

The Effect of Age on Perception and Preference of App Icon Styles

Chiwu Huang^(✉) and Po-Ti Chen

Department of Industrial Design, National Taipei University of Technology,
1, Section 3, Zhongxiao E. Rd., Taipei 10608, Taiwan
chiwu@ntut.edu.tw

Abstract. Hand-held computer devices, such as smartphone, tablet etc., are popularly used at present. The icon styles for the apps in those devices can be generally classified into two types, namely, Aqua and Metro. How they can be perceived and preferred by people in different ages? What are the design features of these styles? This study aims to explore the relationship between icons' style and perception on different ages.

10 Aqua and 10 Metro icons with same meanings were sampled. 300 respondents, evenly distributed in genders, aged 16–65 years old, stratified in ten age groups were recruited to do the test. A 5-point Likert scale was used to evaluate the perception of icons. The study examined the perception and preference of different age groups in using app icons of Metro and Aqua style. Four distinct design features, i.e. concrete, abstract, flatness and stereoscopic were also examined. In particular, it investigated whether an icon image that is concrete and solid at the same time can be more legible and preferable by the respondent. It also analyzed whether male and female exhibit different degree of perception and preference over different styles.

It was found that the perception on Aqua icons was not significantly different among 10 age groups. In contrast, the perception of Metro icons was significantly different between two age groups: 16–30 and 31–65. All age groups prefer Aqua to Metro, especially on older groups aged beyond 31. Younger groups tend to be more comfortable with Metro than the older groups did. The study also found that perception was strongly influenced by concrete and abstract features.

Keywords: Perception · Preference · Age · Icon · App · Metro · Aqua

1 Introduction

Hand-held computer devices, such as smartphone, tablet etc., are very popular at present. The icon styles for the apps in those devices can be generally classified into two types, namely, Aqua and Metro. Each one has its own supporters. Aqua is the graphic user interface (GUI) and primary visual theme of Apple's OS X operating system. It is based around the theme of water, as its name suggests, with droplet-like elements and liberal use of translucency and reflection effects. Steve Jobs noted Aqua's

glossy aesthetic: “One of the design goals was when you saw it you wanted to lick it”. [1] An Agua’s icon always exhibits a three-dimensional looking. Metro, in contrast, adopts a rather “flat” visual design strategy compared to its counterpart. Its icons use two-dimensional symbolic shapes that are claimed to be recognized easily [2].

How they can be recognized and preferred by people in different ages? What are design features of these styles? This study aims to explore the relationship between icons’ styles and recognition on different ages. This study has two hypotheses: (1) the icons’ solidness and concreteness will determine the degree of recognition for an icon. (2) Age plays a role in the recognition and preference of icon’s styles. Therefore this study aims to find out:

1. The effect of age groups on the perception of two app icon styles.
2. The effect of age groups on the preference of two app icon styles.
3. What features of the icon design would contribute to these effects?

2 Literature Review

According to Norman’s mental models [3], ideally, the design model should be coped with user’s model. An icon design should be compatible with user’s expectation therefore can be understood. Peirce classified signs into three categories, icon, index and symbol [4]. The icon in this study includes these three categories. Horton [5] argued that icon itself is meaningless. Through viewers’ association with past experience and memory an icon stands for something. Age-related change in cognition can be important to consider when design for older adults [6]. Therefore this study aims to test whether age has effects on the perception and preference of icon styles.

3 Methods

3.1 Test Samples

10 pairs of Aqua and Metro app icons in same function, including library, weather, camera, calendar, mail box, album, music, games, video and address book, were sampled as test objects.

3.2 Respondents

300 experienced users with hand held computer devices, e.g. smart phones, tablets etc., aged between 16–65 years old, evenly distributed in genders, stratified in ten age groups (A-J) each with a five-years interval (i.e. 16–20, 21–25, 26–30 ... 61–65) were recruited online to do the evaluation. Each age group includes 30 respondents. Due to the worries about older people’s unfamiliarity with online questionnaire, paper form of questionnaire was used for three age groups, 51–55, 56–60 and 61–65. Online evaluation was adopted for the rest of age groups. Convenient sampling method was used to render the sampling process.

3.3 Questionnaire

This study aims to determine the effect of ages and genders on the perception and preference of app icon styles. The ages and genders data were collected. The perception on each icons was evaluated in Likert 5-point scales, 1 = very disagree, 2 = disagree, 3 = common, 4 = agree and 5 = very agree. Questions include: (1) Does this icon remind you a “camera”? (2) Does this icon look solid? (3) Does this icon look flat? (4) Does this icon look concrete? (5) Does this icon look abstract? Finally, the respondent was asked to choose a preferable one among two icons.

3.4 Data Analysis

SPSS Statistics 20 was used to analyze the data. Descriptive statistics, Cronbach’s α , Levene’s test, ANOVA, Tukey’s HSD and Games-Howell, correlation coefficient and independent sampling t-test were conducted.

4 Results and Discussion

The questionnaire was tested for its reliability before survey. The result showed that Cronbach’s α was 0.955 (>0.7) which represents the questionnaire is highly reliable. 300 valid questionnaires were received. The result is presented in the following.

4.1 The Perception and Style Features

The average ratings of two icon styles are shown in Table 1. It is observed that the average ratings of Agua are higher than Metro on perception, solid and concrete, whereas, lower than Metro on flat and abstract. This suggests that Aqua may be easier than Metro to be perceived by the respondents. A further analysis on their correlation between recognition and variables is listed in Table 2. It is observed that both the

Table 1. Average ratings of two app icon styles (n = 300)

	Aqua	Metro
Perception	4.48	3.66
Solid	4.17	1.78
Flat	2.13	4.30
Concrete	4.31	2.24
Abstract	2.04	4.12

Table 2. Pearson coefficient between perception and design features (n = 300)

Variables	Aqua	Metro
Solid	0.806*	−0.317*
Flat	−0.587*	0.353*
Concrete	0.830*	−0.032
Abstract	−0.508*	0.513*





















*p < 0.01

perception of Aqua are highly positive correlated to solid and concrete, and fairly negative correlated to flat and abstract. In contrast, the perception of Metro are fairly negative correlated to solid and concrete and fairly positive correlated to flat and abstract. That means the design feature of Aqua tend to be solid and concrete whereas Metro tend to be flat and abstract.

4.2 Age Groups on Styles

Table 3 shows the F value of perception on each Aqua and Metro icons. It is observed that only a few of icons show significant difference among age groups on Aqua. In contrast, all the icons on Metro show significant difference among age groups.

Table 3. F values of perception on Aqua and Metro icons

Aqua	A1	A2	A3	A4	A5
					
F	2.39*	.74	3.49*	1.02	1.47
Aqua	A6	A7	A8	A9	A10
					
F	.85	1.86	.58	3.06*	1.57
Metro	M1	M2	M3	M4	M5
					
F	7.87*	7.54*	4.66*	7.10*	11.32*
Metro	M6	M7	M8	M9	M10
					
F	5.46*	9.59*	11.41*	13.17*	5.57*

*p<.05

Table 4. Tukey’s HSD test on the age groups

Metro icons	Age groups
M2 weather	ABC – I – DEFGHJ
M4 calendar	ABC – EI – DFGHJ
M8 game	AB – CD – EF – GHJ
M9 video	ABC – DEFGHIJ

This means that there are very little effect on ages with Aqua. However, there are a lot of differences between age groups with Metro.

A further analysis on Tukey’s HSD test (see Table 4) shows age groups can be roughly divided into two groups, ABC (16–30 years old) and DEFGHIJ (31–65 years old).

4.3 Age Groups on Preference

Figure 1 shows the frequency of preference on Metro and Aqua respectively against age groups. Although most respondents prefer Aqua to Metro, a tendency can be observed that the preference of younger generation, i.e. 16-30, shows very minor difference, at least not as dramatic as the rest of age groups. This comply with the result of Table 4. The reason may be lie in that these groups of people were brought up in a rapid computer technology development era. They tend to be familiar with all kinds of technology including GUI. However, older groups prefer Aqua to Metro. This may be due to that older people tend to be rely on their daily life experience. This is also confirm to a previous findings that icons designed with realistic image would make them easier to be recognized [7].

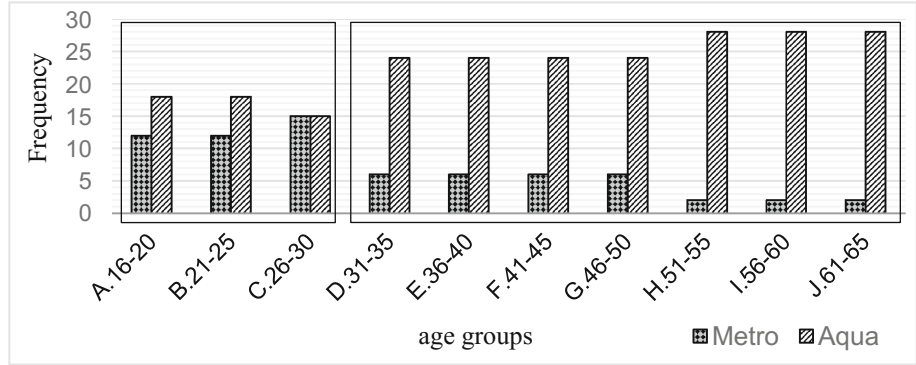


Fig. 1. Frequency of preference of age groups on Metro and Aqua

5 Conclusion

This study explored the perception of two types of icon, Aqua and Metro on different age groups of people. The following findings may be considered when design an app icon, especially when dealing with age related issues.

1. Aqua tends to be more readable and legible than Metro in average.
2. The perception may be highly positively correlated with solid and concrete characters of icon design and fairly negatively correlated with flat and abstract characters.
3. Significant difference was found between age groups on the perception of Metro icons.
4. Most respondents prefer Aqua to Metro. However younger generation (16-30) shows very little difference between two types of icon.

Acknowledgments. Thanks for the sponsorship of the Ministry of Science and Technology, Taiwan (MOST 103-222-E-027-098).

References

1. [http://en.wikipedia.org/wiki/Aqua_\(user_interface\)#cite_note-macworld2000-3](http://en.wikipedia.org/wiki/Aqua_(user_interface)#cite_note-macworld2000-3) (browsed on 30 March 2015)
2. <https://msdn.microsoft.com/en-us/library/windows/apps/hh781237.aspx> (browsed on 30 March 2015)
3. Norman, D.A.: *The Design of Everyday Things*, pp. 189–191. Basic Books, New York (1988)
4. Fiske, J.: *Introduction to Communication Studies*. Yuan-Liou Publishing, Taipei (1995). Chinese edition, Interpretation by Chang, C. H.
5. Horton, W.: *The Icon Book: Visual Symbols For Computer Systems and Documentation*. Wiley, New York (1994)
6. Fisk, A.D., Rogers, W.A., Charness, N., Czaja, S.J., Sharit, J.: *Designing for Older Adults*, 2nd edn, pp. 18–19. CRC Press, New York (2009)
7. Huang, C., Tsai, C.-M.: The effect of morphological elements on the icon recognition in smart phones. In: Aykin, N. (ed.) *Part 1, HCII 2007. LNCS*, vol. 4559, pp. 513–522. Springer, Heidelberg (2007)