Rediscover Herbal Lane- Enhancing the Tourist Experience Through Mobile Applications

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Abstract. This study explores how to use a mobile service to improve tourists' experiences when visiting Herbal Lane's business district in Taipei. In Taiwan, mobile broadband Internet access is very popular, and it can thus support mobile applications to provide visitors with better tourism experiences. We approached the research by conducting a design project. This study developed a mobile application by integrating professional fields including design, information engineering, and traditional Chinese medicine. This study delivered a workable prototype—a mobile application for visiting Herbal Lane. With the workable prototype, we further carried out a user-testing study to understand whether the mobile application can improve visitors' experience in Herbal Lane district. A total of 114 visitors (61 male and 53 female) were recruited to participate in the user-testing study. The results indicated that the mobile application could improve visitors' tourism experiences more than those without the mobile application. The mobile application significantly enhanced the visitors' tourism experience on the four dimensions: enjoyment, novelty, local culture, and involvement. The findings and implications are further discussed in this paper.

Keywords: Mobile application · Tourism experience · Design

1 Introduction

This study explores how to use a mobile service to improve visitors' tourism experience when visiting Herbal Lane's business district in Taipei. Herbal Lane, which is the largest business cluster of herbal business in northern Taiwan, is one of the many regions in Taipei that is worth marketing and promoting (see Fig. 1). This is because its long history of herbal culture makes it a very unique tourist attraction in Taipei. Herbal Lane is an ancient street that has experienced urban periphery problems, but owing to the changing population and urban development over time, it has gradually transformed into a tourist attraction for health, wellbeing, and cultural tours. The buying and selling activities in Herbal Lane are rare and novel for visitors and thus easily attract people's attention. In order to develop the tourism resources of Herbal Lane, the city's municipalities have displayed wooden plaques at each intersection. However, despite these attracting some visitors to the area, the visitors often fail to understand the special characteristics of the

herbal industry. Reforming the street and the region can promote Herbal Lane to make it well-known, but it cannot expand the market or attract younger generations to continue the culture of the herbal industry. While the government is focusing in promoting the Herbal Lane business district, it is limited to using traditional forms of landscape transformation, without considering the herbal industry and its unique culture of herbal health and wellbeing. This means that visitors are unable to develop an understanding of the long and profound herbal culture, and new customers cannot be developed in order to continue the culture of the industry.
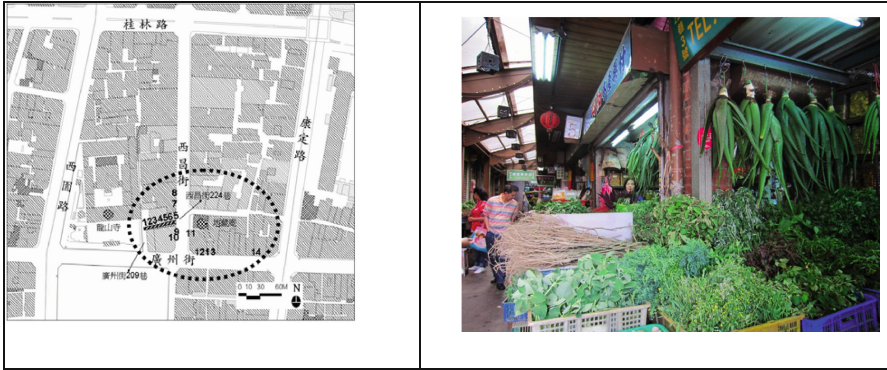

Fig. 1. Herbal Lane's business district in Taipei

In recent years, business owners in the Herbal Lane business district have tried to use digital marketing to develop the market and attract new customers. Some shops have already carried out promotional activities such as QR-code scanning or Facebook check-in, indicating that business owners in Herbal Lane are actively seeking new media exposure and promotional methods to gain acceptance of the herbal industry from a larger population. While the business district is a component of a city, the development of a city's business district is closely related to urban prosperity, and thus district transformation is an import part of urban promotion. Kotler et al. [1] proposed the concept of place marketing and regarded a region as a corporate body. Driven by market demand and by combining the local advantages and characteristics, the region can be actively developed into an attractive product to promote the development of the local economy, tourism, and investment. As a result, when promoting a business district, the different characteristics will often require different strategies for promotion [2].

Mobile service can be used to strengthen the business district and tourism industry. In Taiwan, mobile broadband Internet access is very popular, and it can thus support mobile applications to promote regions. This study attempts to promote regional marketing by integrating designs with mobile service. Herbal Lane's business district is currently going through a transition to open the market to new customers. Therefore, by incorporating new methods of design and mobile service, Herbal Lane's business district could provide consumers and visitors with a profound experience, thus improving the image of the region. For this reason, our study uses Herbal Lane as the research field. We approach the research by conducting a real design project. Design is

an approach of inquiry and action used by humans to engage with the world. Cross [3] coined the term "designerly ways of knowing" to highlight the uniqueness of design knowledge, and he argued that part of design knowledge is inherent in the activity of designing, gained by engaging in and reflecting on activities through the design process. Thus, we carried out a design project by focusing on the design of a mobile service to enhance the tourism experiences in Herbal Lane. The design outcomes created through this study served as answers to the design inquiry and sources of design topics [4, 5]. Further, the design outcome was used as a workable prototype to conduct a field study to gain insight into the effects of the design outcome on visitors' experiences of Herbal Lane.

2   Tourism Experience

Tourism experience forms the core of tourism activities and affects visitors' psychological factors or travel behaviors during their journeys. People visit various places and seek various entertainment and recreations because they are bored with their bland lifestyle and they wish to pursue something that they cannot usually grasp [6]. Otto and Ritchie [7] concluded that people who travel possess a subjective state of mind based on the following types of experiences. First, the external environment stimulates the visitors' senses. The visitor feels and interprets the information received based on their individual knowledge and previous experiences. The information is integrated and stored in their memories. The series of processes constitutes the tourism experience. Therefore, tourism experience is a process. Even when the process ends, the feelings that people experienced stay in their memories, and the souvenirs they purchased bring them unforgettable memories. Ooi [8] proposed that the visitors' backgrounds and interests could affect their tourism experiences. For example, two travelers doing the same thing at the same location can have very different travel experiences depending on their feelings and emotions at a particular time. Kim et al. [9] proposed seven factors of memorable tourism experiences (MTE): (a) hedonism, (b) meaningfulness, (c) involvement, (d) local culture, (e) knowledge, (f) novelty, and (h) refreshment. Sthapit [10] used the MTE scale was to investigate the impact of each factor on visitors' tourism experiences in Rovaniem city. The results showed that "local culture" and "novelty" have the most significant impacts on visitors' tourism experiences. Research on tourism experience has gradually changed from focusing on physical objects to studying visitors' subjective perceptions [11]. Tourism service providers should comprehensively weigh the proportion of each factor of memorable tourism experiences to better tourists' experiences.

3   Mobile Applications

Nowadays, the constantly evolving information technology can allow visitors to a location to rapidly understand the area, and many suitable services and products have been developed to meet consumer requirements [12]. After the rapid development in recent years, mobile phones have become the most convenient mobile device, evolving from

feature phones to the current mainstream smart phones with the expansion features for third party programs. Because phones support the functional expansion of countless mobile applications, mobile phones have become mobile service-providing centers. Henseler et al. [13] stated that mobile services have become increasingly important because of improved access to the Internet and the large amount of add-on functions on newer models. People's acceptance of mobile services has risen due to the popularity of smart phones and the functions of the available applications.

Owing to this increased acceptance of smart phones, carrying out marketing campaigns using the Internet and smart phones has become an effective promotion strategy. Shankar and Balasubramanian [14] stated that mobile marketing between the business and the consumer could be regarded as using mobile media, equipment, or technology to perform a wide range of interactions and promotions. The smart phone can be used at anytime and anywhere, and its interactive function makes it easy for users to rapidly share and spread their travel experiences through social network platforms. With the mobile content, we can combine the visitors' virtual experience with their real experiences on site to effectively promote and market the region and bring a different experience to the visitors. For example, because almost every attraction in London has a long history and cultural background, an application called Street Museum was developed, which enables visitors to see how the streets where they are standing looked in the past. Another example is the Ubiquitous Art Tour in Tokyo, which offers visitors "Ubiquitous Communicators" to guide them to respective art works in Tokyo's Midtown area. As the visitors stand in front of each artwork, they can access information about the art and the artists with images that introduce the creative process.

The functions of smart mobile devices are becoming more powerful. The involvement of information technology in marketing is no longer limited to providing a functional user interface. Using technology, we can establish an environment that combines the real world with the virtual world, based on the existing service, and provide a valued and innovative service. The concept of integrating O2O (Online to Offline) has been increasingly accepted by consumers. Using information technology, we can create interactive experiences between the people and the location, which contributes to regional marketing and promotions. This study uses Herbal Lane as the research field. By implementing and verifying our design project, we explore how to develop a mobile application to market the business district and improve the travel experience of visitors.

4   Design Project

This study focuses on the business district in Herbal Lane and explores how to improve visitors' experience of the business district using a mobile application. We formed a multidisciplinary team that consisted of design and computer science students who collaborated with a traditional Chinese medicine (TCM) practitioner on the approach for this design project over nine months to develop a mobile application for Herbal Lane.

4.1   Problem Finding

First, we started with interviewing business owners in Herbal lane to understand the development and challenges of Herbal Lane's business district. We then observed the visitors' behaviors and interviewed the visitors to understand their travel experiences. From the interviews and observations, we learned that the younger travelers are unfamiliar with and lack interest in the herbs and their efficacy despite the benefits to their health and wellbeing, which prevents them from enjoying their experiences in Herbal Lane fully. We therefore aimed to design a solution that would trigger the visitors' interest in the herbs in Herbal Lane. In order to achieve effective marketing results, the marketing content needed to be relevant to the consumers, containing compelling and contextual factors that would entertain the consumers sufficiently for them to share the products with others.

4.2   Solution

Based on the problem we discovered above and to promote the business district in Herbal Lane, we aimed to propose a solution that can establish connections with the visitors and the Herbal Lane by providing them with a novel way to experience the Herbal Lane. This study developed a mobile application to allow visitors to understand the properties of herbs in Herbal Lane based on their individual needs, thereby motivating them to explore Herbal Lane. This project developed a mobile application that can determine user body constitution by asking him/her questions and was inspired by the ten questions used for the TCM diagnosis from which a TCM practitioner learns about patient body constitution. The mobile application then recommends a suitable herb to the user according to the body constitution of the user. This creates connections between the visitors and the herbs in Herbal Lane, and guides them to Herbal Lane to search the recommended herbs. Icon tags are displayed on the herb containers so that visitors can use the pattern recognition feature in their mobile phones to ensure they find the correct herb that was recommended to them, thereby allowing visitors find the suitable herb for their health and wellbeing. With the mobile application, the new tourism experience in Herbal Lane is described below.

4.3   New Tourism Experience in Herbal Lane

Understanding Your Body Constitution. To build connections with the visitors and spark their interest, we invited business owners from Herbal Lane and senior TCM practitioners to participate in discussions and develop a database for "question-body constitution -herb." By asking a series of questions, the body constitution of the visitor can be estimated and the suitable herb for the health and wellbeing of the visitor can be recommended. Once they finish answering the questions, they are notified of their body constitution and the recommended herbs.

Finding Your Herb. After answering the questions, the application recommends suitable herbs to the visitors by displaying pictures and icons of the recommended herbs.

The visitors are then invited to go to Herbal Lane to find the herbs. The pictures or icons of the herbs help visitors to find the recommended herbs, and the icon on the herb container can be scanned using the camera on the mobile phone to obtain information about the herb. When the phone camera is held close to the tag of the herb, based on pattern recognition, the application can automatically identify the type of the herb and notify the visitors if they have found the correct herb (see Fig. 2).
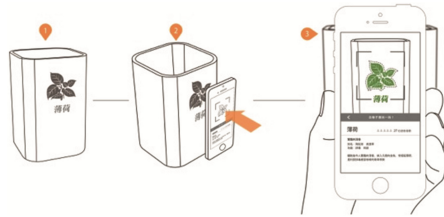

Fig. 2. One kernel at *xs* (*dotted kernel*) or two kernels at *xi* and *xj*

Share Your Finding. When the visitor has found the correct herb, the system will introduce the preparation method and efficacy of the herb. Once the system has obtained consent from the user, the herb information will be automatically uploaded to social media platforms.

4.4   User-Testing Study

In order to understand whether the mobile application proposed in the study can improve visitors' experience when they go to Herbal Lane, we obtained permission from the shops in Herbal Lane to perform a user-testing study. We recruited 114 visitors (61 male and 53 female) to participate in the study. The participants, aged between 20 and 35, were divided into two groups randomly; 55 participants used the application while the other 59 did not use the application. The application could be downloaded via the QR code on the site. The two groups were similar in sex distribution and age. Once the participants had completed their tour of Herbal Lane, we asked them to fill out a questionnaire. The participants were thanked and offered a gift certificate worth $8.

4.5   Measurement Tools

The tourism experience questionnaire was modified from a version of the MTE scale proposed by Kim et al. and focused on four factors of tourism experience: hedonism, novelty, local culture, and involvement.

The hedonism factor consisted of four items: (1) Visiting Herbal Lane was pleasurable, (2) I indulged in the activities in Herbal Lane, (3) I really enjoyed this tourism experience, and (4) Visiting Herbal Lane was exciting. The novelty factor consisted of three items: (1) Visiting Herbal Lane was unique, (2) Visiting Herbal Lane was different from previous experiences, and (3) I experienced something new at Herbal Lane. The local culture factor comprised two items: (1) I have a good impression of the local people

and (2) I closely experienced the local culture. The involvement factor contained three items: (1) I visited a place where I really wanted to go, (2) I enjoyed the activities that I really wanted to do, and (3) I was interested in the main activities of this tourism experience. The scales were measured using a set of paper-and-pencil questionnaires, and each item was scored using a 7-point Likert scale ranging from 1 (very strongly disagree) to 7 (very strongly agree).

5   Results

Internal consistency was calculated to assess the reliability of the scales. Cronbach's alphas for the four factors of hedonism, novelty, local culture, and involvement were all higher than 0.7. According to Nunnally, a Cronbach's α value of 0.7 is adequate for internal consistency reliability; therefore, the measures used in this study demonstrated adequate reliability. Table 1 shows the mean scores of hedonism, novelty, local culture, and involvement rated by the participants. A t-test was performed to examine whether the use of mobile application affected the visitors' tourism experience regarding hedonism, novelty, local culture, and involvement. The results showed that the mobile application developed in this study significantly enhanced the visitors' tourism experience on the four dimensions.

Table 1. The results of the user-testing study

Independent variable	Condition	N	Mean (SD)	t
Hedonism	With app	55	5.42 (0.86)	5.14***
	Without app	59	4.53 (1.00)	
Novelty	With app	55	5.92 (0.86)	4.89***
	Without app	59	5.06 (0.99)	
Local culture	With app	55	5.50 (1.16)	3.16**
	Without app	59	4.86 (0.98)	
Involvement	With app	55	5.39 (0.93)	4.71***
	Without app	59	4.52 (1.04)	

** $p < 0.01$; *** $p < 0.001$ (2-tailed)

5.1   Hedonism

The mean of hedonism rated by the participants who used the mobile application was 5.42 (0.86) and by those who did not use mobile application was 4.53 (1.00). The differences were statistically significant at $p < .001$ by independent t-test. Based on the survey results, participants using the mobile application had higher scores than those without a mobile application when answering, "I indulged in the activities in Herbal Lane" and "Visiting Herbal Lane was exciting." The participants who used the mobile application found the experience of visiting Herbal Lane pleasant; they enjoyed visiting Herbal Lane and participating in the activities.

5.2   Novelty

The mean of novelty rated by the participants who used the mobile application was 5.92 and by those who did not use mobile application was 5.06. The differences were statistically significant at $p < .001$ by independent t-test. Participants without the application found the herbs being sold at the shops in Herbal Lane very novel. Their travel experiences were completely different to their experiences of previous attractions. The participants with the application also felt the novelty of the Herbal Lane experience, expressing it as a new and interesting experience to use the application to not only guide their visit to Herbal Lane but also gain a more in-depth understanding of the herbs for health and wellbeing. The results show that using a mobile application in a unique business district such as Herbal Lane can improve the sense of novelty for visitors in regards to their tourism experience.

5.3   Local Culture

The mean of local culture rated by the participants who used the mobile application was 5.50 and by those who did not use mobile application was 4.82. The differences were statistically significant at $p < .01$ by independent t-test. When the participants without the application visited Herbal Lane, they could understand the history of Herbal Lane through the introduction at the entrance of Herbal Lane. By contrast, the participants who used the application while visiting Herbal Lane used the mobile application to participate in the herb searching activities and develop an understanding of the herbs on Herbal Lane. They could also understand related knowledge about the herbs through the application. The information provided by the mobile application allowed the visitors to acquire basic information about the herbs, encouraging them to inquire further about the efficacy of the herbs and how to consume the herbs. The visitors therefore gained a deeper impression of the cultural environment of Herbal Lane than those without the application.

5.4   Involvement

The mean of involvement rated by the participants who used the mobile application was 5.39 and by those who did not use mobile application was 4.52. The differences were statistically significant at $p < .001$ by independent t-test. The results from the survey showed that the participants with the application were significantly more involved than those without the application while they were visiting Herbal Lane. They gave high scores in their feedback for 5.40 (1.13) and 5.78 (1.01) stating, "I enjoyed the activities that I really wanted to do" and "I was interested in the main activities of this tourism experience." This shows that the visitors believed that the mobile application proposed in our study can help visitors to enjoy participating in activities in Herbal Lane, and hence improve their degree of involvement while visiting Herbal Lane.

6   Conclusion

This study developed a mobile application to promote Herbal Lane's business district by integrating professional fields including design, computer science, and TCM. It is hoped that the application will improve the tourism experience for visitors and help them understand more about the herbs in Herbal Lane so that they can become potential consumers. This study conducted a design project to approach this topic and delivered a workable prototype—a mobile application for visiting Herbal Lane. With the workable prototype, we carried out a user-testing study to understand whether the mobile application would enhance a visitor's tourism experience. The results indicated that the mobile application could improve visitors' tourism experiences comparing to those without the mobile application. Based on the findings of this study, further discussions follow.

6.1   Enhance the Tourism Experience with Mobile Application

The mobile application proposed in this study can improve the visitors' tourism experiences while visiting Herbal Lane. It is therefore feasible to use the mobile application for regional promotion from the aspect of enhancing visitors' travel experiences. The application not only allows users to perceive a sense of joy and novelty, but can also promote the local culture to the visitors and increase their willingness to participate during the visit. The mobile application proposed in this study provides a new channel for visitors to encounter Herbal Lane and the local shops, and to understand the culture of Herbal Lane. As a result, visitors are not merely walking past attractions quickly, but can instead gain a deeper understanding of Herbal Lane's culture and learn about the herbs. The practical experiments showed that the application helped the visitors to become more involved in the activities at Herbal Lane. In addition to enjoying various herbs, they were also more willing to ask the shop assistants about the effects of those herbs, thus forming an interaction between the shop assistants and the visitors. In addition, by the end of the tour, since visitors gained an initial understanding of Herbal Lane, they experienced Herbal Lane from another perspective and demonstrated a stronger desire to make a purchase.

6.2   Increase the Touch Points

A destination 'touch point' is any point of contact that a visitor uses to find out about a product or service, or to make a purchase. Using a mobile application to enhance visitors' tourism experiences can increase the touch points between the visitors and the place they are visiting so that the visitors can actively interact with the people, objects, and environment of the location. In our study, the visitors who used the application to visit Herbal Lane gave positive feedback about the built-in interactive sections of the application, including the herb searching activity, which guides visitors to actively search for the herbs that are suitable for their body constitutions. Through the pattern recognition feature, visitors can obtain information about the herbs in Herbal Lane. The design of the activity is exploratory, and can thus stimulate the visitors' curiosity while increasing

the touch points of Herbal Lane. Once the visitors have completed the herb searching activity, the mobile application provides herb information, thus allowing the visitors to upload the information to social media channels and share it with their friends. This public exposure can attract more visitors in the future. Promoting cultural marketplaces, such as Herbal Lane, by designing a mobile application that aims to increase the touch points of the attraction increases the chances for visitors to encounter the local culture. This is a sustainable strategy for tourist attraction sites to attract more visitors long term.

6.3   Suggestions for Future Modifications

Based on the participants' feedback, we outline three suggestions to modify the mobile application. The first modification is to offer more information about Herbal Lane. When visitors enter an unfamiliar place, they have an urge to find out more about the place. The mobile application can rapidly provide information in many forms. Our study results show that a useful and easy-to-use application is essential for visitors' travel experiences. While the application in our study provided an experience for exploring herbs, the participants expressed that basic information about attractions could be included and introduced when appropriate so that the visitors could know more about the places they visited. Another user requirement is the inclusion of a reasonable navigation route. In our study, herb-searching activity was used to guide the visitors to Herbal Lane to explore the herbs. Some users stated that in subsequent versions, the navigation function of the application could be enhanced by adding a location-based service (LBS) to provide guidance during the exploration process and to make the experience more interesting. The third requirement is to combine multiple modalities for the interface design. A good interface design can significantly enhance the usability and reduce the operation burden on the users; it can also indirectly improve the quality of the user experience. The participants stated that the interface design of the application in this research was simple and refreshing, which reflects the actual atmosphere of Herbal Lane. Regrettably, the operating interface designed for this study focused on the presentation of the visual arrangement; however, the participants stated that audio feedback and presentation would enhance the usability. Subsequent designs should therefore use an improved visual interface and audio feedback to enhance users' interest in the exploratory game and the guidance provided by the interface.

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