TAS MOVE: The Processes of Applying Flat Design in an Efficiency Require Mobile Application

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Abstract

As a new graphic design style, Flat Design that expresses information more efficiently has become more and more popular in the field of user interface design in recent years. Several principles of Flat Design have been proposed to direct the processes of creating user interfaces. However, the processes of designing a user interface following the principles are seldom proposed.

In this paper, Flat Design is applied to the user interface design of a travel application, named TAS MOVE, which focuses on accessing information to users efficiently. This article discusses about the processes of creating TAS MOVE application, including element simplification, color setting, font setting, style unification and user testing. The result based on users' feedback illustrates that most users could accomplish the tasks easily and in an intuitively manner, which reveals the efficiency of our design. At last, it argues that the processes proposed in this paper are general, and can be applied to other mobile applications that aim to convey information efficiently.

flat design processes; user interface (UI); mobile application

Flat Design, as a new communication design style and an extension of Minimalism Design and Swiss Design, has gained popularity in both computer interface and mobile devices recently. It has been widely used in most of the mainstream operating systems, such as Microsoft Systems (Microsoft 8 operation System), Android System and iOS7 (Amber, 2014). Different from previous design styles with shadows, textures and gradient (Page, 2014), Flat Design has conveyed the information in a more simple and legible way. It allows users to focus more on the

content, and access the information accurately and efficiently. Therefore, Flat Design is more suitable for applications that aim to deliver information efficiently.

In this project, Flat Design is applied to a mobile travel application named TAS MOVE. Specifically designed for tourists on the move, the application focuses on satisfying their needs during the trip. It aims to assist users to receive the information they required accurately and quickly, and eventually help their destination planning and decision-making. This article describes the processes and method of applying Flat Design in this mobile application.

Literature review

What is Flat Design

Flat Design is a design style that argues for simplicity, clarity and honesty of materials in user interface (Kelsey, 2013). The features of the elements in Flat Design are simple shapes, flat colors and no any extra effects, such as shadows, textures and gradients (Page, 2014). It is now widely used in the world of User Interface (Moore, 2013), such as Microsoft 8 operation system, iOS and Android operation system. The simple elements allow the users to concentrate on the content in the interface, so the users can receive the information more efficiently (Grief, 2013). Therefore, it is suitable for on-screen experiences (Luke, 2013) and especially on small screen ones, such as mobile phone interface.

The history of Flat Design

While Flat Design is hard to determine at the beginning, there are two periods of design and art styles that Flat Design may be extended from (Amber, 2014), including Swiss Style and Minimalism Design.

1. Swiss Style:

Swiss Style (International Typographic Style) is always mentioned while the history of Flat Design is discussed. It was an important style in the history of modernism and the dominant design style during the 1940's and 1950's in Switzerland (Amber, 2014). During the 1920's to 30's graphic design was seen as a part of industrial production by the pioneer artists who produced the advertisement for Swiss Industry (Richard, 2006). Therefore, they chose the industrial-looking typefaces, which are called san-serif typography rather than those designed for books (Richard, 2006). Besides, they organized the images and texts by geometrical grids. The main features of Swiss Design such as the use of grids, sans-serif typography, and clean hierarchy of content (Amber, 2014) can be seen originally from here.

The Holy week music poster is a Swiss Design style sample (Figure 1). This work is made of simple geometric shapes and texts. The geometric shapes are presented in bright colors and the texts use a classic san-serif font named Helvetica, which is the representative font of Swiss Design. What is the most important is all elements are presented in clear hierarchy. Those features are very similar to the principles of Flat Design. That is the reason why Flat Design can be seen as an extension of Swiss Design.

Figure 1: Holy week music poster (Marin, 2012)

2. Minimalist Design:

Minimalism Design is another influence of Flat Design. It is sometimes interchangeable with Flat Design. It was defined as " a style or technique that is characterized by extreme sparseness and simplicity" by the Merriam-Webster Online Dictionary (Ohad, Noam and Joachim 2007). The influence of Minimalism covered various mediums, such as architecture, visual art and design. Flat Design is included in the design and art region (Amber, 2014).

As well as Swiss Design, Minimalism Design focused on the use of geometric shapes and less elements. Besides, it was also featured in bright color and clean lines. The poster below followed the principles of the Minimalism Design. It used the simple lines, bright colors and clear fonts and made information easily to be read. Those are the inspirations of Flat Design principles.

Figure 2: Infographic poster (http://pinthemall.net/, 2015)

Principles of Flat Design

Carrie (2013) proposed several principles of Flat Design, including (1) No Added Effects, (2) Simple Elements, (3) Focus on Typography and (4) Focus on Colors, etc. The rules of each principle are described in this section.

1. No Added Effects:

The term Flat Design is from the shape it uses. All elements in Flat Design works are presented in a two-dimensional style and without any decorations, such as shadows, bevels, gradients and textures. In mobile applications, the elements may include Navigation Bar, icons, buttons and texts. Having less effect to help users to distinguish the importance of information, good information translations rely on the clear sense of hierarchy. The size, layout and color of all elements are the key points of making hierarchy clear. The paragraphs above are talking about the method how to set all elements to make an understandable and distinct interface.

2. Simple Elements:

Buttons and icons are the most common elements in mobile user interface.

They are also one of the most important lead when users operate the mobile applications. Therefore, the buttons and icons should be simple, understandable and easy to tap. Using geometric shapes such as rectangles, circles or squares to assemble the elements can make them simple and clear. Besides, the interactions between the buttons should be continual and intuitive. Colors and fonts are the key points for creating a smooth user interface.

3. Focus on Typography:

Because of the simple elements, typography is extremely important for Flat Design works. The tone of typography must match to elements. The structure of san-serif typography is much simpler than serif one, so it is the main typography in Flat Design. However, there are hundreds of fonts in san-serif typographies, choosing the simple and readable font will allow users to operate the interface efficiently. Besides, the font family of one font is also important while choosing typography. Font family means how many font types are contained in one font. Rich font family allows designers to distinguish information clearly and convey the information in clear hierarchy.

4. Focus on Color:

Creating a color palette that matches the tone for Flat Design work can give users a good visual experience and also help users to operate the interface easily (Carrie, 2013). The bright and highly saturation colors are commonly used in Flat Design. In Flat Design the color palettes are also much more colorful than those in the other sites, for example, there are six to eight colors that can be applied at the same time, but only two to three can be used in the other styles. Additionally, several colors are especially popular frequently, such as salmon, purple, green and blue. Designers can choose one or two of them to be the primary

color and choose four to six secondary colors that match those colors while creating their own color palette. With this method, the work can be unique and also keep on the trend.

Research Questions

It is important to maintain the consistency of user interface while creating the mobile application with Flat Design. Besides that, the smooth interactions among each page are also very important. The Flat Design principals can be the references when creating the Flat Design interface. Following those principles, designers can create their own methods and processes for different Flat Design work. However, there are few complete design processes proposed by designers. In this article, following the principles of Flat Design, a prototype of TAS MOVE is created and a common process of Flat Design is proposed. Finally, several users are invited to test the prototype. The design and testing processes will be discussed in detail in next section, which are the main topic of this article.

Research Method

The user interface of the mobile app TAS MOVE was designed with the Flat Design style. Clum (2013) states that, "Flat Design allows interface designs to be more streamlined and efficient. It is easier to quickly convey information while still looking visually appealing and approachable." TAS MOVE was created for use while "on the move". In this scenario, checking information efficiently is the most important thing for tourists. Flat Design style can help tourists to understand information quickly. Following the Flat Design principles, five processes of creating the User Interface of TAS MOVE were produced, including Image Simplification, Color Setting, Font setting, Style unification and User testing. The five processes will be sequentially described in this section.

Image Simplification

Icons are one of the key elements in mobile applications. That every element should be simple and understandable is the most important principle of the Flat Design style. There are three steps for creating simple and distinct icons. The processes are as below:

1. Image Searching:

Icons are the symbol of the objects and can be simplified from the images. Therefore, the first step to create the understandable icons is searching the images that can be associated with the objects. For example, the fork and knife images are commonly associated with food, so they are commonly used to be the symbol of restaurants. With the apposite icons, applications can convey the information to users correctly and intuitively.

The Category page is the main page of the TAS MOVE travel application. There are six icons of category in this page, including Food & Drink, Farm & Factory, Farm Stay, History & Heritage, Market and, Art & Culture. Several images are searched and matched to every

category. The image of tableware could stand for the Food and Drink category. The scenery of a farm could be matched with the Farm category. Bed can be associated with accommodation, so it may stand for Farm Stay. The images of old building are linked to history easily, so it can used to stand for History and Heritage. Shopping basket stands for Market. The Australian flag could be associated to country or culture easily, so it stands for the Art & Culture category.

2. Feature Analysis and Sketch:

After image searching, figuring out the obvious features from the images and sketching the icons is the second step. Choosing the proper features is the key point to create a simple and distinct icon. The method of choosing the proper features is observing and assembling. Observe and choose two or three representative features from the image, and illustrate the features with geometric images (Figure 3). This will generate several versions. Designers can choose the most distinctive and understandable one. Also, designers can ask mobile users to help choose the most understandable icons.
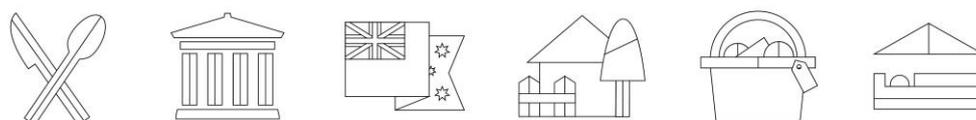
Figure 3: Sketch

3. Sketch Simplify with Priority:

The main goals are to simplify the icons until it has the most concise appearance and to ensure it is still understandable. In the case of TAS MOVE, the Farm & Factory icon was assembled with a house, tree and fence. Designers omitted the tree, which is not on essential element of this icon (Figure 4). The same situation with the Farm & Factory icon, the Farm Stay icon was assembled by the roof and bed that stand for accommodation and the roof was omitted (Figure 4). With fewer elements, users could still recognize the icons, and even more intuitively. Therefore, the simplification icon is successful.
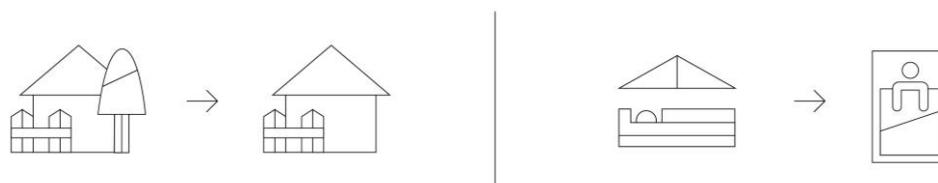
Figure 4: Sketch simplification

Color Setting

Color is one of the most important elements in Flat Design. It is important to create a color plate while creating a Flat Design work. The colors in TAS MOVE follow the principles of Flat Design by using the bright and highly saturated colors. Besides that different colors can brings completely different feelings and associations to the user (Lichtle, 2007), there are a total of six bright colors were used to represent the different categories and the main pages in TAS MOVE, including yellow, orange, light red, green, purple, blue (Figure 5). The rules of using the colors are described as below.

1. Yellow: It is one of the warm colors, which represents happiness, cheerful and delicious. It is often used to apply to restaurants, illumination industry, and electricity industry etc. It also has the effect of stimulating the appetite. Therefore, yellow is used to represent the category Food & Drink (Figure 6).

2. Orange: It represents fascination, creativity, and attraction. It is used to apply to architecture, the chemical industry and department stores etc. It is used to represent History & Heritage in TAS MOVE (Figure 6).

3. Light Red: Red is the color of courage, creativity, and energy. It is often used in restaurant and national flag etc. Light Red is a bright appearance of red. It can also stands for creativity and energy. In TAS MOVE, it represents Art & Culture. Besides, it is also the main color in TAS MOVE (Figure 6).

4. Green: Green normally stands for anything natural. It symbolizes growth, freshness, and fertility. It could be applied to forestry, agriculture, and apartment stores etc. This color represents "Farm & Factory" in this application (Figure6).

5. Purple: Purple conveys feelings about wealth and creativity. It is usually used in business and service industries etc. It represents the category "Market" (Figure 6).

6. Blue: Blue is the color of the sky and sea. It can make people feel calm and comfortable. It is normally used in accommodation and hospitality. Green is the color of nature. It represented the Farm category. As such, the color blue and green represented the category "Farm Stay" (Figure 6).

M25 Y90		M55 Y67	
M65 Y50		C45 Y90	
C45 M75 Y30		C60 M5 Y40	

Figure 5: Color setting
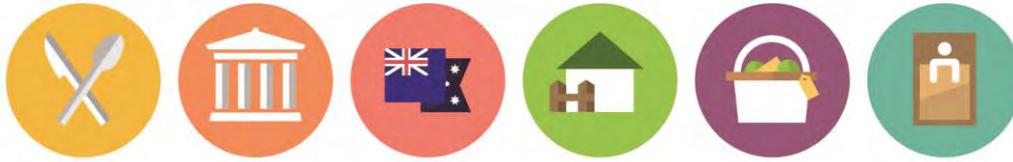
Figure 6: Color setting

Font Setting

English typeface can be divided into serif and sans-serif. Serif is characterized by thin horizontal strokes and thick vertical strokes while serif conveys formal, elegant, and delicate. Sans-serif is characterized by thick equal strokes is simple, clear, generous, and suggestive. Sans-serif is the font in our application in order to match the rule of Flat Design, simple and clear. In addition, users often used the smart devices when they are on the move, so the clear outline of the font is very important. The typeface's function is to express the message and also to help the user to read efficiently. Currently, there are hundreds of fonts. Every font has different proportion, thickness. In order to make sure the hierarchy of information could be clear, choosing a readable font from a font family is very important. Therefore, TAS MOVE uses a simple, readable and relaxed font called DIN Pro. It has five font types, including Light, Regular, Medium, Bold and Black (Figure 7). Besides, Medium is the most readable font, so it is used to display texts. Bold and Black are the most high attention levels. They are used to use in the titles and subtitle. Use of the font DIN Pro on the smart device communicates with user accurately and efficiently.

Figure 7: Font setting

Style Unification

There are more than twenty pages of user interface in TAS MOVE. The elements that were created by Flat Design include buttons, navigation bar and texts. To keep the consistency of these user interfaces, the colors, fonts and shapes of those elements all follow the rules that have been previously defined. The processes of creating user interfaces are as below:

1. Navigation Bar: it is the heading of every page. They are all made of titles and colors.

(1) Font: the Navigation Bar is the heading of every page. Follow the pre-defined font that have set, the title used the font DIN Pro. Black level is particularly chosen to attract users and allow them be aware of their current position in this app.

(2) Color: the main color of TAS MOVE is light red, therefore the Navigation Bars in every main function was set in light red. Except the main functions, the colors of the other Navigation Bars follow the color of the category they belong to. For example, in the Food & Drink category, every Navigation Bar is yellow, which stands for this category.

2. Buttons: there are more than ten buttons in TAS MOVE, including four main functions, six filters etc. The buttons are all made of icons, color and subtitle.

(1) Icon: followed the rules of Image Simplification, the icons are made of geometric shapes and only keep one or two features.

(2) Font: followed the Font Setting, the font of the buttons are DIN pro-Bold. Texts on button are much smaller than that on Navigation Bar. One of the most significant benefits of this design is that the text can be recognized more easily, since the strokes in bold level are thinner than the black Level.

(3) Color: Different from the Category icons, the icons on the buttons are presented with a single color; white. White is the brightest color among all of the colors, which allows it to match other colors easily and get attention easily. Besides, colors of buttons are determined by their functions, for example, the filter buttons are extended from the Categories page, so the color must follow the Categories.

User Interface Testing

After the user interface design, all the pages were integrated into a prototype that can be operated and then wait for the prototype testing.

The main goal of the prototype testing is to check the consistency of the user interfaces that is determined by whether users can operate the prototype smoothly or not. During the test, the processes of how users operated the prototype were recorded. Both the correct and incorrect paths are the important resources for revising the user interface.

1. Tasks of testing

The test includes seven tasks as shown in Table1. Individually, users participating the test are asked to accomplish each task from No. I to No. VII.

Table 1: Task List

I) Today we are going to go to Launceston; please help me to find what Launceston is famous for?

II) Please choose a seafood restaurant and save it.

III) I would like to know how could I go there? How many kinds of transportation I can choose? Is the restaurant on business time now?

IV) I don't have too much time this afternoon. Could you just search some attractions nearby?

V) I am not interested in any food right now, so could you filter the food out?

VI) I would like to schedule my plan for tomorrow. Please choose some attractions and save it. Please show me what you have chosen.

VII) Do you have any other suggestion to this application?

2. Result:

There are five users invited into this test. The results are presented in Table 2. The symbol "V" stands for that the user can accomplish the tasks successfully; symbol "∗" means that the user feels hesitated; and symbol "X" means the user feel hard to finish the tasks. In Table 2, most results are singed in symbol "V" which stands for users can understand most of the interface. Only few missions are singed with "∗" symbol, such as task No I and task No VI. Users feel hesitated when they press the button, which means that the button may not be obvious and not easy to understand for users. Those buttons were revised after the test. Users also proposed some suggestions for the user interface after testing, which are the important resources for revising the user interface of TAS MOVE.

Table 2: User testing result

Task	Function of app	User 1	User 2	User 3	User 4	User 5
(Question number)	V: Successful / * Hesitant / X: Fail					
I Find Launceston	Location	V	*	V	V	V
Problems:	Icon					
	• User 2: They think the icon by the introduction could be press.					
II Find restaurant	Category	V	V	V	V	V
Problems:						
III How to go?	Information	V	V	V	V	V
Problems:						
IV More place to go	Nearby	*	X	*	V	*
Problems:		Icon	Icon	Icon		Icon
	• User 2: It's hard to find (understand) the nearby icon. • User1, 3, 5: They are not sure the nearby icon could be press.					
V Filter out	Nearby	V	V	V	V	V
Problems:						
VI List the attractions	Add, Saved	V	V	V	V	V
Problems:						
VII Suggestions	• User 2: I don't think the color of Art & Culture icon is suitable. • User 1, 3, 5: The nearby icon could be bigger, add word or let it look more clearly. • User 4: The map of nearby could have a distance limit setting.					

3. User Interface Revise

According to the result of user interface testing, the Nearby button and the symbols in category were revised.

1. Nearby icon:

Users couldn't recognize the nearby button at (Figure 8) at the first time. Therefore, the text of this symbol is added into the nearby button to make icon more understandable (Figure 9).

Figure 8: Nearby button without text   Figure 9: Nearby button with text

2. Introduction of location

The icons in location page confused the users (Figure 10). The form of the icons looks like the button, but they can't be pressed actually. Therefor, the backgrounds of the icons are changed into line style (Figure 11). It makes the icon more like the part of information but a button.
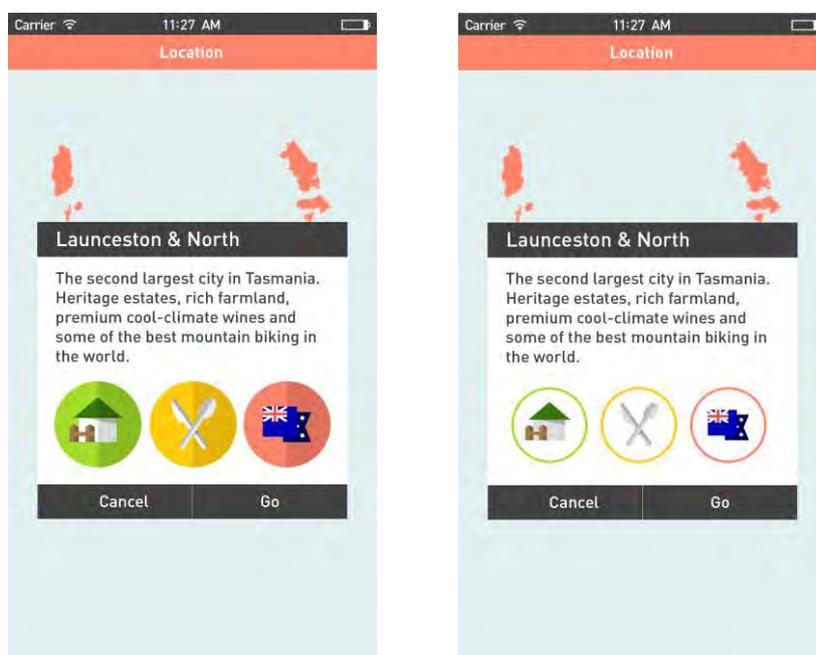

Figure 10: The icons with filled background   Figure 11: The icons with line style background

Discussion and Conclusion

In this paper, Flat Design style has been applied to create a travel application named TAS MOVE. Following the Flat Design principles proposed by Carrie, the design processes for TAS MOVE are proposed, including element simplification, color setting, font setting, style unification and user testing. Finally, the result of user testing illustrates that users can find the correct way for most of the tasks efficiently, which not only proves the usefulness of the user interface of this prototype, but also proves that Flat Design can be applied to the mobile application which aims to convey information efficiently.

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Kuan is a Communication Designer in Taiwan. She has been finished her 4 months internship in UTAS Australia in May 2015. She is responsible for communication design and research in UTAS. She has been finished her master degree of Communication Design from Taiwan University of Science and Technology in 2015. She is good at graphic design, user interface design, package design and illustration etc. She has won two design international competitions including Adobe Design Award and Reddot design award since 2014.

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Yuan is a research engineer in the Human Interface Technology Laboratory Australia (HITLab AU) since 2013. She received her BSc degree majoring in Computer Science from University of Canterbury, and completed her Master's degree at Human Interface Technology Laboratory New Zealand (HITLab NZ). Her Master research aimed at developing a tool for mobile phones that

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