

# Patterns can bring in knowledgeable users into the software development cycle

## Position paper

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### **Cross-pollination on many levels**

The over-arching question for this workshop is how patterns can help to design more usable interactive systems by facilitating the integration of HCI knowledge into the entire software development process. One of the more practical formulations of this very broad question asks "how to integrate [usability] patterns into the daily software development process?" I will try to stake out my position in relation to this and the other related questions in the workshop call by taking a closer look on a recent book on patterns for web-design, a book which I think is quite important to discuss within the pattern community. In conjunction with that I will also present a set of patterns relevant for the design of an e-shop, the other assignment called for in the workshop presentation. But first I will briefly comment some of the concrete questions about usability and patterns articulated in the workshop call.

### **Are some patterns more valuable than others in order to increase the usability?**

The term "usability patterns" can be taken literally as patterns that guide the practice of performing task-analysis, writing scenarios, or articulating user requirements for particular systems. There may indeed be an avenue for identifying such patterns that relate directly to the practice of specification and follow-up of user requirements. Such patterns would probably have much in common with another "high-level" approach, namely Meszaros and Doble's 'pattern language for writing patterns' [1].

However, what I think is at least as important as directly addressing *the domain* of usability practices, is to focus on *the usability potential* already within the body of existing patterns from the fields of OOP,

HCI, media, and architecture. When patterns from these fields succeed to document, in a concise and pertinent way, the useful practices they try to convey, then, what they actually catch is essential, contextualised knowledge about usability in their respective fields.

True, one way to distil more general usability knowledge would be to mine for high level parallels between the proven, useful genre and media specific solutions. But what could be even more fruitful, is to develop one aspect of patterns that seems to be under-developed: their potential to bring in critical and knowledgeable end users into the design process.

I will try to elaborate this potential for user participation from two perspectives. (1) Design teams could deliberately utilise pattern languages as a communication medium in its own right when involving end users in systems development. (2) Looking at pattern languages not only as a professional methodology, but as a methodology with a unique potential to transcend professional jargon, brings in another concept which is central to all media research on audience reception – the concept of genre.

In other words, from the point of view of the individual design team, pattern languages (PL) can be seen as a powerful way to catch, and articulate, crucial empirical user experiences. From the more general point of view, this paints a picture of domain specific PLs as sourcebooks that are easy and revealing to read – full of detail, yet comprehensible – for any lay person interested in the genre at hand.

### **Pattern languages to unite and transform the software team**

One of the practical questions raised in the call to this workshop asks how pattern languages can be

shared within the software development team. With a vision of PL as genre specific sourcebooks, it is not hard to imagine that all team members are drawn to this treasure chest of concise, yet colourful knowledge. For software teams that want to stay in business for long, a living contact with their customers and end users is probably the best quality assurance. And the PL sourcebook is "the place" this contact can be nurtured and kept alive. This does not mean that the book is guarded and kept in isolation from other tools and methodologies. On the contrary. There are quite obvious possibilities to link pattern definitions to storyboards (walkthroughs, schematics etc.), linkages that could animate the PL sourcebook as well as the complementary techniques considerably.

### **UML complementing the pattern specification**

Another question for the workshop to consider is whether formal modelling techniques, such as UML, could be used in combination to the pattern language formalism. At first sight, this may be seen as departing from the vision of PL as 'the user participation life-line'. But such a puritan user orientation would disregard that 'developers are users too' and that UML, managed with care, may be a very pedagogical complement to more iconic and indexical notations, such as figurative sketches, photographs, and maps. Today's authoring and reviewing tools allow us to apply multiple views without losing our sense of orientation. In that respect, UML diagrams could become one of the key complements to the PL formalism of the near future.

The focus on PL as a communication medium foregrounds its potential to promote the consolidation of perspectives between OOP, HCI, and all the different professions with genre specific conventions in their respective trades. But differences in perspectives is not only a matter of technical dimensions such as point of view, distance, and scope. It is also about cultural differences in respect to dimensions such as vocabulary, mode of representation, authorial voice, visual conventions etc. Therefore, it is important that the pattern languages of tomorrow are open to use all the tricks of all the trades addressed. The visual representations should employ all applicable modes of representation, from indexical, iconic, to symbolic representations. And it should welcome all stylistic traditions (and hybrids thereof) in respect to renderings techniques. It should not, I think, restrain itself to the established combination of typographic,

textual, figurative and photographic formats. (Unless when such "normalisation" is warranted for special reasons.) The adoption of more or less formal diagrammatic depictions could turn out to be vital for the popularisation of the pattern language methodology.

### **Tools for pattern authoring and review**

A third, very relevant sub-question raised in the workshop call concerns the fruitfulness of tools for handling patterns as a means for creative cross-pollination between end users and the different software development professions. As may be derived from the positions I have taken in relation to the earlier questions, I think useful tools for authoring and reviewing patterns is one of the more advantageous paths ahead. I think it may prove to be essential for finding practical ways to share and consolidate perspectives between all the different roles involved in the design process.

Simple, yet powerful browsing tools could help the daily participation from end users while keeping professionals within the deployment organisation and the development team abreast of new user needs and new directions for design. The development of such tools are already in the making. In respect to the technical requirements on such tools, a quote from Till Schuemmer's position paper to the CHI2003 workshop on patterns [2] is well worth making: "A pattern authoring and viewing environment should model the structure of the pattern language, provide filters, layout the language, link it to the textual representation and keep all visualizations in synch." In respect to other user requirements, e.g. how all kinds of stakeholders should be able to contribute in authoring and reviewing each other's specifications, the web based repository created by the DIAC'02 Conference is a very interesting example [3].

### **Patterns for building an e-commerce web site**

The workshop call requested participants to prepare or select patterns that are relevant for the design and implementation of an e-shop. This gives me the opportunity to reference a recent, and in my opinion very valuable, book on patterns for web site design - The Design of Sites [4]. Hence, I will opt for the alternative 'select existing patterns', rather than to prepare new ones. And I do that because I think the authors understanding of genre specificity is very important to highlight.

When I wrote my doctoral thesis, about the Documentary film project meeting digital media [5], I was inspired by how a computer scientist, Tom

Erickson, applied the genre perspective on digital artefacts. He also wrote interesting articles on pattern languages, and after conversations with him I reached the conclusion that some of the high-level patterns, especially in media applications (a very broad category indeed), in fact should be understood as genre patterns. This is the conclusion also reached by the authors of the Design of Sites (DofS). Furthermore, Jenifer Tidwell, who provided crucial building blocks both for my thesis and for DofS, writes very favourably about the book, and, which is as important, applies the genre perspective herself in her position paper to the CHI2003 workshop [6].

What is important with genre patterns, as I stated earlier, is that virtually all people recognize their meaning. If a person have a special interest in a particular genre, then this person can very often be characterized as an "amateur researcher". But even without a special interest, people probably have quite a good idea of some of the key elements of the genre, all the same. Because in the kind of media environments where people start to apply genre categories, like in today's web based media, conventions (and the naming of conventions) get the massive, popular scrutiny that Christopher Alexander found was the real creative ground for the design of sustainable artefacts [7].

The authors of DofS calls the highest level of patterns in their book "Site genres". Below that level comes the following layers of patterns: Creating a navigation framework, Writing and managing content, Building credibility and trust, Helping customers complete tasks, Designing effective layouts, Making site search fast and relevant, Speeding up your site. (There are also two additional groups of patterns concerned with E-commerce and one group of patterns that go deeper into Navigation.) This enumeration of pattern layers is interesting in the relation to the question raised in the workshop call, whether there are any particular pattern groups which are more important than others, from the perspective of usability. It is fairly evident, that all the layers identified in DofS are very, very important in order to build useful, effective, efficient, and satisfying web sites. As a side note, if I *had* to choose one category out of these, I would choose the top level category, genre patterns. Because it seems to echo the authors interest in empirical findings based on the massive use of critical end users. It is a good beginning. To me, the lower-level patterns that the authors claim "make up" the different genres, in unique and very different constellations, echo the voice of their end users.

Among the eleven genres on the web identified by the authors, "Personal e-commerce" is the first one mentioned. (News mosaics, Community conference, Self-service government are among the ten other genres, just to name a few.) The solution paragraph of the Personal e-commerce pattern (on page 116) reads as follows: "Differentiate your site so that customers know why it is compelling and valuable. Give shoppers browsing and searching tools, and provide rich, detailed information about your products and services. Make your site accessible to everyone. On every page include clear links to your privacy and security policy, shipping and handling policies, return policy, and frequently asked questions. Let customers collect items together and check out quickly, with minimal distraction."

An interesting thing is that the authors don't just analyse e-commerce as one of eleven web genres. They also devote two special groups of patterns to E-commerce – Basic e-commerce and Advanced e-commerce. In the root, genre pattern's section "Consider these other patterns", subsection "All e-commerce sites", all nine patterns in the group Basic e-commerce are referenced as a group. Four of them are also referenced with individual motivations, along with eight other patterns from four other layers. In the reference subsection "Advance e-commerce", all the seven patterns in that group are referenced with individual motivations. In this context, I think it will be sufficient to name all the seven patterns in the Basic e-commerce group: "Quick-flow checkout, Clean product details, Shopping cart, Quick address selection, Quick shipping selection, Payment selection, Order summary, Order confirmation and thank-you, Easy returns."

So far, as a note on methodology, I think the authors have succeeded in one of the most difficult tasks of pattern language writing – to lay bare how patterns on different levels interact with each other. The higher level patterns uses those they reference on lower levels. In that sense lower level patterns "make up" those on higher levels, they support them. The core relation between patterns that interact in this way is – the usability of their practical solutions. End users are happy to encounter solutions to all their specific problems (lower-level pattern) in order to "solve" the overall challenge (higher-level pattern). And in this particular application of the pattern language, on e-commerce, it becomes evident that the authors have looked deep into the empirical problems, i.e. that they have been able to share the overall user experience.

When reading the list of patterns in the group "Basic e-commerce" in conjunction with the solution section quoted above, it is clear that the genre pattern "Personal e-commerce" to a large extent is "made up" of these lower level patterns, that it needs them, in just the right combination and supported by as many patterns from four other layers of the language. End users will not be content if any of those practical solutions are missing. Instead, they will be critical in respect to the site's overall usability.

### **How are patterns related to other usability methods in The Design of Sites?**

In preparing this position paper, I took an extra look on how the authors present the methodology of patterns in relation to other usability methods. My end impression is that the authors promotes what could be characterized as "an ad hoc usage" in relation to the overall design process. The very thorough introductory section of the book opens with 16 pages on 1. Customer-Centered Web Design, followed by 11 pages on 2. Making the most of web design patterns (What are patterns, A sample pattern, How to read a pattern, How to use patterns). After that, another 75 (!) pages is devoted to a dense, yet popular and well written summary of the following issues: 3. Knowing your customers: Principles and techniques, 4. Involving customers with iterative design, 5. Processes for developing customer-centered sites.

Well, how are the pattern methodology integrated with the more traditional usability methods? The last section of section 2 is called "An example pattern" and it exemplifies what could be called "a last resort usage" of patterns in the design process. Here, patterns are only looked into when some hard-to-track-problems have already arisen: a designer skims a genre specific category (e-commerce), finds pertinent problem (checkout), pinpoints a hidden problem (confusing link names), skims high-level genre pattern again (Personal e-commerce), finds another relevant pattern (Shopping cart), makes mental note to ask team members about a particular design detail, finds a pattern referenced as a lower level pattern in the e-commerce category (Process funnel), sketches alternative designs, informally interviews programmers in the design team, refines the designs, informally tests the old and the new designs with five users, reports findings in design team, which reaches a consensus on the crucial features.

The same very open and ad hoc usage of pattern collections, much in the spirit of using them as self-contained sourcebooks, is found in the other sections. For example in 3.2 "Techniques for knowing your customers" (about Task analysis, Scenarios, Observations and interviews, Customer surveys, Focus groups, Web site analysis) patterns are only mentioned once, in relation to scenarios/storyboards, where genre patterns can help to depict the overall usage at an early stage in the design process.

Likewise, in section 5. Processes for developing customer-centered sites (about the phases of design: Discovery, Exploration, Refinement, Production, Implementation, Launch, Maintenance) some 30 patterns are mentioned, but never, with two minor exceptions, in the concluding section where the deliverables are described and explained.

### **Conclusion**

What can be concluded from this lack of integration between methods, even in a book that promotes the pattern language method so well? One conclusion is that the pattern method has not reached the kind of stability and consensus among its practitioners it needs, in order to find salient connections with other usability techniques. If this is true, then this workshop has framed its subject well. Especially the answers to the questions on team collaboration, complementing diagrammatic representations, and tools for authoring and review, may indeed become inspirational for the future cross-pollination between the sub-genres of usability research.

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