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Mobile Social Media for the Blind:
Preliminary Observations

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ABSTRACT

Mobile social media penetrates into common people's lives and extensive researches are concerned about their use behaviors. However, the blind and visually impaired users as special user groups are often ignored. Only few researches have been conducted to understand their interactions with current mainstream mobile social media. By the assistance of Hong Kong Blind Union, six blind and visually impaired smartphone users participated in this research. Qualitative research methods are adopted including interviews and observational studies. Based on different vision conditions, three kinds of use behaviors in interacting with the touch screen were distinguished. In addition, usability problems and psychological characteristics of blind people interacting with mobile social media studied. It is concluded that blind people are inclined to passively receive information rather than actively post information in mobile social media; photos and images are often problems for them; a strong sense of security is reflected in making online friends; color is often used in social media to represent a certain kind of social meaning.

1. INTRODUCTION

With a fast development of the smartphone technology, mobile devices are of great enhancement in people's lives, including a special user group: blind and visually impaired people. Mobile devices can be used to implement assistive software for people with special needs [1]. Kane et al. [2] introduced a set of audio-based multi-touch interaction techniques that enable blind users to access touch screen applications. Kane et al. [3] also proposed guidelines for more accessible mobile device design for the special user group. Watanabe et al. [4] surveyed blind mobile phone users about accessibility problems with current mobile phones. Leonard et al. [5] asked sighted and visually impaired participants to perform tasks with a mobile device, and analyzed differences in performance between the two groups. An increasing number of blind and visually impaired people are also gradually involved in mobile social media along with popularization of mobile devices. A recent statistics shows that more than 100,000 blind and visually

impaired individuals own an Apple iPhone since the introduction of a screen reader (VoiceOver) in 2007 [6]. However mobile social media still pose barriers to blind people, as they must constantly re-learn how to navigate these systems [7]. Some studies have been performed on mobile social media for blind people，such as usability testing. Wentz & Lazar reported empirical data of usability evaluation of Facebook with blind participants [8]. However, there are still few studies investigating characteristics of people who are blind when they interact with mobile social media. In order to explore the underlying reasons, which related to blind people's psychological characteristics of using mobile social media, rather than merely the usability issues, we adopted a qualitative research methodology that included in-depth interviews and observational studies to explore blind people's behaviors in using smart phones and interacting with mobile social media.

2. METHOD

2.1 Participants

In order to guarantee the representativeness of user samples, several rounds' discussions were conducted with Hong Kong Blind Union to select the participants. Six blind and visually impaired smartphone users, who have different vision conditions (four blind and two visually impaired), were chosen for the interviews. Nicknames are used for the consideration of privacy. Among them, three are males and three females; five are high school students and one university freshman with the age from 19 to 27. The detailed vision conditions are listed in Table 1.

2.2 Procedure and Qualitative Data Collection

Both questionnaire and observation are adopted in the interviews. An interview is conducted separately for each participant, which lasted around one and a half hours. The interview requires participants to take their own smartphones, with no restriction on a certain model, to the interview. Surprisingly, all the participants had an iPhone. They explained that iPhone had the best auditory accessibility among all the smartphone models. The questionnaire used in the interviews included three parts: 1) Basic personal information (name, gender, education

and detailed vision condition); 2) Questions about their use of current mainstream social media, including usability issues and their attitudes towards making online friends; 3) Wish lists and prospects of the dreaming mobile social media. The interviewer spoke out the questions and explained them to the participants, at the same time recorded their answers by a tape recorder. The sample questions are listed in Table 2.

Name	Vision condition
HONG	Become blind at age of nine and still have color impression
MENG	Total vision loss and no color sense from birth
WEN	Vision loss from birth and have weak light sense after a surgery
ZHONG	Total vision loss and no color sense from birth
LIN	Serious visually impaired from birth and have color sense
MA	Visually impaired and color blind from birth

Table 1.Vision conditions of six blind participants

Part 1: Basic personal information
Name__ Age__ Gender __Education _____   -Describe your vision condition   (For instance: blindness or visually impaired. Please provide the medical diagnosis description from the doctor as much as possible.)   -Which reason caused your blindness?   (For instance: vision loss from birth, vision loss after birth. If vision loss after birth, provide information about the causes.)
Part 2: Questions of mobile social media
-What do you think of making online friends in social media?   -Which topic do you prefer to chat online?   -Which mobile social media do you have your own account for?   -If you want to share a photo with your friends, what will you do? Do you choose to share from social networking sites?   -Which problems do you have when you share photos online?
Part 3: Usability issues and Wish Lists
-Primary usability issues in current mobile social media;   -Expectations of possible improvements.

Table 2. Sample questions in questionnaire

In observational study, based on the answer to the question "Which social media do you have your own account for", six participants were encouraged to free use their familiar mobile social media such as Facebook, MSN and Skype to show the use and interaction. These actions were recorded by a video camera.

3. FINDINGS

Based on the interviews and observational studies mentioned above, the main focuses of findings are the interactions with touch screen and interactions with mobile social media.

3.1 Interactions with Touch Screen

Based on the different vision conditions, the participants were divided into three groups: blindness, severe visual impairment and moderate visual impairment. HONG, MENG, WEN and ZHONG belongs to the blind group, their interaction with iPhone must rely on VoiceOver (a screen reader). LIN belongs to the severe visual impairment group and she needs partial assistance of VoiceOver. MA belongs to the moderate visual impairment group and she can distinguish the outline of objects. She can also use a physical magnifier. The features of their use behaviors are categorized in detail as following.

(a)   (b)   (c)
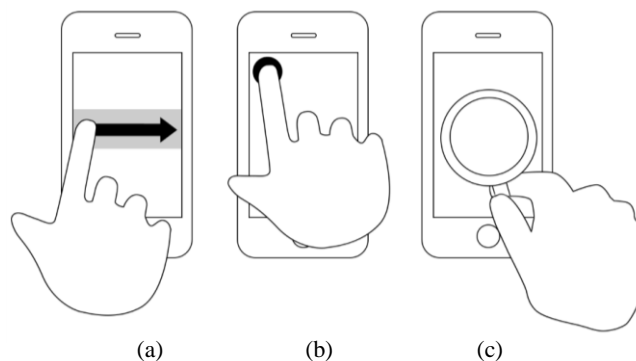
Figure 1. Interaction with the touch screen: (a) Blind group; (b) Severe visual impairment group; (c) Moderate visual impairment group.

3.1.1 Category 1: Blind group

They used their index fingers to swipe from left to right quickly in a horizontal line at the center of the touch screen (Figure 1(a)) for going through the choices and then double-tapped to confirm the selection based on the auditory feedback of VoiceOver. The auditory feedback was usually too fast and too weak for the interviewer to catch, but could be discerned by all the participants.

3.1.2 Category 2: Severe Visual impairment group

LIN could recognize the general location of manipulative items. For instance, she tapped one certain tab of the interface consciously (Figure 1(b)). However, she could not tap each tab accurately, so VoiceOver was still required for her assistance.

3.1.3 Category 3: Moderate Visual Impairment group

MA did not need VoiceOver. She knew iPhone had a function of scaling size of the entire touch screen, but she preferred to use a physical magnifier to zoom elements on the touch screen (Figure 1 (c)).

3.2 Interaction with Social Media

3.2.1 Inclined to be a Passive Information Receiver

The social services that blind participants had their own accounts are listed in Figure 2. One of them had six accounts (Facebook, MSN, Skype, WhatsApp, TalkBox, Yahoo! Messenger and Tango) and all participants had Facebook and MSN accounts.
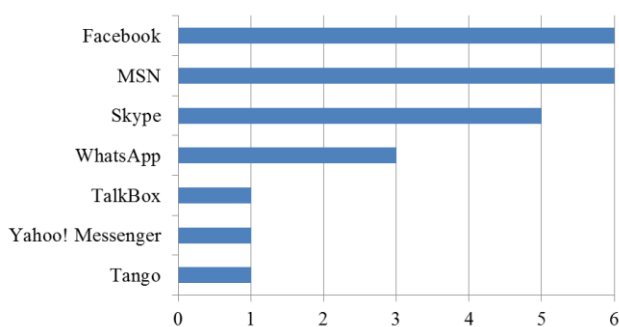

Figure 2. Participants' social media accounts

During the interview, they demonstrated some actions on Facebook (Table 3) to the interviewer: 1) "Check in" and "Status", 2) Read posts from others and post by themselves. Rather than actively posting on Facebook, they all read posts from others and received useful information passively. Besides, they also replied to posts from others inactively. HONG said he merely used "Like" to briefly response to posts sometimes. WEN emphasized that she seldom replied posts from others, because she thought she had many friends if she just replied one friend's post, it seemed to be unequal to other friends' posts. LIN checked "Messages" of Facebook regularly and wanted to know how many friends were online, but she never sent a massage.

3.2.2 Expectations of Acoustic Photo (Table 4)

MENG complained that Facebook was not suitable for blind people because the screen reader could only feedback the meaningless symbols such as 'blank, blank, blank' when browsing photos. He expected technology could realize both real-time acoustic information of scenarios (record the synchronous sound when taking a photo) and acoustic description of photo contents (such as information of object, location and color). WEN also said: in acoustic description, the key principle was to keep description objective as much as possible rather than to use too many subjective adjectives, with which the core message might be distorted by personal emotions to some degree. HONG uploaded a photo to Facebook very quickly, but he did not know the photo content. He said

VoiceOver just spoke out the sequence number of the photo, and he was not able to understand its content. In the interview, he was afraid of making a mistake and cancelled photo upload at the end.

Name	Actions	Summary
HONG	Upload a photo to Facebook	HONG could upload a photo to Facebook smoothly, but he did not know the photo content. He said VoiceOver merely spoke out the sequence number of the photo without any description of its real content.
WEN	Check in and post	WEN used "Check in". She liked it without any special reasons maybe partially for killing time. She posted to Facebook occasionally.
MING	Status and check in	MING usually used "Status" and "Check in" in Facebook. He aimed to inform his friends his location. He also wanted his friend to know special places where he had been to.
LIN	Check in, read posts	Read posts from familiar groups; used "Friends Nearby". She only concerned about locations of her intimate friends.
MA	Read and post	MA usually used Facebook to read others' posts and sometimes she also posted something.

Table 3. Actions by blind participants in Facebook

3.2.3 Concentration on Security

In the interview, the interviewer asked the participant about their attitudes of making online friends in social media. Four of them (blind) admitted they never added strangers as their online friends; they could only accept those who they knew in real life as their online friends. For instance: MENG stressed that, as a blind person, he was easier to be cheated or involved in a dangerous situation than a non-bind person, so he had to be more careful in making new friends. The interviewer further asked where his worries of security came from (i.e. parents, teachers' education or himself), his answer was: it came from himself and it might be a kind of instinct of the blind only. The other three blind had also the similar

concerns. The typical responses of making online friends are listed as following:

"I choose to chat with the friend I have already known in real life. I do not have any absolute online friends. I have no emotion with them. Occasionally some strangers initiatively added me in MSN but I never talked to them and deleted them later." [HONG]

"All the online friends are from my real life. I want to protect myself. I have already lost my eyesight and it is very dangerous for me to make unknown online friends. I like to make friends when I join some social activities such as being in a church. I think friends meet in the church are safe." [MENG]

"I like face-to-face talk, because I think it is more real. Type in computer makes me feel the distance with friends." [WEN]

"I like to chat online and almost all my online friends are familiar to me in my real life. I feel free to talk about anything, sometimes just say "hi" and "how are you doing." [MING]

3.2.4 Recognition of Color

When the interviewer talked about photo sharing in social media, MING emphasized particularly the importance of color information. He said: "I need color information in the photo. For example: I use iPhone to take a photo of a T-shirt and I want to know its color. Although I cannot see, I still need to know the color of T-shirt. I don't want to wear pink, because it is too feminine." MING suffered vision loss from birth and he had also no color sense, but he still stressed in the importance of color, which had a significant meaning in distinguishing the gender.

(a)

(b)

Figure 3. iPhone shells of participants: (a) From females; (b) From males.

The other interesting phenomenon also proved color had an important social meaning for blind people. The iPhone shells of the female participants were made of high-gloss material with the color of bright yellow, pink and red,

showing a strong femininity, while the iPhone shells of the male participants were made of matte material with the color of black, blue and orange, which seems masculine and neutral (Figure 3). In fact, they were blind people and most of them had no sense of color, but their choices of shell color were still influenced by the social implications.

Name	Expectations
HONG	- Location information of the photo; - The number of people in the photo, their positions, surrounding buildings and related color information
MENG	Spatial context of the photo such as a room or a public hall
WEN	The description of the photo needs to be objective rather than subjective. People may have different emotional reflections towards the same object, which may affect the accuracy of description. Do not use too many adjectives in description.
MING	-Include color information in the description of objects in the photo; - Speak out the text information embedded in the photo such as the text part of an advertisement; - Location of the photo taken
LIN	Listening to the photo is useful. The blind cannot see but they can still listen. Comparing to the non-blind people, the blind may have better aural ability.
MA	Information in the photo should be spoken out as much as possible, for example: how many people in a photo; color of their clothing; the background of the photo (a hill or a lake); contexts of the photo (restaurant or other places). If it was a restaurant, she also wanted to know the information about the food in the photo.

Table 4. Expectations of digital image contents

4. CONCLUSION AND FUTURE WORK

This paper conducted interviews and observations with the blind smartphone users. Three kinds of use behaviors of the blind or visually impaired people interacting with the touch screens are investigated in depth based on different vision conditions: blindness, severe visual impairment and moderate visual impairment, which can be helpful for improving the existing touch screen based design to better fit for blind people. In addition, it is also concluded that blind people tend to passively receive information; they have strong sense of security; they also

need color information for its social implications; they become sensitive when being questioned about their capabilities in using smartphone and social media.

Some usability issues in current mobile social media are also addressed: photo content is hardly accessible for blind people. Blind people expect the real time acoustic information to help them understand different context as well as the description of photo content. Therefore, a preliminary design concept 'Voice Photo' is proposed, which is expected to have the following features: 1) Record synchronous voice when taking a photo; 2) Recognize and speak out the text information embedded in the photo; 3) Automatically detect objects' colors and speak them out etc. The prototype of 'Voice Photo' has been implemented based on HTML 5 and jQuery Mobile. The future work will conduct the usability test of the prototype.

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