecture, and not so much into art galleries. If it's something that is more historical, I would be interested. I like interactive things.

- Is it more convenient for you to know featured local food, leisure activities after using the app?

Yes. In a pretty interactive way.

- Have you read any background story during usage of the solution?

Yes. It gives you more details about what you are looking at.

- How does the solution help you to understand the local history better? It puts things into context.

You are not just going some where and seeing something. It makes it more interesting to visit.

- What would you like to know more about Nanjing after using the solution?

To know more about the recommendations.

- Do you feel fun while using the solution? Yes.

- What kind of fun? Does it help you relax?

It's very interactive. I have the choices and questions. I am entertained. It's not a very serious things. It has some humanistic things in it. I feel I am "talking" to person, not just reading.

- Is it easy to start using the solution? Yeah.

- Would you like to use similar solution for other travel destinations? Yes.