Designing Interactions in Tourism Mediascape – Identification of Patterns for Mobile 2.0 Platform

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Abstract

Applying pattern language theory, this study identifies patterns of tourists' interactions with their social networks in the context of mobile-mediated experiences. The patterns were conceptualized from sequences of tourists' stories and observers' field notes through narrative analysis. The identified patterns were then organized into a typical scenario of tourism experience. Mobile 2.0 platform is proposed as interactive mediascape to mediate tourists in situ.

Keywords: tourism experience; technology-assisted mediator; mediascape; mobile 2.0; pattern language.

1 Introduction

People around the world exhibit an unprecedented degree of attachment to mobile phones. The device is virtually ubiquitous in the urban life, making it the one of the most personal technology artefacts of our times. As people are increasingly mobile driven by both work and leisure-related purposes, the use of mobile phones by travellers on the move are increasingly important to explore. Recent research shows that people often use computer and mobile mediated communications to replace social groups with social networks (Sproull and Faraj 1995). The new mobile media enables people to enact and experience differentiated segments of networks within different settings. When a tourist uses her mobile phone while touring a foreign destination, for

example, she can experience the mobile-mediated interactions with a selected network of remote others while simultaneously experiencing the physical landscape and socioscape of the destination. Furthermore, the emergence of new collaborative media called "Web 2.0" is being rapidly integrated with various types of mobile devices, changing the way tourists retrieve, communicate, and share information with others while on the move.

Recently, there has been a considerable discussion on the idea of "Mobile 2.0" within the travel industry. However, the conceptual and practical foundation of the applications has not been widely explored. Adjusting the existing Web 2.0 sites to fit mobile phone screen will not be sufficient for creating Mobile 2.0 platform. As an illustration, reading a lengthy blog or consumer review on a mobile phone is highly inconvenient for tourists in situ. This leads to a design problem in Mobile 2.0 development. This study attempts to provide a better understanding to the tourists' mobile-mediated interactions while they are on tour to gain new insights on designing potential applications of Mobile 2.0 platform in tourism settings. This study applies pattern language theory to comprehensively describe the design problems and solutions in the context of tourists' interactivity within a Mobile 2.0 platform.

2   Theoretical Foundation

2.1 Mediation of Tourist Experience

It is argued that tourism experiences are becoming increasingly mediated (Jansson, 2002; Jennings & Weiler, 2005; Beeton, Bowen, & Almeida Santos, 2005). According to Jansson (2002), tourism becomes more mediated when it gets more organized. Jennings and Weiler (2005) argue that tourists often engage with others, i.e., personal and non-personal elements, who and which serve to mediate their tourism experiences in the process of constructing their knowledge. These personal and non-personal elements, the *mediators*, become essential for creating and delivering quality tourism experiences. Among personal mediators are tourists (i.e., who help mediate other tourists), service providers, governments, and local communities; non-personal mediators include signage, street furniture, design, and settings.

Today, there has been a growing interest in the development of technology-based mediators including the Internet, mobile phones, and digital cameras. The technology developments allow people to benefit from being able to use multimedia features to enhance and add value to their tourism experiences. Based on the temporal dimension of the tourist experience, technology-assisted mediators not only exist at the experiential phase (i.e., on-site), but also at the anticipatory (i.e., planning) and the

reflective (i.e., recollection) phases (Tussyadiah, 2007). Recently, the emergence of consumer-generated media (CGM) has created several mediation mechanisms enabling tourists to share their experiences with others (i.e., get into the mediation mechanism) while they are experiencing on-site activities, thereby accelerating and enriching the mediation process. Jansson (2002) proposes three concepts of tourist scapes: landscape (i.e., refers to physical space), socioscape (i.e., refers to social space), and mediascape (i.e., refers to media space). When the mediation process is increased, tourists' interactions with and within the mediascape are intensified. Hence, it is of vital importance to recognize the foundation of creating and designing a better tourism mediascape in order to deliver quality tourism experiences.

2.2 Conceptualizing Mobile 2.0

The term "Mobile 2.0" in this paper refers to the platform of Web 2.0 in a mobile device. Many people still argue about the exact definition of Web 2.0. However it is often referred to as *the participatory web* and associated with CGM. Below is an attempt to define the term:

> "Web 2.0 is the network as platform, spanning all connected devices; Web 2.0 applications are those that make the most of the intrinsic advantages of that platform: delivering software as a continually-updated service that gets better the more people use it, consuming and remixing data from multiple sources, including individual users, while providing their own data and services in a form that allows remixing by others, creating network effects through an "architecture of participation," and going beyond the page metaphor of Web 1.0 to deliver rich user experiences." (Tim O'Reilly, *radar.oreilly.com* [August 28, 2007])

Following O'Reilly's definition, the most important aspect of Mobile 2.0 platform is its participatory architecture, which enables the interactive and democratic interface that allows users to easily add contents and participate in the online community. Another important aspect of Web 2.0 is its ability to *associate* different contents through tagging, much the same way human actors form social networks. The result is a computing platform that enables emergence of dynamic and complex contents based on dynamic associations among various elements of CGM.

Mobile 2.0 is connected to the concept of web-everywhere technology, hence strongly significant in travel and tourism settings. Mobile 2.0 platform can enhance the tourism mediation process because of its participatory and ubiquitous nature; tourists on the move can share their gained knowledge instantly to help mediate others tourists who travel at the same time but in different places (i.e., space gap), or who travel to

the same place at different times (i.e., time gap). Hence, Mobile 2.0 is conceptualized as a rich-ubiquitous-participatory-emergent mediascape.

2.3 Pattern Language

The concept of Pattern Language was introduced by Christopher Alexander in his book on architecture design patterns (see Alexander et al, 1977). A single pattern is a textual entity which describes an invariant solution to a problem within a context (Dearden & Finlay, 2006; Kotzé et al, 2006). Patterns are connected with other patterns; the relationships between patterns establish hierarchy of patterns. The term "pattern language" is comparable to human natural language, and is used to describe the network of multiple interconnected patterns as a constructive guide through an entire design process. A pattern language then is a collection of patterns that can solve all the problems in a particular domain (Casaday, 1997). Dearden and Finlay (2006) and Kotzé et al (2006) describe the key characteristics of patterns as follows:

- A pattern implies an artefact; patterns suggest a solution to a problem.
- A pattern includes its rationale.
- A pattern is grounded in a domain.
- A pattern is part of a pattern language; individual patterns are connected to other patterns so that the reader of the language can be guided to go through a series of related design decisions.
- A pattern bridges many different levels of abstraction, including descriptions and examples.

Alexander (1977) suggests the representation of patterns in a specific textual and typographical format which consists of the following elements:

- Name: A name for the pattern.
- Context: A context for the design problem.
- Forces: Forces which require resolution.
- Problem: A problem growing from the forces.
- Solution: A known solution, proven in practice.

van Welie and van der Veer (2003) regard a pattern as a small piece of the entire design knowledge puzzle; the long-term goal of pattern research is to put together the single pieces of puzzle to unfold the entire body of knowledge. Pattern theory has been utilized not only in architecture and urban design context but also recently applied in the field of software engineering and human-computer interaction (HCI), specifically within the area of participatory and interactive design platform (Tidwell, 1999; Dearden, Finlay, Allgar, & McManus, 2002; van Welie & van der Veer, 2003;

Smith, Stewart, & Turner, 2004). Tidwell (1999) argues that patterns "…provide design solutions that are concrete enough to immediately put into practice, with good results, and yet are sufficiently abstract to apply to countless situations." Hence, the use of pattern language in Mobile 2.0 platform design context is justifiable because of the widely-accepted benefits of the pattern language in providing design solutions in HCI context. This study analyzes tourist narrative patterns, which represent sequences of experience, with their contexts, problems, solutions, and connections with other patterns, to recognize the pattern language in order to design tourism mediascape with a Mobile 2.0 platform.

3 Methodology

3.1 Data Collection

This study utilizes a multi-method approach of data collection including interview, observation, time-interval survey, and questionnaires. The participants were tourists visiting Philadelphia who were 16-39 years of age. It was required that all participants are familiar with the basic features of a mobile phone and a digital camera. The participants were recruited through direct recruitment at the Independence Visitor Center, as well as indirect recruitment through announcements posted on different blogs related to the City of Philadelphia and *e*Newsletter sent out by the Greater Philadelphia Tourism Marketing Corporation (GPTMC) to potential travellers.

Participants were asked to use Nokia's N95 multimedia phone while they were touring downtown Philadelphia for several hours. The N95 device was used because it offers a variety of data services useful for tourist on-the-move including navigation services, internet browsing, high quality digital camera, 3G and Wi-Fi radios, in addition to other typical mobile services. The participants were encouraged to explore different features of the phone while touring and were required to do two general tasks: telling stories and capturing images. For the first task, the participants were asked to report their experiences every hour using the voice recorder feature on the phone. They were given a set of cards containing a list of questions as guidelines for them to describe their experiences. For the second task, they were asked to capture images that they perceive as representations of their experiences; they were also encouraged to share the captured images to their contacts and upload them for public viewing. ShoZu™ service was added onto the phones to enable the process of geotagging for all pictures taken by the participants. The pictures were then uploaded to Flickr™ website and each geotagged picture is located on a digital map of Philadelphia. Participants were also asked to provide descriptions for their uploaded pictures. For ethnographic studies, in addition to the tasks performed by the participants, observers were asked to prepare field notes based on their examination.

To date, a total of 49 participants have completed the tour; 41 participated in the time-interval survey, and eight tourists participated in the ethnographic study. The 49 participants were either individual or group travellers; only one member of a group was allowed to participate in the study. All participants were given a gift card worth $200 upon completion of the tasks.

3.2 Analysis Procedure

The time-interval survey and ethnographic study resulted in rich descriptions about tourists' activities related to time and space and their perceptions toward their own experiences, including the use of mobile phones. The descriptions from the sound files of tourists' reports were transcribed into textual documents. The contents of these documents and the observers' field notes were transformed into meaningful stories and then were deconstructed into story episodes. From the point of view of narrative analysis, the method utilized in this study can be categorized as plot analysis (Boje, 2001); the antenarratives were deconstructed in order to find the sequences, episodes, and schema of the narratives. The story episodes were then analyzed and coded in the context of tourists' activities and interactions using ATLAS.ti software. The typical codes represent tourists' activities, problems, solutions, and contexts. Identified codes were then interpreted to determine the nature of relationships among the codes within the topological network.
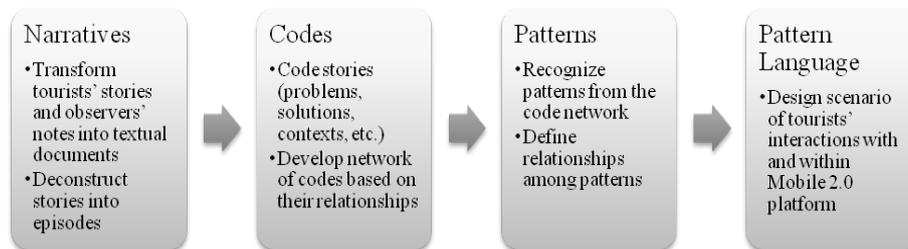

Narratives
- Transform tourists' stories and observers' notes into textual documents
- Deconstruct stories into episodes

Codes
- Code stories (problems, solutions, contexts, etc.)
- Develop network of codes based on their relationships

Patterns
- Recognize patterns from the code network
- Define relationships among patterns

Pattern Language
- Design scenario of tourists' interactions with and within Mobile 2.0 platform

Figure 1. Analysis Procedure

Based on the relationships among the codes from the narrative analysis, initial patterns of potential tourists-Mobile 2.0 interactions were identified and their relationships were analyzed. The interrelated patterns were then organized to create a narrative of pattern language. Based on the pattern language, typical scenarios were proposed as a foundation to design various potential forms of interactions in Mobile

2.0 platform and, consequently, potential Mobile 2.0 applications in travel and tourism context.

4 Patterns of Tourists-Mobile Phones Interactions

4.1 Mobile Phone Use

In order to give a clearer context to the pattern identification, this section presents the general findings of participants' use of mobile phones while they were touring, including kinds of information they searched, kinds of applications they used, several problems they had to deal with, and solutions they found to solve those problems. Tourists mostly search for information on attractions/sights (78.7%), shops (59.6%), and restaurants (44.7%); other on-site information searched by tourists include weather, transportation, and events. Even though the mobile phone offers various services, only 27.7% of the tourists used mobile internet as the media to search for the information. Most tourists used the assistance of street signs (80.8%), followed by brochures/leaflets (36.2%), friends/relatives (34%), paper maps (31.9%), and info centre/kiosks (27.7%).

From the ethnographic study, it was also found that tourists tend to use more than one media to get assistance for solving problems while on tour. Some tourists, especially ones travelling in group, were using multiple media to search for information. Some of them tried to compare information they got from the internet on the mobile phone with the information provided on the guidebook. When tourists tried to navigate themselves to a certain place, some of them also tried to synchronize the map they have (with the GPS-assisted application on the phone) with the street signs to get a better orientation.

4.2 Identified Patterns from Tourists-Mobile Phones Interactions

The first phase of analysis was to deconstruct stories into several episodes and code them based on the activities, problems, solutions, contexts, information needs, etc. Extract 1 represents an example of an episode containing six codes ("asking others for information," "calling," "negotiating decision," "reference to others to signify decision," "task," and "use of mobile phone"). A total of 32 codes were identified from the entire textual data. The relationships between codes (e.g., "associated with," "cause of," "part of," "contradict," etc.) were then defined to create a topological network of codes. Extract 2 represents an example of codes relationships.

Extract 1. A Coded Episode of Observers' Field Notes

> **P 1: fieldnotes.txt - 1:15 [We walked out of the visitor c..] (72:72)**
> **Codes**: [asking others for information] [calling] [negotiating decision] [reference to others to signify decision] [task] [use of mobile phone]
>
> *"We walked out of the visitor center but before we crossed the street Jonathan saw the store (at the visitor center), they went back inside to the store. Rebecca said Jonathan had to buy a birthday gift for his grandmother. They found silver spoons with the liberty bell decoration. Jonathan called someone to be sure about buying the spoons, and then he bought them (it was his mother on the phone)."*

Extract 2. Samples of Code Relationships

encounter with in…	is associated with	inquiry for site-spec…
encounter with in…	is associated with	preserving the mom…
encounter with in…	is cause of	inquiry for time-spe…
excitement	contradicts	disappointment
excitement	is associated with	encounter with inte…

A total of 12 patterns were recognized from the code network: Reference to Others, Negotiating Decisions, User Stories, Location-Based User Review Sites, Sound-Based User Review Sites, Task Fulfilment, Site-Specific Instant Information, Preserving the Moments, Sharing the Experiences, Instant Uploader, Self Map, and Sound-Based Navigation System. Table 1 illustrates the detail information of each pattern.

Table 1. Identified Patterns

Pattern 1 *Reference to Others*	Pattern 2 *User Stories*
Context: Design of collaborative interface	Context: Design of collaborative user-created content
Forces: People always want to make sense and meanings of their decisions and experiences	Forces: People want to know what interest others and what others do in the city
Problem: When references are unavailable on site (e.g., insufficient interpretation, no personal interpreter, no interaction with others), people will be dissatisfied.	Problem: People would feel uninspired when they are on tour if they couldn't find some interesting reference from others.
Solution: Provide an interface where people can easily get references from others' stories, reviews, and opinions.	Solution: Develop a narrative self map where users can easily find stories from others about events occurred at a particular point on the map.

Table 1. Identified Patterns - *Continued*

Pattern 3 *Negotiating Decisions* Context: Design of collaborative interface Forces: People want to consider others' opinions, needs, & wants when they make decisions Problem: A failure to communicate with friends & relatives to negotiate decisions can cause a failure in decision making. Solution: Develop an interface where people can interact with others who are separated in space and time.	**Pattern 6** *Self Map* Context: Design of location-based navigation system Forces: People want to know their self orientation Problem: People will get stressed out if they always have to change directions to find out their orientation when reading a map. Solution: Develop a GPS-based map where users can see themselves in it – the icons on the map will move as they move physically, making it easier to get self-orientation.
Pattern 4 *Task Fulfilment* Context: Design of informative interface Forces: People want to get fully mediated when they are trying to get something done in a place foreign to them Problem: A difficulty to access their preferred source of information on tour can lead to frustration Solution: Integrate a mobile version of a customized web-based information source with the location-based services	**Pattern 7** *Sound-Based Navigation System* Context: Design of location-based navigation system Forces: People want to get clear instructions about direction to a desired site Problem: It is quite inconvenience for people to always fix their eyes on the map while walking – they would miss the sights in between Solution: Develop a GPS-based navigation system with spoken instructions – once people locked their desired location on their self map, they can follow the instructions with their headset on
Pattern 5 *Site-Specific Instant Information* Context: Design of location-based information source Forces: When people encounter an interesting artefact, they would like to know and understand more about it. Problem: If there is no information and interpretation available, people will be disappointed Solution: Create a quick-response code on urban artefact that users can capture it with their phone and retrieve information	**Pattern 8** *Location-Based User Review Sites* Context: Design of collaborative user-created content Forces: People want to know other people's opinion and evaluation about a site Problem: If it is too difficult to retrieve information from different people in one task, the force is not resolved, and people will be dissatisfied. Solution: Develop a review site connected with user's self map – create an icon on the map where user can automatically retrieve reviews from others about the site

Table 1. Identified Patterns - *Continued*

Pattern 9 *Preserving the Moments*	Pattern 11 *Sound-Based User Review Sites*
Context: Design an interface to capture slices of experiences	Context: Design of collaborative user-created content
Forces: People need to capture and store moments representing their memorable experiences	Forces: People want to easily retrieve other people's opinion and evaluation about a site/event
Problem: A poor quality images and sounds cannot fully represent people's image of the experiences	Problem: It is too difficult and time consuming to read text reviews on a small screen while people are moving around
Solution: Integrate a high quality camera and voice recorder in the mobile phone	Solution: Develop a review site based on sound file – users can listen to the reviews with their headset on while seeing the en-route sights
Pattern 10 *Sharing the Experiences*	Pattern 12 *Instant Uploader*
Context: Design of collaborative interface	Context: Design of collaborative user-created content
Forces: People want to show off and share information to others	Forces: People want to immediately show others what they have created
Problem: People would not have a chance to express themselves fully in their mobile-mediated social networks when they are on tour	Problem: The gap between the actual moments on tour and their representations on the web will cause the excitement to cease
Solution: Develop an interface where people can easily interact with others, share their experiences, and get feedback from others	Solution: Develop an interface where people can capture and create files and immediately upload the files from their mobile phone to the web

In addition to the 12 initial patterns described in Table 1, two patterns were identified based on the cognitive process related to the interaction patterns. They are: *Story building;* when people communicate with others to share their experiences or retrieve information, they engage themselves in the process of story creation, and *Narration*; the story building process results in narrating the stories through texts, sounds, images, and combination of those.

4.3 Using Patterns to Design Tourist-Mobile 2.0 Interactions

To conceptualize the design of Mobile 2.0 applications, a scenario of tourist-Mobile 2.0 was created as a narrative pattern language. Based on the hierarchy and relationships of the patterns, a typical story of a tourist associated with the use of mobile phones was created (see Fig. 2). The story was then broken down into scenes where patterns were then placed. The story begins when a tourist has an encounter with an interesting site. The tourist needs to make a decision whether or not she will

enter the site (i.e., trade off between time-cost and enjoyment). To negotiate the decision, the tourist needs reference from others to retrieve information and justify her decision. This resulted in an interaction with a Mobile 2.0 interface that would provide her with location-based, site-specific user reviews and stories. Once she decided to enter the site, the tourist feels the need to preserve the experience and share it with others. This leads her to the process of story building and narration and results in another interaction with the Mobile 2.0 interface. The "instant uploader" should enable the uploaded files to be compatible to the contents sites, make the files immediately available for references of others. In this case, additional applications such as geo-tagger are necessary for the uploading process.

Fig. 2 also illustrates that the storyline applies to other people in different landscapes. Tourists within the same social networks, even though they are physically separated (i.e., experiencing different landscape), still can enjoy immediate interactions within the mediascape to perform a co-creation of shared narratives and joint mobility.

This scenario is one of the many possible scenarios that the analysis suggests. Due to the space limit, this paper only presents this particular one in order to demonstrate the efficacy of the pattern analysis in exploring new design options for Mobile 2.0 applications.
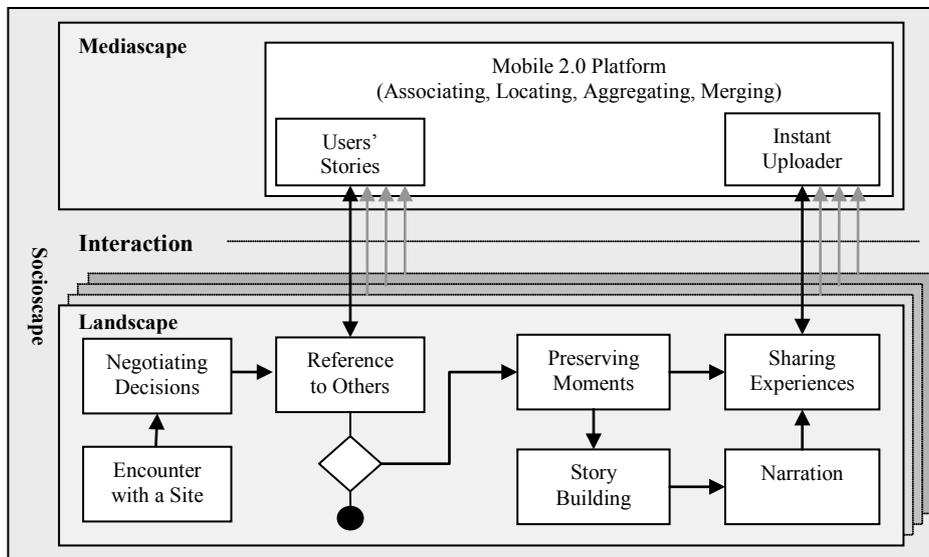

Fig. 2. A Typical Tourist-Mobile 2.0 Interaction Scenario

5 Concluding Remarks

This study used the patterns from narratives of tourists' experiences to develop a meaningful scheme for designing Mobile 2.0 applications in tourism settings. Since tourists' stories consist of interrelated sequences of experience, recognition of story sequences means recognition of interrelated patterns of tourists' interaction with others occurring in the landscape, socioscape, and mediascape of touristic sites. The study conceptually contributes to the idea of mediation and brokerage of tourism experiences by deciding new forms of tourists' interaction in the new media and mobile technology. Pattern language analysis of a typical tourist story can be used to design a platform of Mobile 2.0 applications in travel industry. The pattern language described herein explains the initial concept of tourist-Mobile 2.0 interactivity. A further research is necessary to study the detailed components of user-interface interaction in order to develop a prototype for different types of mobile applications.

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