

Investigating Children Preferences of a User Interface Design

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Abstract. Though there have been many studies of user interface design preferences, only a few have considered the children preferences. This paper presents an investigation into the children preferences regarding user interface design. The objective of studying this area is to investigate the differences of children preferences on the elements of a user interface design. An experiment was conducted regarding five elements of user interface design: font type, font size, background color and interface type. Findings show that there is a significant differences in the children preferences for interface type, font type and background color. Further analysis was conducted and the results indicate that there is a significant difference between gender groups for background color, interface type and font color. This study provides empirical evidence on the importance of considering the children in the interface design.

Keywords: Children, User interface design, Preference, Color, Interface type.

1 Introduction

Currently, almost the applications designed for children are developed by adults and they do not consider the children's skills and preferences. As a result, the applications may not be easily learned and used by children [1]. Besides that, majority of the tools available are for the expert users which are not suitable for novice users particularly for children who have very limited knowledge in computer. In addition, the importance of individual differences such as gender, has been emphasized in the human computer interaction literature regarding the user interface design. However there is still lacking of empirical studies that examine the gender differences among children in their preferences of user interface design. Further research are required to strengthened the empirical evidence on the gender differences among children's in the user interface design issues [2].

The purpose of this paper is to investigate the differences of children preferences on the elements of a user interface design. An experimental study was conducted for this purpose.

2 Literature Review

One of the largest group of using the computer and internet is elementary-age children. They are not young adults but a special user group. However, many interfaces

for children do not consider their skills and preferences [1]. Interface developers should not design with the expectation that the child is able to understand in interaction with an extremely complex machine. The principle for the user centered design practices is that there is no design that fits all, but design should be driven by the knowledge of the target users. There is a growing amount of attention given to children as a special user group [3].

Many authors have discussed interface design, and it is common to have an emphasis on the user in the discussion. Shneiderman [4] did argue that any design should be based upon an understanding of its intended users. Among the important user characteristics that should be considered are age group and gender. Shneiderman argued that it is very common to find in practice that the children are not being considered in the user interface design guidelines. In fact, the involvement of children themselves in the design process is very unusual. Therefore, the interface designers and developers should be responsible to seek for a good quality products design which will positively contribute towards the children's development and health [5].

The children's interactions with the technologies are different depending on their age level which reflects their changing interests, characters, humors and contexts. According to Acuff and Reiher [6], ages between 8-12 the children are in the rule or role stage. In this age group, the interests gradually shifted from fantasy to reality. They become more interested in competition and prefer play in pairs and groups. A sense of logic and reasoning and simple abstractions start developing. This is a stage of shifting from main influence of parents and schools to a bigger influence from peers. From the age of 8 to 12 children start to understand more abstract terms and longer and more complex sentences. They develop the ability to analyse critically what they read. Children at the age of 9 and 10 are still not very good at planning their story and start telling the story straight away.

Handheld computing devices and laptops are examples of current products targeting to this age user group. The design of these devices are more adult-like such as using less bright colors, than those designed for them when they were at their younger ages. More complex interfaces often provided by these new products such as having several functions represented in one button and varieties of menu structures available for them to explore. The functionality gives them more freedom in performing their task.

Children, like adults often use the technology to perform their tasks. Markopoulos and Bekker [7] argue that the interface design need to be extended and specifically address the needs of children. They have pointed out two major issues In the context of designing for children: age-specific interaction styles, e.g. how to structure menu, font, interface type, color, etc.; and the involvement of children in the design process. According to them, research in the former is very sparse. One of the study related to children is by Inkpen [8]. This study reports that children ages between 9 to 13 preferred point and click over drag and drop. In addition, Read et al. [9] discussed the different text input techniques suitable for children. This research is rather limited compared to the corresponding research for adults. In addition, the research especially on the user interface elements e.g. font type, font size, color and interface type is still lacking.

Standard user centered design approaches need to be adapted when considering the specific needs for children. Current design guideline compilations still focus mostly

on adult users. Gilutz and Neilsen [10] take initiative to compile guidelines for web sites for children.

3 Method

An experimental study was conducted with 40 primary schoolchildren of Sekolah Kebangsaan Seksyen 6, Shah Alam Malaysia. They were randomly divided into groups with five children per group. The range of their age is from 10 to 12 years old. A briefing on the purpose of the experiment and about the instruction was given to each of the group before they start the experiment. Each of the participants was given a maximum of 15 minutes to complete the task.

Five user interface elements had been tested in this study, namely font type, font size, background color, interface type. For font type, 4 conditions were tested which were Arial, Comic Sans MS, Courier New and Times New Roman. For font size, 2 conditions were tested which were 12 and 14. For background color, 5 colors were chosen for the experiment namely green, blue, purple, red, and yellow. The interface types were categorized as simple and complex. The participants were asked to select the most preferred choice for each of these interface elements.

4 Results

Results from the Mann-Whitney Test for analyzing gender difference have shown that there were significant differences between boys and girls in their preferences for background color with $p = 0.001$, and interface complexity with $p = 0.036$. In addition, there was marginal significance in their preferences for font type but no significant difference for font size.

From the cross tabulation analysis, it was found that majority of girls prefer purple whereas the boys prefer blue for the background color. For the interface type, all girls have chosen simple interface type as their preferences. However, there were 20% of the boys preferred the complex interface type. Results for the font type, have shown that majority of the boys have chosen Arial as the most preferred and Comic Sans MS as the least preferred. In contrast, majority of the girls have chosen Comic Sans MS as the most preferred and Times New Roman as the least preferred.

Further analysis has been conducted to examine the age difference among the children using Kruskal Wallis Test. The results shows that there were marginal age difference among children in the background color ($p=0.063$) and interface type ($p=0.073$).

5 Conclusions

Interface design guidelines are not hard to find, but typically they also meant for adults rather than young users. This study examines the children preferences on the interface design. Five interface design elements were tested. Results showed that there are significant differences in children preferences for interface type and background color. In addition the result also highlights the importance of considering the effects

of gender-based differences in the user interface design for children. From these findings it is concluded that a specific interface design guidelines are required for children rather than simply relying upon general design guidelines and it is necessary to involve these users in the design process in order to formulate those guidelines.

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