

Exploration of Picture E-Book Design for App Web

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Abstract. The objective of this study is to investigate the interactive relationship between picture e-book design and children with the interface of APP web for mobile devices. In order to achieve the objective, the focus of this study is in applying APP technology to picture e-book. Also, APP web interfaces based on both smartphone and tablet via picture book are designed in the study. Furthermore, this study discusses children interface satisfaction in reading the e-book. It shows that both the interactive process and the result differ in smartphone and in tablet. It seems to be the best way for children to read the picture e-book if they can easily touch the buttons on the screen of a tablet.

Keywords: Picture e-book, APP web design, smartphone, tablet.

1 Introduction

With the development of information technology and the utilization of network, children play on the computers and digital devices increasingly in Taiwan. Children are growing up in an ever-changing electronic media environment. The multi-functional electronic media for children combines video and audio, and children can enjoy e-books, music, animations and films.

A picture book most often attracts young children. The images in picture books are illustrative with verbal narratives. With the digital media, a picture book can be designed with picture, language, audio and animation. There is a digital fever for books right now, and picture e-book is being developed rapidly in the web. There are many learning webs providing a lot of picture e-book for young children. Young children read picture e-book on personal computers and smart phones. It is difficult for children to surf the general web with smart phones having to zoom in and zoom out. Therefore, I am exploring the following topics: what is difference between the application of APP web and general web for picture e-book? How to take advantage of the existing picture e-book and incorporate into a smartphone device? How children can easily navigate and interact with smartphone and enjoy the information of audio and video in order to learn and play from the e-book web.

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2 Picture E-Book Design

In 2007, Apple Inc. introduced the original iPhone, one of the first mobile phones to use a multi-touch interface. The iPhone was notable for its use of a touchscreen for direct finger input as its main method of interaction, instead of a stylus, keyboard, or keypad that were typically used with smartphones at the time. In July 2008, Apple introduced its second generation iPhone with a much lower listed price and 3G support. Simultaneously, the APP Store was introduced which allowed any iPhone to install applications (both free and paid) over a Wi-Fi or cellular network, without requiring a PC for installation; applications can be added, browsed through and downloaded directly. Featuring over 500 applications at launch [1], the APP Store was very popular, and achieved over one billion downloads in the first year[2]. Following the success of Apple's APP Store other smartphone manufacturers quickly launched application stores of their own. Google launched the Android Market in October 2008. For several years, the demand for smartphones has outpaced the rest of the mobile phone market [3]. According to a 2012 survey, around half of the U.S. mobile consumers own smartphones and could reach about 70% of all U.S. mobile devices by 2013 [4]. In profit sense, worldwide smartphones profitability far exceeds that of non-smartphones. As of December 2012, the worldwide smartphone market had Android as its top operating system, counting on 68.3% of market share, followed by iOS with 18.8% and BlackBerry with 4.7% [5].

A tablet is a one-piece mobile computer, primarily operated by touchscreen; the user's finger acts like the mouse, and the cursor moves around screen as if a virtual keyboard and buttons are integrated into the display. The virtual integrated keyboard and functional buttons that can be hidden by a swivel joint or slide joint, jumps out only when the user commons the screen for touch virtual keyboard operation. In 2010, Apple Inc. released the iPad with iOS operating system which gained commercial success due to its extremely large fan base. Other manufacturers have produced tablets using a variety of operating systems such as, Android, Windows, and QNX, and most frequently use capacitive touch screens with multi-touch. The tablet focuses on media consumption together with internet, and provides a platform for audio-visual media, including electronic books, periodicals, films, music, computer games, and presentations [6]. The tablet has an optional e-books application, which displays books downloaded from the e-book store or internet. E-books are usually read on dedicated e-book readers, tablets and many smart phones using e-reader applications. Mobile availability of e-books may be provided for readers with a mobile data connection, so that these e-books need not be stored on the device. Additionally, e-books allow for readers to look up words or find more information about the topic immediately [7]. In Taiwan, a great share of picture e-books are available online for free, minus the minimal costs of the electronics required.

3 Methods

3.1 Interface Arrangement

In this research, we design the picture e-book for APP web, and test 30 children from 5-8 years old to compare two types with smartphone and tablet. Children use fingers to touch the screen, and read more information on the same APP webpage.

An idealized picture e-book design for APP web (Fig.1.) was divided into three sections: story text, game and author. In this study, one story was designed for the picture e-book to offer children reading.



Fig. 1. The picture e-book design for APP web

3.2 Participants

The 30 children (5-8 years old) were experimented with smartphone or tablet. All children had color vision test and were found none to be color blind.

3.3 Apparatus

Screens on smartphones and tablet in both display size and display resolution. The most common screen of smartphone sizes range from 3 inches to 5.5inches. The most common screen of tablet sizes range from 7 inches to 12inches.

The experimental stimuli (screen layouts) were displayed by a multimedia tablet (Acer ICONIA Tab A500, 10.1" TFT LCD Display LED Backlight 1280x800 Resolution, Nvidia Tegra 250 1 GHz Dual Core, Android 3.0) (Fig. 2).

The experimental stimuli (screen layouts) were displayed by a multimedia smartphone (Asus Platform, 4.3" TFT LCD Display LED Backlight 960x540 Resolution, Qualcomm Snapdragon S4 8260A Dual-Core 1.5 GHz, Android 4.0) (Fig. 3).



Fig. 2. The picture e-book for APP web on the display of smartphone



Fig. 3. The picture e-book for APP web on the display of tablet

3.4 Procedure

Each subject played with each of the 2 interfaces for smartphone and tablet, and read the uniform picture e-book completely. To prevent bias, 15 subjects were tested with smartphone first, and the rest 15 subjects were tested with tablet first, both finish reading the story with both kind of mobile devices, each subject was asked 6 questions at the end:

1. Have you ever used a smartphone or tablet?
2. Which one do you think is more convenient to reading picture story? smartphone or tablet?
3. Which one has buttons that are easier to touch? Smartphone or tablet?
4. Which one can you read picture story more comfortably? Smartphone or tablet?
5. Which one can you read picture story more comfortably? Smartphone, tablet or book?
6. Which one attracts you to read picture story more? Smartphone, tablet or book?

4 Results and Discussion

The result for the interactive relationship between picture e-book design and children with the interface of APP web for mobile devices are given in Table 1.

Table 1. Overall user interface satisfaction of all participants

question	smartphone	tablet	book	Both (smartphone and tablet)
1. have ever used	20%	3%		77%
2. more conveniently	7%	93%		
3. touch the buttons easily	30%	70%		
4. more comfortably	20%	80%		
5. more comfortably	0%	67%	33%	
6. attract	3%	80%	17%	

All children have used smartphone or tablet; 97% of the children have used smartphone (20%+77%) and 80% children have used table; 93% of the children consider reading picture story more conveniently with tablet than smartphone, because the display of tablet is bigger than smartphone; 70% of the children consider sliding their fingers to touch the buttons is easier on that tablet than on smartphone, because the buttons on the display of a tablet is bigger than on a smartphone; 80% of the children consider reading picture story is more comfortable on a tablet than on smartphone, because the text and picture on the display of tablet is bigger than smartphone; 67% of the children consider reading picture story is more comfortable on a tablet than reading a book, and 80% of the children consider reading picture story is more attractive than reading picture story on tablet than on book and smartphone, because they like to play with the tablet.

5 Conclusion

In this experiment, we observe those children how they operate the mobile devices. Children slid their fingers on the screen to access the web on smart phone and tablet. They read simple and clear information on tablet but have difficulty reading it on smartphone. Because the screen of smartphone is too small, information is read with much smaller font and it is easy to touch the wrong button on the screen. To avoid touching the wrong button, APP web design must be simple and remove redundant information.

A good picture e-book design for children using APP web has three principles: 1. Easy to use 2.Simple target 3.Smooth Operation. The main purpose of picture e-book is how to guide children to read and make the device easy to use. It doesn't need much function and object for children. Children can understand and use the interface immediately, while they browse the good picture e-book design for APP web first time. Children like to use the tablet, because the display of tablet is bigger than smartphone. They feel that it is convenient and more comfortable to read the picture e-book on tablet, so the smartphone can't replace the tablet in picture e-book. Children also consider reading the picture book is more comfortable than reading the picture e-book with smartphone, and they really don't like to read the story with small fonts and tiny display on the smartphone.

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