

Usability Study of Icon Designs with Social Network Functions

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Abstract. The social media and related applications were developed and spread fast in our daily lives. Many users of social network sites (SNS) would use social network functions to communicate with their friends, such as share, like (or dislike), check in, upload interesting information to website, etc. Research on visible icons design in SNS user interfaces were one of the most important direct manipulation research issues. Moreover, how the privacy setting in different interaction model were discussed in this study. The results showed that: (1) The well-designed icons illustrated higher concreteness, less complexity, higher familiarity and suitable semantic distance than others; (2) There existed higher privacy setting in personal photo content than landscape photo content; (3) The design element used with most highest percentage was the “man image” because the functions were related to friends’ photos and popular users’ photos in the photo sharing Apps; (4) Different privacy setting considerations were dependent on different interaction models and scenarios.

Keywords: Usability Study, Icon Design, Social Network Function, Privacy Setting, Kiosk User Interface.

1 Introduction

The new and real time social interaction lifestyle has arrived by means of popular social platforms and mobile technology built in portable devices. More than 10 million people in Taiwan have Facebook account, and almost one billion people are using Facebook around the world. The influence to users’ lifestyle has becoming an important research issues by integrated different disciplines. There is different research methods used in social media and applications. Not only the sociological and psychological research for usage motivation and Internet addiction, but also the interface design consideration and usability evaluation are discussed in recent years. The social media and related applications were developed and spread very fast. Many social network sites (SNS) users would use social network functions to communicate with their friends, such as share (e.g. photos, videos, links), like (or dislike), check in

(e.g., restaurant, popular place, and school), upload interesting information to website, etc. The privacy setting is another important factor of social media usage - to interact with the SNS in public place or personal use. The visible icons design in SNS interfaces were the direct manipulation issues and quick feedback in usage. "Direct manipulation means that people feel they are controlling something tangible, not abstract" (Apple, 2010). According to the good interface design principles, the interface visibility and affordance consideration could be transferred and applied to icons appearance design and internal semantic distance. This research study is constructed based on four aspects including photo sharing Apps icons, grounded theory for users' icon-function cognitive abilities, icons usability evaluation, and SNS privacy settings. The research purposes are: (1) to exam the icon relationships of photo sharing Apps with semantic distances, concreteness, complexity, and familiarity; (2) to discover SNS privacy setting behavior; (3) to construct the social share interface with grounded theory analysis; (4) to compare the different usability consideration of different SNS platforms and interactions.

2 Social Network Service in Mobile User Interface

Social network service (SNS) stands a critical role in our new mobile life, and the content generated across different function features and platforms were spread fast if the content is valuable or interesting. Design research could be contributed to different function applications based on good interaction design concepts, such as popular interface design principles, cognitive design suggestions, cross social service design research, and scientific user corporation platform investigations (Preece & Shneiderman, 2009). This research study was conducted to help investigate the icon designs of basic social functions with usability research on mobile application, and previous research work of commercial Kiosk interface design (Chen, Hsiao, Chen, Huang, & Wang, 2012) for icon designs of integrated social functions.

3 Icon Design on Mobile and Public User Interface

A good icon design represented the common popular sense for clarity and well identification interface communication (Kolers, 1969; Marcus, 1984). The icon attribution categories were defined to representational, abstract, and semi-abstract aspects (Blattner, Sumikawa & Greenberg, 1989); and icons' features could be analyzed with four dimensions of "concreteness", "visual complexity", "familiarity" and "semantic distance" (Isherwood, McDougall & Curry, 2007; McDougall, Curry & de Bruijn, 1996, 1999, 2000). There was user cognition tasks built based on original and revised icons, and recorded the confirmatory responses and accuracy data during the experiment period (Schröder & Ziefle, 2008).

3.1 The Experiment Process of Mobile Application Icon Design

The icon design in this study was addressed based on four dimensions (Isherwood et al. 2007) and 42 participants were asked to draw their ideal icons of five functions determined by experts within a focus group.

There were four popular photo sharing application ranked by Appstore users and selected to be the samples of features established and icons analysis. The first step was to create the function flows of photo sharing applications and information structures. The next step was to analyze the icon's attributes based on four dimensions (McDougall et al., 2007). A focus group of three user interface design experts was set to discuss these samples.

The experiment was a between-subjects experiment design and the participants were randomly assigned to identify one of the four applications. There were twenty participants including eight males and twelve females in the experiment. After the icon recognition experiment, another twenty-two participants were asked to draw the five ideal function icons as they thought (see Figure 1). The first stage of this research study were to collect forty-two users' icon drawings pertaining to the five functions determined by experts from the popular photo sharing applications.

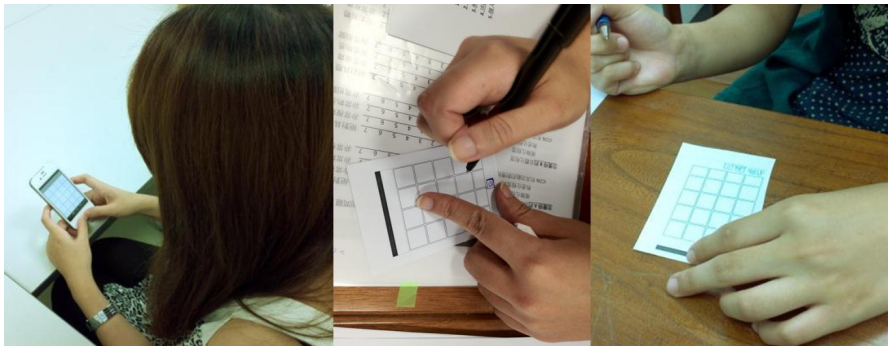


Fig. 1. The experiment process

3.2 The Analysis of Mobile Application Icon Design

The four dimensions mentioned before include “concreteness”, “visual complexity”, “familiarity” and “semantic distance”. There were analyzed by the descriptive statistic and correlation analysis. The appropriate icon design (in this case, the camera icon with the score of 6.8 in a 7 point Likert scale) should be viewed as having the score of higher concreteness, less complexity, higher familiarity, and suitable semantic distance than others. The five primary functions (see Figure 2) were “all photos”, “friends sharing photos”, “take picture”, “friends’ activities” and “personal profiles.” The lowest semantic distance icon was “friends’ activities” (i.e., it had the score of 2.4), which presented the message and man-like image to represent the meaning of what activities friends did or what messages friends left on photos.



Fig. 2. The redesign five main function icons

The four dimensions measurement was discussed with correlation analysis (see Table 1). There were 20 icons from four analyzed applications and 4 set of perspective views (also see Figure 2) used for the testing of dimension correlation. The results were illustrated as the followings: (1) The “semantic distance” had significant positive correlation with “concreteness” and “familiarity”; (2) The “semantic distance” had significant negative correlation with “visual complexity”; (3) The “concreteness had significant positive correlation with “familiarity”; and (4) The “visual complexity” had significant negative correlation with “familiarity.” The results were almost the same as the research conducted by Isherwood et al. (2007). The only difference is that the “semantic distance” had significant negative correlation with “visual complexity.” The difference can be explained that there were only twenty participants to help evaluate the icons. If more participants were invited in the experiment, the results can be different.

Table 1. The correlation analysis matrix of four variables

		Concreteness	Visual complexity	Familiarity	Semantic distance
Concreteness	Pearson	--	--	--	--
	Sig.(two-tailed)				
	Sum				
Visual complexity	Pearson	-0.263	--	--	--
	Sig.(two-tailed)	0.214			
	Sum	24			
Familiarity	Pearson	0.686	-0.593	--	--
	Sig.(two-tailed)	0.000**	0.002**		
	Sum	24	24		
Semantic distance	Pearson	0.715	-0.523	0.647	--
	Sig.(two-tailed)	0.000**	0.009**	0.001**	
	Sum	24	24	24	

** Significant at the 0.01 level.

3.3 Mobile Icon Drawing Analysis by Grounded Theory

Figure 3 showed that results of participants’ drawings. The grounded coding of icon designs was on the man-like image and the concrete image of noun-based function description. About the “activities” function, there were several different representation designs, such as man and messages, messages, to do list, flags, and comment gesture, etc. The drawing illustration had been affected by the function description. The drawing task should be revised in the future study. It is suggested that before the drawing tasks, there should be simulation interfaces designed for participants to help them get familiar with the task.



Fig. 3. Participants drawing results examples

3.4 Public Icon Design of Social Recommendation and Like Mechanism

The quality of social network content which users shared or enterprises announced information was associated with the users' motivation to access the further action initiative or not. Understanding the popular content distribution patterns which could be spread across different sites and platforms will be the commercial and advertisement opportunities (Benevenuto, Rodrigues, Cha, & Almeida, 2009).

According to the previous study, the social sharing function has positive effects towards users' purchasing behaviors. The function of "Like (+1)" and "friends' recommendation" may attract more users' attention of the products than official social website sharing (Chen et al., 2012). The icon designs for public SNS user interface (see Figure 4) had different consideration from mobile user interface. The "privacy consideration" from signing into the system to upload personal photos stood the critical role in the task process. On the other hand, the task consistency with the physical public Kiosk and the displayed user interface could seriously affect user experience. The immediately feedback of commercial activities built on the interaction scenario would be the most powerful opportunity to catch consumer's attention. The opportunity will be the strength of public interactive SNS related Kiosk if the user interface design and task design are good enough.



Fig. 4. Social recommendation and like mechanism (Source: Chen et al., 2012)

4 The Comparison of Privacy Setting on Two SNS User Interfaces

There were two experiments conducted on photo sharing Apps of mobile phone and photo share function of public commercial Kiosk (Chen et al., 2012). A total of forty-one participants who have SNS usage experience were asked to answer the questionnaire of privacy setting. On the other hand, twelve participants who joined the experiment and conducted tasks with the simulated SNS Kiosk user interface had been interviewed regarding the privacy settings. Figure 5 showed that forty-one participants' privacy setting trends from the photo content of "landscape without people" to "personal pictures." The x-axis represented the privacy setting of "public of everyone (1.00)", "extend from friends circle (2.00)", "only friends circle (3.00)", "special friends (4.00)" and "absolutely private (5.00)" (Facebook website & Google+ website, 2013). According to the results from one-way ANOVA of photo contents and post hoc test (see Table 2), the privacy setting trend of mobile photo sharing behavior followed the photos content from public sharing (i.e., landscape picture) to private (i.e., personal picture) ($F=17.849, P<0.01$).

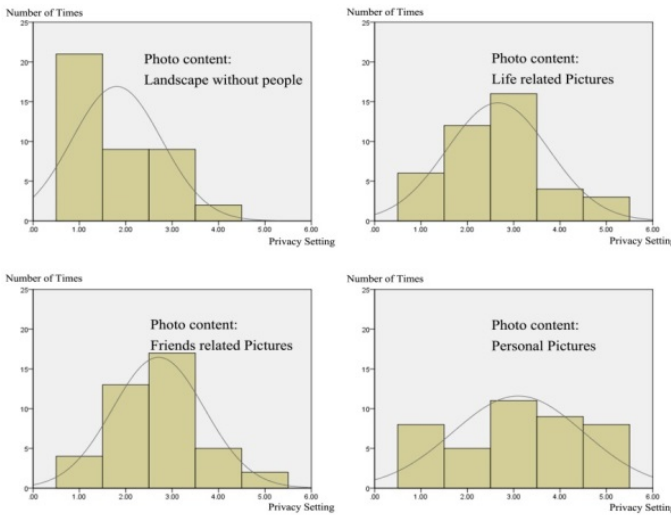


Fig. 5. Privacy setting in different photos content

Table 2. The results of one-way ANOVA regarding photo contents difference

Variable	Level	Mean	S.E.	SS	df	MS	F	P	Post hoc
Photo contents	1.Landscape	1.733	0.151						
	2.Life	2.632	0.178	36.388	3	11.896	17.859	0.000**	4>3=2>1
	3.Friend	2.685	0.160						
	4.Personal	3.049	0.227						

** Significant at the 0.01 level.

Regarding the privacy consideration of public Kiosk, the first priority issue was users pay more attention to the security protection mechanism when they login to the system. There were no different content levels like photo sharing mobile interface, but the basic users' needs of commercial Kiosk service was obvious on personal information security. No matter uploading photos to official Facebook website or logging into personal registration accounts, the public Kiosk user interface should have serious privacy setting and protection mechanism.

5 Conclusion

This study is an integrated research pertinent to public commercial Kiosk user interface and mobile application user interface. The icons design research was conducted to investigation the different dimensions and use situations. Finally, the research had compared two SNS user interfaces with the consideration of privacy setting. It was the authors' intentions to connect user cognition and sociological behaviors in this study.

The results generated in this study showed that: (1) The well-designed icons illustrated higher concreteness, less complexity, higher familiarity and suitable semantic distance than others; (2) There existed higher privacy setting in personal photo content than landscape photo content; (3) The design element used with most highest percentage was the "man image" because the functions were related to friends' photos and popular users' photos in the photo sharing Apps; (4) Different privacy setting considerations were dependent on different interaction models and scenarios. In the further research, the quantified statistical research of user behaviors and usage motivation about SNS user interface and platforms experience can be further explored.

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