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aIRPLane: An Information Retrieval Pattern Language

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INTRODUCTION

What is the value of using interaction patterns and pattern languages for interaction design? In HCI the interest in interaction patterns and pattern languages has grown in recent years [1, 3]. Although there has been much written about patterns and pattern languages there has been little empirical work which examines the value of using patterns or the impact that patterns have on the design process and the resulting designs. Dearden and Finlay [2] recently published a review which provides a summary of the work in this area and also acknowledges the need for more empirical work. Our focus here is on the results of a pattern sorting exercise which is part of a larger experiment that examines the impact of using aIRPLane (an Information Retrieval Pattern Language) to design information retrieval interfaces.

THE DISCOVERY OF aIRPLane

An Information Retrieval Pattern Language (aIRPLane) has been discovered by interacting with 30 IR systems over a period of five months. Each pattern consists of: a **name**, a **picture** showing the pattern, and sections titled: **what**, **use when**, **why**, **how**, **examples**, and **how this pattern is related to others**. An example pattern is seen in figure 1.

Indicate Search Terms in Result Set

70% 3 Nicholson, S. Proof in the *Pattern*. *Library Journal (1976)* part Net Connect (Winter 2006) p. 2-4, 6
SFX Full Text HTML Full Text PDF

What: The user's search terms should be differentiated from all other words in the result set.

Use When: Whenever a user's search term appears within the result set it should be differentiated from the rest of the words in the result set.

Why: Users are presented with a lot of information after they execute a query. The user is trying to find information related to their search query therefore when the terms a user included in their search query appear in the result set they should be indicated or differentiated in some way from all other terms in order to draw the user's attention to the terms which were included in their query.

How: Search terms should be indicated in the result set by differentiating them from other words in the results set. This can be done by highlighting the search terms, bolding the search terms, *italicizing the search terms*, changing the color of the search terms, etc.

Example:

www.welie.com -- **patterns** in **Interaction** Design
A collection for various user interfaces. Includes background information and links to other collections.
www.welie.com/**patterns**/ - 22k - Cached - Similar pages

How this pattern is related to others: This pattern is related to *Result Record.* This pattern is a part of *Result Set.*

Figure 1. Example Pattern

METHOD

Our experiment contains three groups (table 1). All groups were given the same design task in which they were asked to design IR interfaces.

GROUP	TREATMENT
Patterns Group	Exposure to aIRPLane
Guidelines Group	Exposure to guidelines
Control Group	No exposure to any design technique

Table 1. Experimental Design

Pattern Sorting

Subjects in the patterns group were asked to sort and categorize the 39 patterns in aIRPLane (figure 2) using common card sorting techniques. The purpose of the card sort was to help us gain an understanding of the overall structure of the language and the relationships within the language, as seen by the subjects in this study.

Figure 2. Sorting Patterns

The data resulting from the pattern sorting exercise was input into a pattern co-occurrence matrix. The matrix was analyzed using hierarchical cluster analysis and multidimensional scaling. The results of a preliminary two-dimensional multidimensional scaling (MDS) map with clusters enhanced from the hierarchical cluster analysis is seen in figure 3. MDS attempts to represent the whole data matrix as a two dimensional (or more) map. In MDS R Square and stress are indicators of the overall "goodness of fit." When the patterns are mapped in a two dimensional map, as seen here, the R square = .91812 and stress = .13950 (Young's S-stress formula 1 is used). The R square indicates that the subjects tend to see a common arrangement of the patterns (i.e. a pattern language).

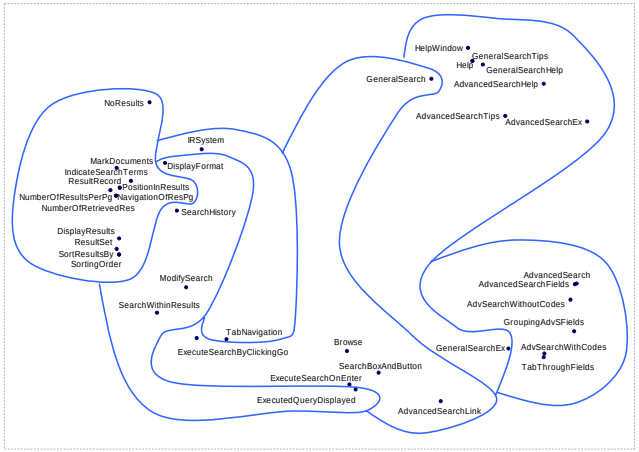

Figure 3. Pattern Co-occurrence Map

Here, patterns, represented as points on the MDS map, are positioned based on the correlation matrix of profile similarities. Patterns with similar co-occurrence patterns are placed near each other in the map. Those with many links to others tend to be placed near the center of the map while highly dissimilar patterns are placed at a distance and those with few local links are at the periphery. Patterns closely positioned but placed in different clusters have important secondary links.

CONCLUSIONS AND FUTURE WORK

Preliminary results show that subjects understand the patterns and can sort them into groups of related patterns, this implies that the subjects see a "language". Using cluster analysis and MDS we can begin to see how the subjects view the overall structure and relationships within aIRPLane. Subjects were also able to use aIRPLane to help them design information retrieval interfaces which may suggest that pattern languages have the potential to improve the quality of designs.

REFERENCES

[1] Collection of Pattern conferences, workshops and panels from 1997 to 2004. Collection of Pattern conferences, workshops and panels from 1997 to 2004. http://www.hcipatterns.org/events.html

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[3] T. Erickson. The Interaction Design Patterns Page. http://www.visi.com/%7Esnowfall/InteractionPatterns.html