Design Practices In Mobile User Interface Design

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Abstract

The purpose of this study was to determine optimal user interface design practices for differing age demographics and mobile operating systems. Specifically, users at three different age groups were administered a test to gauge their preference of mobile app icons. The style of the first set of icons, commonly known as flat design, was minimal and simple, with few colors, bevels or gradients. The second style of icons was a more realistic and detailed style known as skeuomorphic design. Users selected the preferred icons, and then took a brief survey to gauge their opinion. After the data was collected, it was analyzed to screen for trends among the users' ages and mobile operating system. The results have helped identify the importance of age consideration when developing mobile applications for particular audiences. It was found that at 27 to 45 years of age, users tend to strongly prefer a flat design approach to mobile application icons with a strong majority of 65% choosing flat design over skeuomorphic design. A significant 68% of users with Google Android phones preferred flat design as well.

Chapter 1

The Problem

Any device with a screen relies heavily on a user interface. Great user interfaces are informative, simple, and elegant. The graphic style of the UI can heavily affect the usability of the device. Currently, there are two trends in UI design that clash at a fundamental level. Flat design is the concept of clean, minimal graphics with few colors and effects in order to clearly indicate intents and calls to action. Skeuomorphism is the concept of styling user interfaces to resemble or hint at a familiar, often analog counterpart. For example, early versions of iOS have implemented skeuomorphic design in the notepad app, alarm clock app, etc. These applications are made to visually resemble real life objects, and that is thought to aid in guiding the user along. Dials, switches, and levers are common implementations that function similar to their analog counterpart, but are used on a flat screen. In addition to these benefits, both have their faults. Flat design risks being so simple that differentiating between buttons and graphics can be difficult. Such an approach may be appropriate for reading, but two-way interaction might require a more robust approach. Skeuomorphism is an archaic feature; as users continue to be more and more familiar with devices and screens, the link to past analog features may be less relevant to a good user interface. With user interface design of mobile devices in an early stage of development, optimal design practices are largely still being discovered. I wanted to research the usability of these two UI design styles to help determine these design practices.

The Importance

Researching the pros and cons of both design theories is important to anybody who is using or designing user interfaces, which is virtually anyone in this modern age. Having statistical data on best design practices regarding user interfaces can only benefit future UI design implementation. Furthermore, I wanted to specifically address best UI design practices among different age groups. Knowing what demographics respond better to different types of design could change the way developers design specific applications.

The Interest

I am a web developer, so this question is a very real and current issue to anyone in the industry including me. Acquiring relevant UI design data is not only beneficial to me, but any developers interested in optimizing their user experience. In addition, a study like this is very similar to UX design studies performed daily by leading web development companies such as Google, Mozilla, Microsoft, and Apple. Facebook's user interface is adjusted every six or so months not just to freshen things up. It has been tested thoroughly and found to efficiently deliver the content that reflects Facebook's intents. In conclusion, the topic is current and relevant. Doing such a study not only benefits web developers everywhere; it is a phenomenal experience for me to better understand the process of UI design.

Chapter 2

Introduction

All electronic devices require a medium for the user to control and interact with. Devices first started with analog controls such as knobs, dials, buttons, and switches to control the flow of hardware and operations. The advent of screens brought new way to visualize data from computers and changed the way analog controllers are used today (arrow keys to select options from a menu can be used as opposed to a physical button for each option). The development of touch sensitive screens, which began in 1965, has decreased the need for physical input even more. Notably, the iPhone, which was released in late June of 2007, set the standard for how touch screens were used in mobile computing. Prior to its release, most consumer based mobile touch screens used a resistive technology to sense pressures from finger gestures (Kostick, 2011). These mobile devices offered little consistency with control and responded to all type of pressure rather than solely finger touch. With the lack of affordable and usable touch screens, Blackberry's many physical keyboard models held a large stake in mobile market share. As a testament to how disruptive the iPhone was to the mobile market, one need only look at Blackberry's (BBRY) stock price, which hovered at its peak at $230 right as the iPhone was released. Immediately following the release, Blackberry's stock price plummeted to $80 per share as users eagerly made the transition to the iPhone. The company now has a dismal future, likely to be sold as a patent acquisition.

Mobile Today

The iPhone and Android phones immediately following have truly set the standard for mobile computing as seen by their domination in mobile computing market

share. In the third fiscal quarter of 2013, Android's market share has increased to 81%

while iOS market share has shrunk to 13% (Protalinski, 2013). Together these two

operating systems serve the vast majority of mobile users.

Today's mobile smart phones are very physically similar devices. They are

portrait style, four to five inch touch screens with a few physical buttons surrounding the

device. There is generally a physical button to power the device on and off, as well as

buttons on the side to raise and lower device volume or brightness. The difference

between these phones is the user interface that each mobile operating system uses to

interact with the user and help them perform tasks. Even within competing operating

systems, many common user interface elements can be found. For example, a stationary

dock to launch applications is featured in iOS as well as Android phones. Both operating

systems have adopted a "drag from top" notification and control panel to easily access

vital information and options. From a user interface standpoint, both operating systems

continue to unify their experiences into an efficient design. However, the visual aesthetics

of the operating systems do differ, and it is here that there is

controversy as to the best approach.

A great example is Apple's use of skeuomorphism in early

versions of the iPhone's iOS. The note taking application featured

a leathery border (See Figure 1), with a yellow, paper like

background to give it the feeling that the user was actually writing

in a notepad. The font used was a handwritten font. The iPhone's

camera featured a shutter effect. Gradients and textures offered

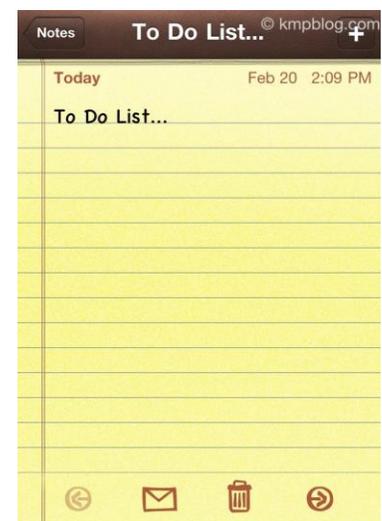depth to an otherwise flat screen. These features were not just for

Figure 1. The iOS 6 notepad app, a prime example of skeuomorphism in mobile apps.

show. They had a specific intent: to help users identify with the software in hopes to

increase fluency and speed of use. However, recently there has been a shift in ideology

regarding user interface design that favors a leaner and more minimalist approach. Flat

design, according to Cyrillo (2011), aims to simplify user interface elements to their most

basic form in order to reduce clutter and unnecessary elements. By simplifying elaborate,

glossy icons into minimal monochromatic symbols, users can just as easily decipher the

interface's intent. Depth and textures only complicate the screen and give false

representation. Clearly, the two ideologies appear to clash fundamentally. Both aim to

eradicate the ailments that the opposite design has produced. A clear winner is still not

visible as mobile platforms continue to experiment and introduce new designs.

To compare and contrast rivaling UI design strategies, one can simply look to the

rivaling mobile companies themselves. In an effort to maintain relevance in mobile

market share, Google, Apple, and Microsoft have continued to aggressively make small

and large changes to their operating systems. On one hand, Microsoft's Windows 8

phones are appearing to have taken the most radical form of flat design seen yet in mobile

computing. A bounty of flat, colorful panels is the cornerstone of Windows phones. However, their market share is pitiful, hovering below 4% with little signs of improvement (Protalinski, 2013). While this isn't entirely due to their flat

Figure 2. A comparison between Apple's iOS 6 and newly released iOS 7.

design approach, it may play a factor in attracting users to their brand. Android was the

first of the three mobile lines to reach out to a flatter design. In their fourth major release

of Android, named Ice Cream Sandwich (ICS), they introduced a new style guideline

named Holo, which featured a minimal flat design. Now, most recently, Apple's October

release of iOS 7 features a complete redesign with simpler icons and flat control panels

(See Figure 2). However, Apple's changes have been met with resistance. Large amounts

of online tech blogs voiced opinions on the sudden and drastic changes that took effect

with the launch of iOS 7. Many claimed the changes were too drastic and implemented

too quickly. Others criticized the simplicity of the app icons, stating they were too basic

and appeared unprofessional. Surprisingly, there are three large mobile operating systems

with three slightly different approaches that are met with wildly different opinions and

responses. This discrepancy in user preferences raises many questions about what makes

a user experience enjoyable.

Chapter 3

Methodology

With flat vs. skeuomorphic design at its infancy, there is much to be researched and studied. The goal of this study is to determine optimal user interface design practices for specific age demographics. As society's reliance of user interfaces continues to grow, gathering statistical data will help developers and designers create intuitive and friendly software. By gathering data on specific age groups, developers may consider different design practices based on their target consumer audience.

Data Collection

This study attempted to determine the optimal design strategy for different age demographics. Three demographics were tested. The first group was young users which consisted of people age 13 to 26 years old. Middle-aged users consisted of people age 27 to 45 years old. The eldest people consisted of people age 46 and older. The population studied was open to anyone in the United States that had experience using a smartphone or computer. The population criteria ensured that a large amount of data could be collected while requiring users to at least be familiar with mobile and computer user interfaces. This study tested users by having subjects select their preference from a set of visually different icons. The icons ranged from highly skeomorphic to very flat, with hybrid icons scattered throughout the survey. The test was administered by a web application, which displayed the icons in the respective design styles and recorded the user's performance. After all the tasks were completed, the user was prompted to fill out a short survey to assess their perceived performance and preference.

Data Analysis

Visual preference was stored in a particular data file depending on their age group. Users were given a score depending on their average icon preference. That score reflects their overall ability to identify and select the visual style of the icon they prefer most. Once the data was acquired, the results were graphed on a scatter plot to determine any correlations between age and performance. Along with a performance assessment, a survey inquiring about the user's experience, preference and mobile operating system usage helped to supplement the data acquired through testing and provided additional insight.

Chapter 4

Results

The study was administered to a total of 48 participants. A third of them were in the young group of 13 to 26 years of age. Another third of the participants were 27 to 45 years of age, while the rest were 46 and older. The data collection was administered over a time period of two weeks. Below is a bar chart that clearly displays the collected data (See Figure 3.1). The blue represents the percentage of users that tended to select icons with a flat design style. The orange represents the percentage of users who preferred a skeuomorphic approach.
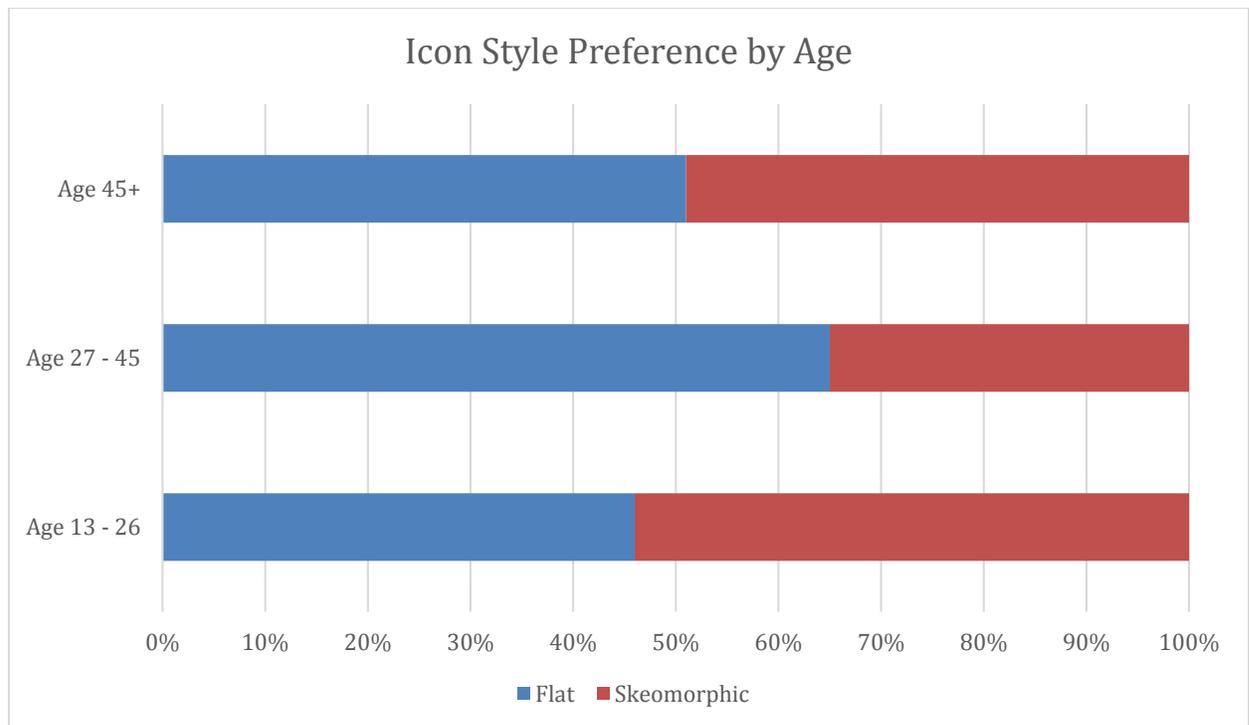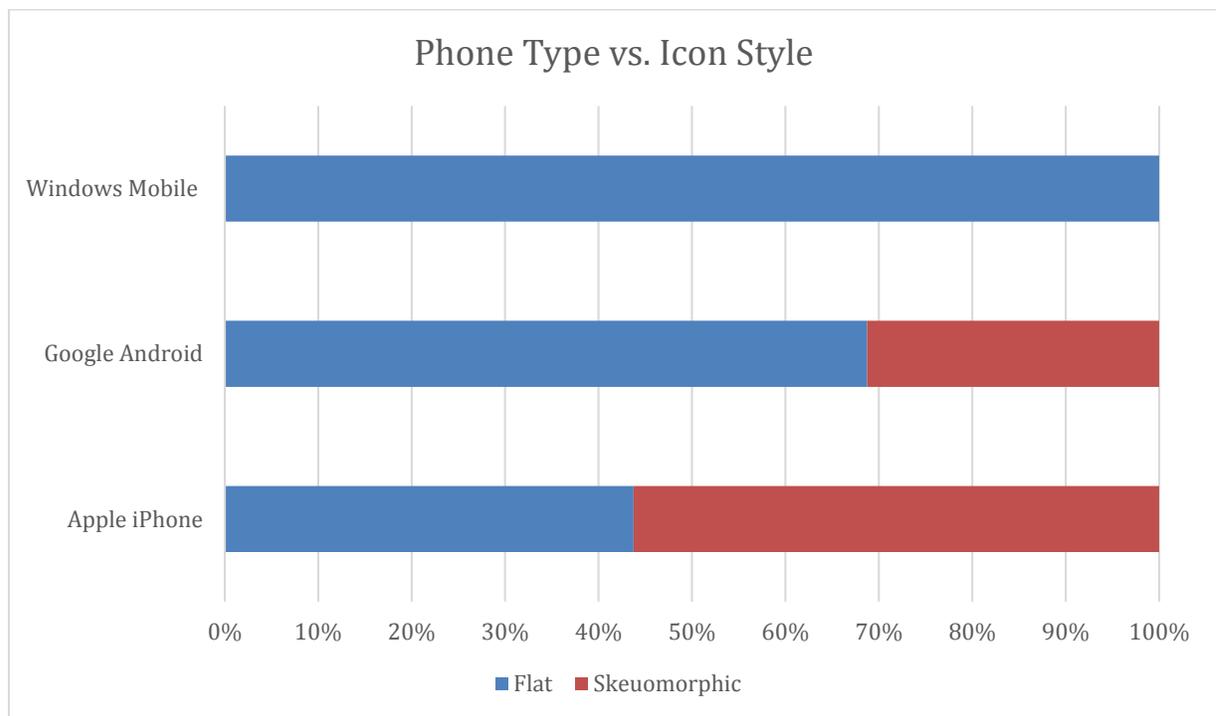

Figure 2.1

The results collected show, in general, a very split group with a slight tendency to prefer flat design. Particularly with the middle age demographic of 24 to 45, flat design was

found to be significantly preferred over skeuomorphic design. Younger participants were

very evenly split with a slight preference for skeomorphic design while participants of 46

and older had a slight preference for flat design. The young and old age group both

represent a balanced group. However, the middle age group appears to have a decisive

preference to flat design.

In addition to visual preference, the survey gathered smartphone data in an attempt to

find correlation between icon preference and smartphone type. The pool of participants

largely owned a version of Apple's iPhone or an Android phone. There was one user who

owned a Windows mobile phone (See Figure 3.2).

Figure 3.2

Because there was only one participant who owned a Windows mobile phone, no

significant conclusion can be determined from their preference of flat design. However,

the iPhone users showed a slight preference towards skeuomorphic design while Android

users had a fairly significant preference towards flat design. This is interesting data as both mobile operating systems currently boast moderately flat user interface elements.

Lastly, the survey asked participants which side of icons they felt they preferred most (all left icons were skeuomorphic and all right icons were flat).
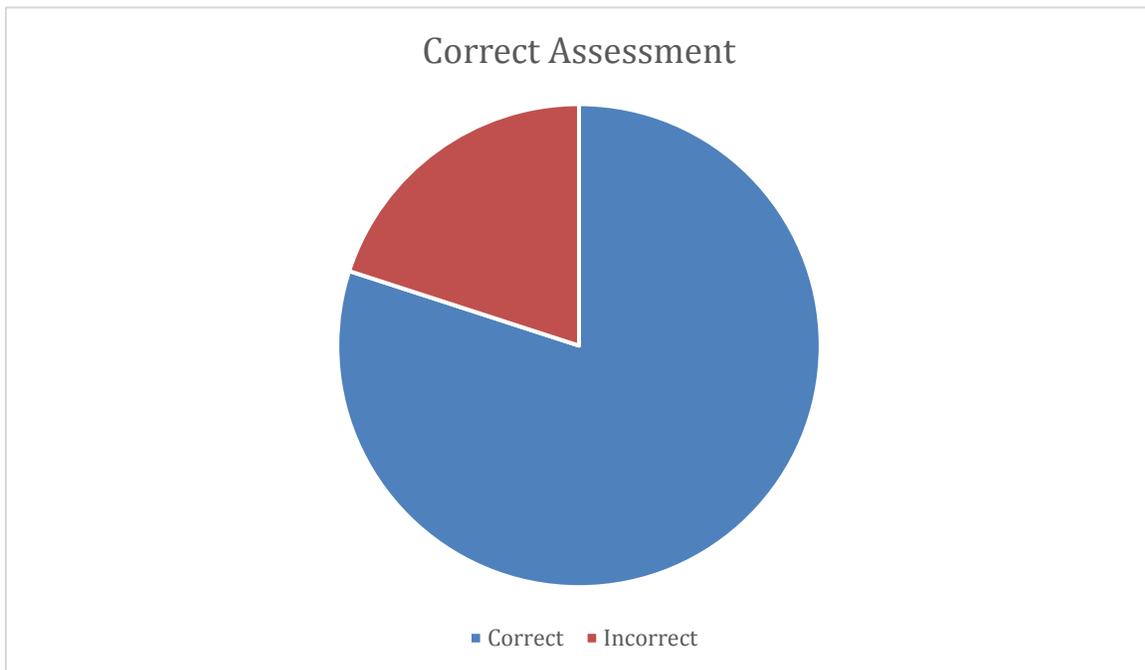
Figure 4.3

This pie chart (Figure 3.3) shows the percentage of participants who accurately determined which set of icons they preferred. Of all the participants, 80% chose the side of icons that accurately reflected their icon preference. The remaining 20% of participants either chose more flat icons but selected the skeuomorphic set, or preferred skeuomorphic icons, but felt they preferred the flat icon set.

Chapter 5

Conclusion

In conclusion, the results of this study show various results. Except for the middle age group of 27 to 45, participants generally had mixed and insignificant preferences on flat versus skeuomorphic design. In the middle age group, a strong bias towards flat design icons was prevalent.

User interface style preference also differed between mobile phone owners. Google Android phone owners generally preferred the clean flat style by a margin of 68%. Only 44% of Apple iPhone users felt the same. It's possible this is due to Apple iOS's previous strong stance on realistic, skeuomorphic design. The sudden change to flat design with the release of iOS 7 may still take some adjusting to for iPhone users. As stated before, only one participant used a Windows Mobile phone and they strongly preferred flat design.

The study also tested how aware users were of their icon preference by first polling for their icon responses, and then asking which style they felt they preferred. Eighty percent of the participants were able to recognize and accurately indicate the icon set they had preferred. The remaining 20% were incorrect in assessing their own preference from memory. This may indicate that a large majority of people do notice the aesthetic subtleties associated with flat versus skeuomorphic design.

By determining user interface design preferences by age and mobile operating system, developers can accurately develop for the demographic they are trying to reach. The data collected from this study definitely shows that to reach middle age consumers, a flat design approach would be optimal. Furthermore, developers can determine which

style may be the best approach by analyzing which mobile operating system their

demographic is using. If developers find that their target audience is predominately

Android users, a flat design approach would likely be the best. These are important

conclusions for user interface developers looking to create the optimal experience for

users. Doing so helps ensure increased usability and continued app usage from mobile

users.

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