Frameworks for Exploring the User Experience of Mobile Apps

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Abstract. Mobile applications have become more popular due to mobile technology innovation and the sustaining rising smartphone and tablet users. As design products comply with user experience they are able to meet customer satisfaction and improve customer loyalty. Therefore, the user interface design of mobile applications has become more important to academics and industry. The goal of this study was to improve customer satisfaction through redesign user interface of the mobile app. This study was based on Hassenzahl's Model of user experience, through three design process, improve Nike+ Running user interface. Our approaches included focus group interviews for runners to understand the needs of runners of pedometer APP, a questionnaire to measure user experience satisfaction, and product design to redesign Nike+ Running APP UI, The result showed that satisfying experience was highly salient in this study.

Introduction

According to Pine, Gilmore experience economy as the next economy following the agrarian economy, the industrial economy [1]. Mobile applications (apps) have become more popular because mobile technology innovation and the sustaining rising smartphone and tablet users. Worldwide mobile app store downloads of 2013 were 102 billion (Mobile Application Design & Development Trend 2013). Google Play reported (2015, 01, 18) that 13 among top 50 Health and Fitness apps were dynamic records apps [2]. Brand apps have continued to increase, yet most of them were designed for short-term promotion. Mobile apps should satisfy Users living and psychological needs. The goal of this study is to improve customer satisfaction through redesign user interface (UI) of the mobile app.

Literature Review

Previously, the purpose of brand apps exclusive mobile apps was only for short-term promotion; therefore, the user experience wasn’t usually impressed users. Nowadays, brand app represents the brand image and its design, hence mobile app is seemed as an independent product and serves to specific customers, deliver service to users. User experience includes user, product environment, and social factors so do brand experience. Therefore, a product with better user experience lifts brand experience up as well. The first image of a product is its visual; hence, interface design is the priority for demonstrating brand features. In addition, conduct focus group interview conduces to understand users’ real thoughts. Nike is used to corporate with Apple, as the result, its iOS app is the priority to be updated. However the market share of Android remains 83%, therefore, the study of redesign Nike+ Running user interface (UI) on Android platform to improve user experience has become more popular with designers and academic.

Mobile Apps

Mobile application (app) is designed to run on smartphones, tablets or other mobile devices. Apps appeared at 2008 which are operated by platform owners such as Apple App Store, Android Market, Google Play, and Windows Phone Store. Some of the apps are free while some of them need to buy. Gartner reported that Worldwide mobile app store downloads of 2013 was 102,062 million, and
forecasted 268,692 million downloads in 2017. Follow the S curve, apps diffuse accumulating enormous downloads, Gartner predicted mobile app stores revenue by 2017 is 74 billion.

**User Experience**

User Experience (UX) has become a well-known concept, common to see UX in product design, service design or brand marketing. According to ISO (International Standards Organization No. ISO-9241-210) [3] reported user experience is “a person’s perceptions and responses that result from the use or anticipate using a product, system or service.” It is also a consequence of the user’s prior experiences, attitudes, skills, and personality. Alben (1996) reported that user experience encompassed all aspects of how people use an interactive product; for example, the tactile impression of the product, the user understanding of the product. During use, whether the user needs the service provided by the product or not, and the compliance degree of the product and the environment [4, 5]. Neilsen Norman Group (1998) defined "User experience" encompasses all aspects of the end user's interaction with the company, its services, and its products. Products have to accurately comply with users’ needs and feel joyful while using it, even just own the product itself can bring the happiness to users. People are the center of everything, hence, it is user-centered design [6].

Garrett (2000) claimed technological progress as well as the popularity of Web pages, user experience research originally focused on the interaction between human and machine, turning to user experience research of web pages, yet web page design is different from machine design in the past. It looks less hard, increase product visual experience and product purpose; hence, people are in the process of using the product, coupled with the goal-oriented software interface, and with information content oriented system, become the new user experience goals [7].

**User Experience Design**

Hassenzahl (2003) elaborated user experience with “Hassenzahl’s model” [8]. Hassenzahl summed up the user experience with the four elements: manipulation, identification, stimulation and evocation, these four elements again allocated to two items: pragmatic and hedonic, the former referred to the use and efficacy of the product, the latter referred to the interactive products, the degree of self-identity or recall the memory. Hassenzahl’s model elaborated UX with user's perspective and designer’s perspective specifically and found that designer considers product features such as content, presentation, functionality and interaction. At the same time, user feels product features begin with using it, after situation to be effective, the product is allowed users to feel attractive, fun and satisfaction. As each user had different prior experience, situation, social and cultural factors, hence the result can’t be designed completely so that users do not just use the product, but to live with the product, along with interactions increasingly, products affect more user emotions, thinking and perception. Therefore, McCarthy and Wrights suggested that UX needs to have a better understanding and analysis of technology user experience [9]. Through Hassenzahl’s model, the designers have to design product from the perspective of the product, rather than to design the user experience. Also, draw the user experience can’t be designed to conclusions. Although the user experience can’t be designed, still there are many scholars have suggested user experience design methods. Donald. A. Norman was the pioneer who set user experience design approach "User-centered Design" and introduced the concept to industrial by his book "Design Psychology".

Software UX design is different from hardware, emphasis visual design. UX design is not only being applied on the website but also for most products. In addition to appearance, function, the most direct psychological factors affect the user experience must be considered as well.

Peter Morville claimed that the factors of user experience included useful, desirable, accessible, usable, findable, credible and valuable, these factors constructed User Experience Honeycomb model. The core of UX Honeycomb was valuable, hexagonal cells brought valuable information to users [10].
User Interface Design Elements

Technology evolution with the popularization of computers has brought up web design. Besides hardware, but also extended to software products. The design focus of user experience changes from the usability to visual design. The frequent contact with the users and more close to users, user experience design began to explore the level of cognitive psychology. The product does not just easy to use but also considers the services offered. From users exposure to the website, the process of using from the beginning to the end, the overall feeling becomes the focus of user experience design, so how do people contact and use the product, and the continuous reaction with the outside environment has become a new target. Garrett claimed the elements of user experience, there were five layers of UX design: strategy, scope, structure, skeleton, and surface. From concrete to abstract, each level will be the basis for the development of the underlying to construct, but there was constraints and influence affecting each other, Garrett adapted "people-centered" design throughout all levels, and it became a standard process, to unify user experience design.

Research Model

Based on beforehand theoretical review we framed User Experience Value Model (figure 1) as our research model. Figure 1 displays user experience consists of manipulation, identification, stimulation and evocation. These elements are influenced by product, users, environment and social culture. However, user experience design mediates between user experience and value. A good user experience design is able to improve user experience, creates more value for users, and elevates customer satisfaction.

![User Experience Value Model](image)

Figure 1. User Experience Value Model.

Nike+ Running App

Nike released the Nike+ Running App On September 7, 2010, at Apple App Store which used a tracking engine powered by MotionX that does not require the separate shoe sensor or pedometer. This application works using the accelerometer and GPS of the iPhone and the accelerometer of the iPod Touch. It is free in the App Store. Nike+ Running is compatible with the iPhone 6 and iPhone 6 Plus [11]. Hereafter released Nike+ Running App in Google Play in 2011. The Nike+ Running App consists with following features:

- Guidance and training: training programs, coaching expertise, and daily workouts to get runner race ready.
- Track your progress: stay on track, no matter where runners are. On the trail, treadmill, or streets, MotionX® combines your iPhone’s GPS and accelerometer for the most accurate tracking of your distance, pace and time. Track how high you climb with elevation tracking optimized for the iPhone 6. Measure the progress every mile with in-run audio feedback.
• Stay motivated: Share runners’ runs and let friends keep going with cheers along the way. Show off users’ Nike+ level color and amp things up with a PowerSong at the press of a button.
• Compare and compete: Nothing’s as motivating as a little friendly competition. Compete with your friends for the top leaderboard spot, or go toe-to-toe with them in a Nike+ Challenge. Just set a distance. Invite friends. And the race to the finish.
• Capture the moment: show off with a thousand words. Take photos before, during and after runners’ run. Customize them with your route, metrics, and of course, a swoosh.
• Apple health: Connected for Health, by accessing Apple Health data, Nike+ can give even more detailed information about your run, including heart rate monitor support in-run when using a Bluetooth 4.0 enabled device like Wahoo’s Tickr products.

**Questionnaire Development**

The objective of our study was to improve customer satisfaction through redesign user interface (UI) of the mobile app. This study was based on figure 1. User Experience Value Model which consisted Hassenzahl’s Model and user experience Honeycomb, and related studies. Through three design process, improved Nike+ Running user interface (UI). Our approach included a combination of focus group interview and a semi-structured survey. We conducted a group interview with 5 interviewees and recorded the tape. The content of the interview was: (1) Is Nike + Running usable to you? (2) Do you wear your Smartphone while use Nike+ Running App? (3) Is it convenient to you? Based on forehand findings from the interview phase, we generated a questionnaire with 39 items.

In this study, we redesigned Nike + Running App UI to increase UX. We conducted focus group interviews, collected information, through qualitative research interviews, gained the insight of user’s thoughts and needs, generated effective questionnaires.

Based on the 39 items questionnaire, the study conducted pre-test. The sampling criteria were: (1) Use Nike+ Running App more than 21 days (21 days effect), (2) Android and iOS portable device users; (3) Smartphone user’s age above 18. There were 19 valid questionnaires from 20 respondents, Cronbach’s Alpha was 0.929 > 0.8 (suggest greater than 0.8).

**Result**

Followed focus group interview and user experience findings, we redesigned Nike+ Running App UI as showed on Figure 2 and Figure 3.

![Figure 2. Homepage UI Redesign Comparison.](image-url)
Modifying homepage: according to focus group interviews, Homepage caused most of the poor experience, so we modify the user interface in order to improve the user experience. (Figure 2)

- Road running start button: the original is small and placed on the top right. Move start button to the bottom of the screen and enlarge the icon. Slide to unlock to fit Android user experience and meet user’s needs.
- Move Nike+ Logo to center and enlarge logo to make it more significant.
- Enlarge and move total kilometer numbers, a total number of the road race, average speed, and average Nikefuel numbers to screen center in order to have clear visual effects.
- Home background, functions, and dynamic effects: after pushing original start button need to wait for dynamic effects demonstrating. New design deletes dynamic effects and background, to be in line with users’ needs to use app immediately.

Modify pedometer page: according to the results of focus group interviews, pedometer page is the longest contact page to runners. So modifying the user interface of this page can effectively enhance the overall user experience of App (Figure 3).

- Map which is users concern the most: original map located at the top left corner of the screen, need to pull from the top left corner to bottom right corner to display the map, it doesn’t comply with Android user experience. Therefore, move map to the middle of the left side, slide to open map function just like slide to unlock. It’s more intuitive to Android users.
- GPS accuracy button: original GPS button without interaction function which is at the top right corner of the screen. New GPS button is at the middle of the left side, just aside Map enables to enlarge the display screen. Consolidate Map function, when user touches the GPS button, it will be replaced by ”Map” in order to remind user there is a map function.
- Data rectangular space: the original icon is a square which automatically comply with the screen resolution. Enlarge space with a rectangular allows more room to display map. The other functions are no significant changes.
- Music button: original is located above the data rectangle. Move it to the top of the screen in order to enlarge the space for displaying map. The rest functions are no significant changes.

Conclusion

On the ground of the above, the scale designed to measure Nike+ Running App user experience satisfaction in this study was reliable. The reliability Cronbach’s Alpha 0.929 of this pre-test was satisfied and acceptable. According to the result of focus group interviews and scale development, redesigned Android Nike+ Running App UI (user interface) to improve its UX (user experience).

This empirical study constructed a fundamental architecture of user experience theories and redesign user interface (UI) of mobile app may contribute to theory and practice field. We suggest that the approach outlined in this study be replicated in more diverse academic environments. Our future study for user experience is to implement spot testing with redesign UI of Nike+ Running App and fulfill user experience satisfaction questionnaire after spot testing.
References


