A Conceptual Design for Children's WebOPAC Interface: Graphic Design Issues

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Abstract. Usability testing on Ilmu (i.e. WebOPAC for children) showed that poor graphic design contributed the most to the usability problem. Three main issues of graphic design are layout, use of colors and human visual perception. A design approach is formulated in an effort to develop a conceptual design that specifies children's requirements and preferences on graphic issues. This involves two main activities which are identifying children's preferences on graphic design and generating design ideas using participatory design method. Four categories of requirements and preferences on graphic design are derived from children. Each category is demonstrated by design ideas. All these constitute towards the formulation of a conceptual design for children's WebOPAC interface and become the basis for redesigning Ilmu's interface.

Keywords: Graphic design, children's interface, conceptual design, participatory design and paper-based prototype.

1 Introduction

The most important issue in this study is the appearance or graphic design of the interface for children. Graphic design provides a communication mechanism between the user and the computer. The designing of graphic design plays an important role in arranging or placing information on children's interface of WebOPAC, which is one of Information Retrieval System (IRS). In Malaysia, it is known as Ilmu [1], a web-based system that enables students to search and browse the bibliography section of books in libraries.

Usability testing on Ilmu showed that poor graphic design contributed the most to the usability problem [1]. The testing involved 16 respondents using two techniques - observation and questionnaire. The parameters used were poor graphic design, lost navigation, less functionality, and display too much text derived from the studies on the IRS for children.

Investigation on the details of poor graphical design had led us to the identification of three issues which were layout, use of colors and human visual perception or aesthetics as illustrated by fishbone diagram in Figure 1 [2,3,4,5 and 6].
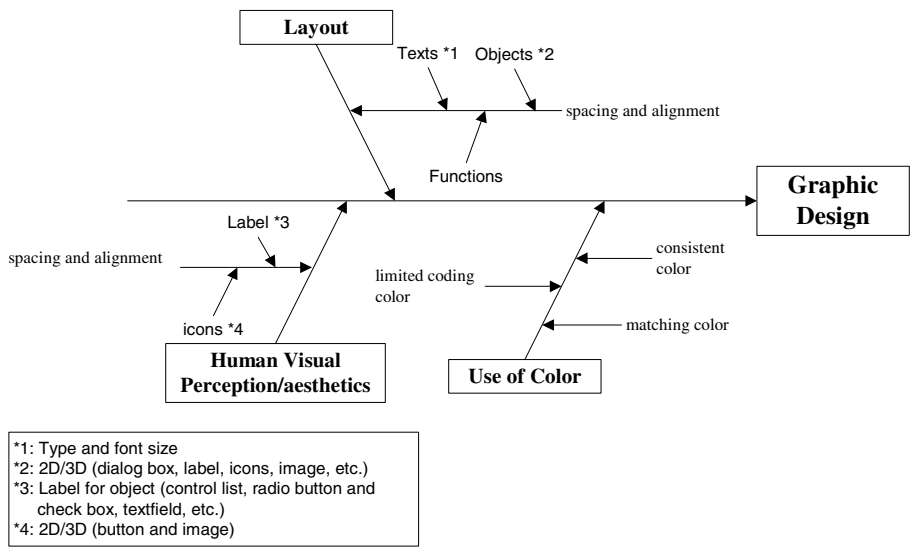
Fig. 1. Key issues in graphic design

Layout is a design of an interface appearance that involves screen and window. It is an important issue in graphic design because it refers to spatial usage. It shows the effect and arrangement of texts, objects (e.g. labels, dialog boxes, icons and menus) and functions on the interfaces which are connected through space. This connection ensures the symmetry and balancing in interface to organize and display information and objects appropriately [7].

The human visual perception or aesthetics is related to the layout issue. It consists of spacing and alignment of icons and labels in the interface. Human visual perception relies on aesthetical value of people which differs according to their age and requirements. However, it still has guidelines and principles to design a visually pleasing interface.

The use of color is very important in graphic design as it helps in changing user's feeling or perception for system interface [8]. The choice of colors must be consistent to avoid the user confused. Too much color effect will make the interface looks messy.

All of the above issues are important for the usability of graphic design on Ilmu's interface. Section 2 of this paper concerns the development of a conceptual design that specifies children's requirements and preferences on graphic design.

2   Design Approach

Figure 2 shows the design approach in developing the conceptual design for children's WebOPAC interface on graphic design issues. It involves 2 main phases which are:

a) Identifying children's preferences on graphic design.
b) Generating design ideas of the preferences identified using participatory design method. Design ideas are visualized through prototyping and evaluated. Based on the feedback from the evaluations, preferences are refined and alternative design is generated. Thus, specifications of conceptual design are emerged iteratively through the participation of the children.
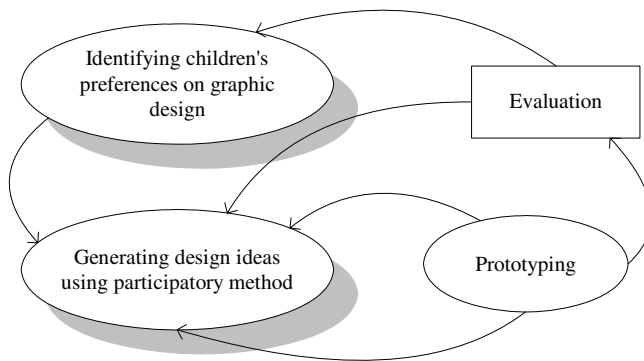
Fig. 2. Development of conceptual design

The two phases involved 8 students, aged from 7 to 11. They were briefed on the research objectives and their role as a design partner. The two phases took 2 months to complete from October to November 2006.

2.1 Identifying Children's Preferences on Graphic Design

The first phase was to recognize and identify children's interest on graphic design of WebOPAC interface. Students were given the following two samples of WebOPAC: Kid's Catalog Web [9] and KidsWeb [10]. The identifying process involved two activities. First, students were asked to search and browse books by keyword, location or subject. Next, is for them to express their preferences and expectations on searching and browsing of books focusing on the elements of layout, use of color and human visual perception. Prior to this, explanations on the three elements were given to the students by showing them the related examples. They recorded their preferences in a form given to them. Their preferences were gathered and a brainstorming session was conducted to clarify on any statements which were not cleared to the researchers.

Analysis and Findings. Table 1 shows a complete list of children's preferences on graphic design after eliminating all the redundant statements.

Table 1. Children's Preferences on graphic design

Elements of graphic	Children's Preferences	
Layout	▪ Use big button ▪ Use big font size ▪ Simple and less text ▪ Simple toolbar and menu	▪ View information in a simple way ▪ Use graphic and drawing to view information
Using color	▪ Color should be striking ▪ Blue is very interesting	▪ Variety of colors and striking ▪ Use clear background
Human visual perception	▪ Include game features ▪ Explore real library	▪ Use agent to search for books (e.g. Spiderman)

As shown in Table 1, students prefer a simple interface design with a bigger fonts and buttons. They enjoy searching and browsing books in an interface environment that uses attractive combination of colors. They are excited to have game features on the website. They are interested towards visual environment such as 3D library while exploring information. Besides that, they also have a preference for an agent who will help them finding information on books. In the next section, these preferences are explored and visualized using participatory design method.

2.2   Generating Design Ideas Using Participatory Method

Two participatory design sessions were conducted with children to generate design ideas and creativity of the preferences identified on graphic design.

Participatory Design Session (1). The participatory design (1) involved the PICTIVE activity where students brainstorm and visualize design ideas. Materials and stationeries to carry out the PICTIVE session such as pens, pencils, various sizes of Post-It notes, stickers and labels and a shared surface (i.e. drawing paper) were given to them. Sketches of their design ideas are the output for the following four task scenarios:

1. You are at the main interface of Ilmu's website. There are three search styles available: keyword, location and subject.
2. You are searching a book by keyword.
3. You are searching a book by subject.
4. You are at the subject menu page and searching for history book.

Figures 3(a) – 3(d) shows the four sketches produced for the four task scenarios. A walkthrough session was carried out with the students to gain an insight understanding of their design ideas produced.

Figure 3(a), the output of task scenario 1, shows a sketch of a train coaches carries a keyword, subject and location with rollover features. Figure 3(b), the output of task scenario 2, shows a superhero character that helps students searching and browsing information by title, author or abstract. Figure 3(c), the output of task scenario 3, shows a caterpillar character containing information of the available subjects such as
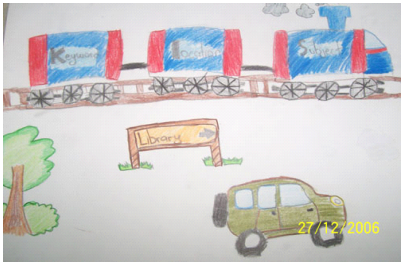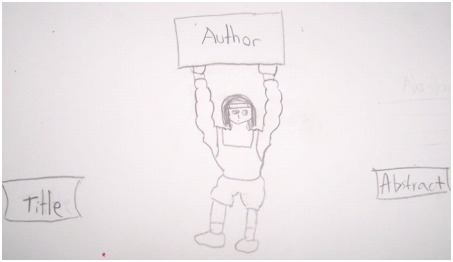
Fig. 3a. Rollover features
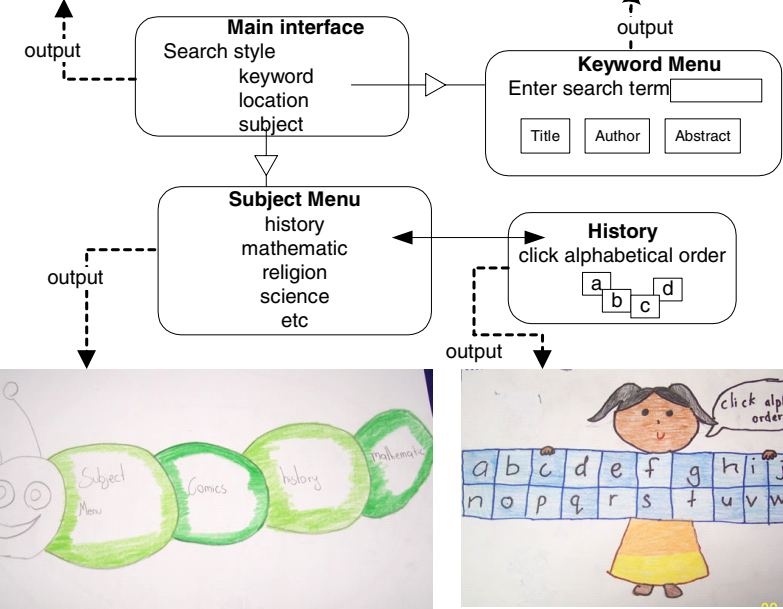

Fig. 3b. A superhero character

**Fig. 3c.** A character character

Fig. 3d. A friend character

**Fig. 3. (a) – (d)** Journal of design ideas for the four tasks scenarios

history, mathematic and science. Figure 3(d), the output of task scenario 4, shows a girl character that provides choices in alphabetical order of the available history books in the library when a student chooses a history subject.

Figures 3(a) – 3(d) visualize students' preferences on the concepts of agents in helping students locating books in the library; viewing information in graphics/ drawing, thus achieving a simple and less text page; and fun features as part of the interface on graphic design.

Participatory Design Session (2). The participatory design (2) started with a paper based prototype produced by the researchers as shown in figure 4(a) as an initial platform for students to work on the design ideas of browsing and searching
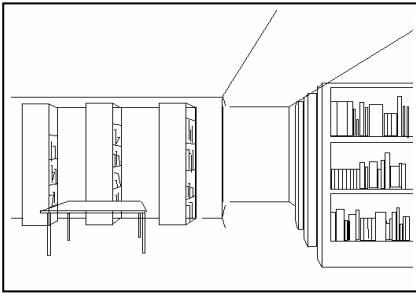
Fig. 4a. A real library in 3D environment
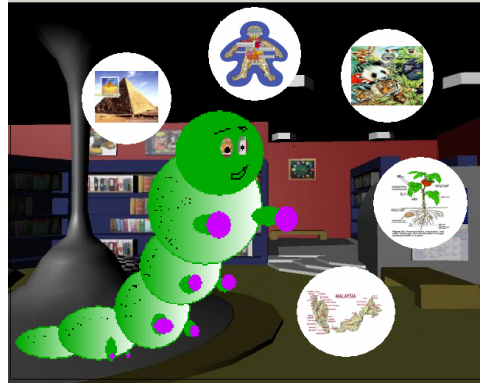
Fig. 4b. Design ideas from children on 3D environment

information in a real library in 3D environment. Figure 4(b) showed the design ideas evolved from the prototype given.

Figure 4(b) illustrates the environment preferred by children for searching books by subject. It clearly shows that students preferred an exciting and relaxing 3D environment rather than following sequence of steps as in the current WebOPAC. They illustrate easy steps in searching information through graphical icons and interface agents. They would also prefer the interface to incorporate games features in supporting the searching and browsing activities.

3   Conclusion

Layout, use of color and human visual perception are the three main issues that contribute to the usability of graphic design. Current Ilmu's interface encounters these issues of graphic design. The design approach formulated as described and illustrated in Section 2 concerns the development of a conceptual design that specifies children's requirements and preferences on graphic design. This is achieved through two main activities which are identifying children's preferences on graphic design and generating design ideas using a participatory design method. Figure 5 gives a schematic structure that conceptualizes the findings of this research which shows the:

- three main graphic design elements, which are the issues in the current Ilmu's interface
- the requirements and preferences on graphic design derived from children
- design ideas demonstrated by children in supporting their requirements and preferences

All these constitute towards the formulation of a conceptual design for children's WebOPAC interface and become the basis for redesigning Ilmu's interface.
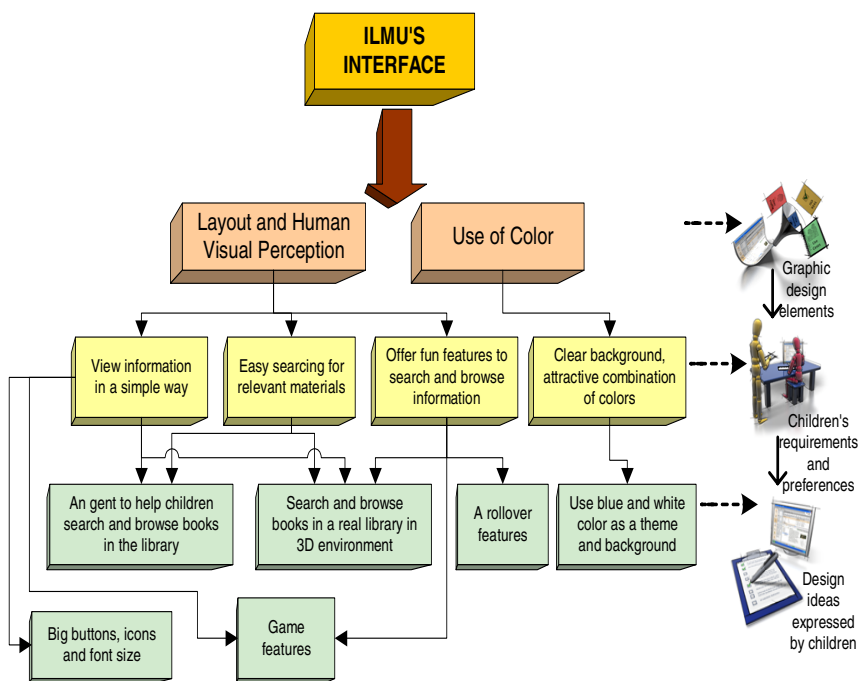
Fig. 5. Findings of research

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