

Exploring a connection between HCI patterns and the Cognitive Dimensions framework

Abstract

My work follows the search for Patterns and Pattern Languages in HCI, and examines some of the problems that the search has encountered. Here, I examine some aspects of the Cognitive Dimensions framework and suggest that there may be a relationship between the two endeavours, to the probable enhancement of the pattern endeavour and the possible enhancement of the expression of the CD framework.

Where endeavours meet

HCI patterns are strong in that they have a well-developed, effective and expressive form, but weak in structure/call to invariance, and have an impoverished set of examples to draw from. CDs are strong in structure and invariance, and encompass many domains of artefact, but weak in defining the relationship of parts to the whole, and in their expressive form. Might the deficiencies of one system complement the other?

It is interesting to note how closely elements of the list describing constituents of a CD form (Blackwell et al., 2001) map the essentials of a pattern-form. (The form I have chosen to use is that of the INTERACT'99 workshop as being a fairly representative minimum (Fincher, 2000))

Name	Should encapsulate the pattern's intent. Ideally, short and pithy
Sensitising example	A concrete example of implementation of the pattern. In Alexander, the photograph conveys this example of implementation, in GoF patterns (Gamma, Helm, Johnson, & Vlissides, 1994) it is the code sample. We took it that the purpose of these components is to sensitise the reader to the application of the pattern. "In looking at the photograph, a reaction is invoked. The intention is that the reaction is favourable-"Wow, that's good. I'd like to live there"-and from that point the reader is sensitised so that the information that the rest of the pattern contains becomes more accessible, more useful in a specific implementation". Our expectation was that for UI patterns, this example would most likely be a photograph or a screenshot of an interface, or (depending on medium) possibly a video of a task being accomplished.
Problem Statement	Normally expressed as a conflict between forces
Body	Textual description
Solution Statement	Tells you what to do, not how to do it
Technical representation	We considered this to address the audience of HCI experts, rather than users, or experts in other domains (i.e. the audiences most receptive to the sensitising example). It differs from the sensitising example in that it should represent the solution less impressionistically and with less potential for ambiguity. A possible medium might be UML
Related Patterns	Other patterns which either: are peer to this one, enhance this one or complete this one.
Attribution	

Table 1. INTERACT' 99 Pattern Format. From The Pattern Gallery (Fincher, 2000)

Choosing names; length of name	It seems like one or two words should be enough
Pictorial example	It would be very useful for every "killer example" to be supported by a pictorial illustration
Examples; vernacularity; supporting apparatus	CDs should sound both technical and approachable at the same time A CD is more than just a name and a definition ... all ... are supported by a range of documentary and tutorial apparatus
Impact	Different dimensions have different impacts on various activity types and profiles
Sources	Research sources should be cited ... to give appropriate credit to previous researchers

Table 2. CD format. From Cognitive Dimensions of Notations: Design Tools for Cognitive Technology (Blackwell et al., 2001). The phrases are all abstracted from the text of the paper.

So, matching the expression of what would be *desirable* as a form for capturing examples of CDs against what has been well-worked with regard to patterns, we can see an interesting commonality:

CD	Pattern	PLML
		UID
Choosing names; length of name	Name	Name
		Alias
Pictorial example	Sensitising example	Illustration
	Problem Statement	Problem
Examples; vernacularity; supporting apparatus	Body	Context Forces Evidence (example, rationale)
Impact	Solution Statement	Solution
		Synopsis
	Technical representation	Diagram Implementation
	Related Patterns	Related Patterns (Three relationships are defined: <i>is-a</i> , <i>is-contained-by</i> , <i>contains</i>)
		Literature Confidence
Sources	Attribution	author, credits, creation-date, last-modified, and revision-number.

Table 3. Comparison of elements of representative pattern-form, CD-form and PLML elements. From Perspectives on HCI patterns: concepts and tools (introducing PLML) (Fincher, 2003) Note that the elements do not appear here in the same order as in the DTD.

There is a good fit between the sorts of things Pattern languages and CDs are trying to express. However, there remain elements from the CD list that are not represented in the INTERACT form. But when placed against the more general elements of the Pattern Language Markup Language (PLML), further complements are found. PLML was (amongst other things) devised to allow pattern-authors to share patterns across collections. It may be that its strength will persist beyond the boundaries of a single design approach, and allow expressions of CDs to become artefacts shared with pattern collections.

Summary

I look at some ways in which Patterns and Cognitive Dimensions may be related, and where they may complement each other. I suggest that CDs could be the invariant principle—the value system and structure—that the HCI pattern endeavour has so far lacked, and that patterns may provide the form for the detailed pragmatic expression of the CD framework. For a fuller (although still preliminary) exploration of these ideas, see (Fincher, 2002)

References

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