Pattern Languages as Languages

A Position Paper for the CHI 2000 Workshop: Pattern Languages for Interaction Design

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ABSTRACT

I begin by discussing the use of pattern languages as *lingua franca* for supporting communication among the diverse parties to the design process. Next, I describe an example of the emergence of a *lingua franca* during the process of re-designing a small town, and the ways in which it enabled the community to shape its own future. I conclude by suggesting that pattern languages which describe a workplace or work domain could similarly function as a common language, giving workers more control over the future of their workplaces. I provide an abbreviated sketch of a language called *Design Consultancy*, which includes patterns such as *Maintaining Mutual Awareness*, *Locally Mobile Workers*, and *Receptionist as Hub*.

INTRODUCTION

In the last decade, pattern languages have attracted increasing attention from technologists, first in the object oriented programming community, and now in the HCI community. For HCI, in general, and interaction design, in particular, patterns are an idea whose time has arrived.

However, I have a number of concerns about the ways in which design patterns are being used, and the reasons for which they are being adopted. In my experience, the two most oft-cited reasons I encounter are these:

- **Quality**. Design patterns will support the creation of systems that have what Alexander and his colleagues [1, 2] call "The Quality Without a Name" (and which, computer scientists, in their inimitable way, have reduced to the acronym QWAN) — this is a shorthand for systems which really 'work' for people, in all of the many meanings of that phrase, and
- **Re-Use**. Design patterns permit the re-use of the hard-won wisdom of designers, allowing the accumulation and generalization of successful solutions to commonly encountered problems.

While I think there are reasons to look skeptically at both these rationales[1], my purpose here is not to critique them, nor to discourage people from pursuing these very difficult problems. Rather, I would like to focus on a different rationale for using design patterns, one which I believe has not received proper emphasis: the potential role of design patterns as a common language among designers, stakeholders and users. I believe that taking this perspective seriously has implications for how to frame patterns, as well as how to use them.

In this position paper, I will do three things. First, I'll say a little bit about the need for a *lingua franca* in interaction design. Then, the bulk of the paper will describe a case study from the urban design literature: the "re-design" of the town of Manteo, North Carolina, by Randy Hester and his colleagues in the 1980's [5]. The case study is of interest to us because it illustrates the utility and power of creating a *lingua franca* to be used in guiding a design project. The case is also interesting because the *lingua franca* described did not result from applying the Alexandrian pattern language approach, and the resulting 'language' is not a pattern language, as conceived by Alexander and his colleagues, though there are interesting parallels. The paper concludes by returning to interaction design: it argues that pattern languages could function analogously in situations in which new technologies are being introduced into workplaces, and provides an abbreviated example of a workplace pattern language drawn from an ethnographic study of a design firm.

THE NEED FOR A *LINGUA FRANCA*

As the audience for this paper is from the HCI filed, I will only say a little about the need for a common language, as I believe this is obvious to anyone in our field.[2]

[1] For example, unlike architecture, we are not able to look back over several millennia of design examples, nor do we have agreement, as far as I can tell, about what would constitute the Quality Without a Name in our domain

[2] That is, the *need* is obvious; whether it is really possible to practically address the need is another question.

The fundamental problem is implicit in the "design triangle" shown below (figure 1). The basic point is that for design to actually happen, there typically needs to be interaction among designers, users (or representatives of potential users), and other stakeholders. However, because the various participants in the design process come from a very wide variety of backgrounds, it is unlikely that there is a shared conceptual framework, disciplinary orientation, or other form of common ground. This, in turn, makes communication difficult and time-consuming. And current trends—the increasing complexity of design which requires participation from even more disciplines, and the increased desire to move quickly—exacerbate these problems.

Figure 1. The Design Triangle.

I believe that pattern languages offer a possible solution to this problem. As I have argued elsewhere [4], design patterns have a number of representational properties that make them useful as a *lingua franca*: they have memorable names; they have associated images; and they are protoype-based — that is, patterns are expressed in terms of concrete prototypes.[3]

CASE STUDY: THE REDESIGN OF MANTEO, NC

Note: The content of this section—excepting the "Alexandrian Interludes"—is drawn almost entirely from an article by Randolph T. Hester, Jr. [5]; the article discusses both the design process and its consequences over the ensuing decade. To avoid annoying the reader, I will not repeatedly cite it.

The Problem

In the 1950s North Carolina built a bridge to facilitate tourist travel to the beaches of its Outer Banks. While this was a boon to the Outer Banks' tourist trade, it was a slow but sure catastrophe for the town of Manteo, which was bypassed by the new highway and the flow of tourists. Over the next thirty years Manteo was transformed from the region's principal trade center to a near ghost town with the highest unemployment and tax rates in the state.

In 1980 the town of Manteo asked Hester, a community designer, to devise a plan to bring about an economic revival by developing Manteo's historic waterfront to encourage tourism. At the same time, the residents wanted to preserve the aspects of Manteo that they valued; they didn't want to sacrifice the town's character to tourism.

The Beginning of the Process

Hester began by trying to identify what it was that residents valued about their town. Initially he used surveys and face to face interviews to explore what was important to the residents. These techniques resulted in a number of general findings: people valued small-town qualities such as friendliness and informality; they also saw certain areas (the waterfront) and places (particular shops) as important to their quality of life.

However, Hester and his team were not satisfied by these findings. It was not obvious how to move from the general sentiments expressed, to decisions about what might be changed and developed and what ought to be preserved. So, Hester and his colleagues turned to an approach they called "behavior mapping." This involved observing and recording the activities of the townsfolk over a period of several weeks. The result was a set of sketches of settings and maps of place-based activity that seemed important to the life of community. Mapped behaviors included activities such as "hanging out at the docks", "watching the sunset", and "debating politics in the Dutchess restaurant" (figure 2). It is interesting to note that most of the places in which seemingly important activities were observed had not been mentioned in the surveys or interviews. And as Hester said, "Lifestyle and landscape were intertwined. Daily ritual was place-specific, and the cultural dependence on places seemed more widespread than people had reported in our interviews."

Alexandrian Interlude

Let's pause, briefly, to reflect on the similarities between the activity maps described here, and Alexandrian patterns. The activity maps seem like particular instances of Alexandrian patterns for "local shops and gathering places." However, none of these observed activities actually map

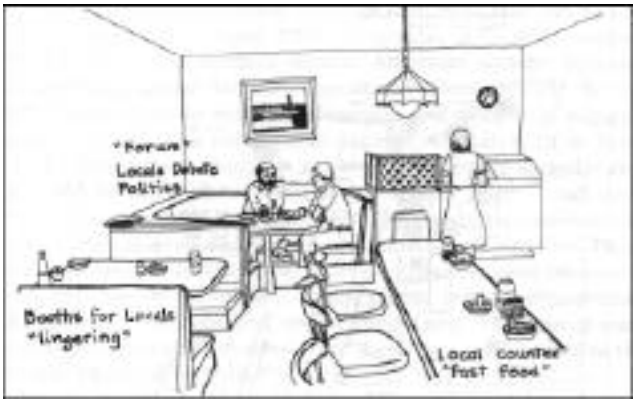

Figure 2. An Activity Map of The Dutchess restaurant, indicating that locals often gathered in a corner booth.

[3] Note that the template for UI patterns developed at the Interact workshop omits, or at least under-emphasizes these attributes (see http://www.it.bton.ac.uk/staff/rng/UPLworkshop99/Poster.html). In particular, there is no requirement for an image (though the example does show one), nor is the importance of a memorable and evocative title established.

directly onto an Alexandrian pattern as described in *A Pattern Language* [2] — the closest match is between The Dutchess restaurant activity map and "Street Cafe", but that's still a bit of a stretch. Note also that Hester and colleagues generated their activity maps from direct observation, and not by starting with Alexandrian patterns.

Validation and Ranking

The next step was to verify that the places where the activities occurred were actually important to the residents. Using information from the surveys, interviews and behavior mapping, and drawing on knowledge of social patterns in other towns and discussions with Manteo's leaders, a list of 'important places' was generated. The list, in conjunction with a newspaper based questionnaire, was used to allow the residents to rank the places in order of their importance. The idea was that items above a certain point would be protected from development. The results were collated, and the resulting list was published in the town newspaper. One resident, observing that quite a few places were ranked higher than the local churches and cemetery, dubbed the list "the Sacred Structure of Manteo." The name stuck, and came to be used for the places that were to be preserved and protected.

Manteo's "Sacred Structure"

Manteo's sacred structure (figure 3) consisted of seemingly mundane places. As Hester notes, "these places are almost universally unappealing to the trained professional eyes of an architect, historian, real estate developer, or upper-middle-class tourist." For example, the sacred structure included the marshes surrounding the town, a park, the Dutchess restaurant, locally made (unreadable) street signs, and a gravel parking lot where people gathered to watch the sun set and where the town's Christmas tree was set up. Of the sacred places, only two were protected by historic preservation legislation, and a few more by zoning laws; that is, the existing planning and legal mechanism intended to help preserve the character of places missed most of what was actually valued.

Figure 3. Manteo's Sacred Structure map.

The codification of Manteo's sacred structure had a number of important consequences. First, it shifted the discussion of the town's redevelopment from the abstract ('let's keep it friendly and homey') to the concrete ('let's keep the Dutchess restaurant and the gravel parking lot'). Second, it enabled the residents to see that each person's preferences weren't idiosyncratic: for the first time, for example, it became evident that *many* people liked the unreadable street signs. Third, the sacred structure map became a vehicle for legitimization. That is, Manteo's sacred structure was not, as already noted, composed of impressive buildings or places. Indeed, Manteo was not a particularly "quaint" place, and occasional disparaging comments from tourists led many residents to feel that the unpretentious places reflected poorly on their town. When the design team recognized that locals were somewhat ashamed, they stepped forward and spoke in favor of the places, and the townspeople came to feel that their values were legitimate.

Over time, the sacred structure map became a part of the local vocabulary, and, by so doing, it came to serve as a collective tool for controlling the development of Manteo. One role the sacred structure played—by virtue of its mapping abstract values onto concrete places—was that of a measuring rod. That is, it may be difficult to see whether building a shopping mall in a particular location will decrease the friendliness of the town; but it is very easy to see whether it will require the marsh to be filled in, or the gravel parking lot to be built on. Second, the sacred structure also served as a negotiating tool. It provided a way for residents to articulate their intuitive responses to particular development plans and proposals. And, because the sacred structure was representation that the townspeople shared, it gained power. A developer intent on building a strip mall on the gravel parking lot might ignore the first few people who described it as a sacred structure, but as he encounters more and more people who speak of it in the same way, a powerful impression is formed.

Alexandrian Interlude

The emergence of the sacred structure map as a concept shared by the community seems, to me, to be provide a superb example of the benefits that a pattern language as a *lingua franca* would provide. As it became part of the common tongue of the town, it gained power because people had a shared understanding and set of values, and because they knew that their understanding and values were shared.

Indeed, though Alexander focuses on the use of pattern languages for achieving the quality without a name, he has much to say about pattern languages as languages. He argues that, in pre-industrial societies, pattern languages were not the domain of architects, but were shared by all members of a community:

> In a town with a living language, the pattern language is so widely shared that everyone can use it. [1, page 229]

And he goes on to say:

> Each person in a town knows that his own small acts help to create and to maintain the whole. Each person feels tied into society, and proud because of it. [1, page 231]

This seems in remarkable synchrony with what happened in Manteo, with the creation of the sacred structures leading to a shared understanding that certain places were valued by the community, and that those valuations were legitimate.

Manteo's Sacred Structure Seven Years Later

Hester's work did not stop with the creation of Manteo's sacred structure; the process continued, resulting in a development plan and the solicitation of proposals from developers. However, we will not look at that; instead we will jump ahead seven years to when Hester returned to Manteo to see how the plan had fared over the years.

The redevelopment effort was extremely successful in stimulating economic growth without destroying what residents liked about the town. However, what is of primary interest here is the degree to which the community's knowledge of Manteo's sacred structure had persisted. The residents of Manteo— not just politicians and planners, but 'ordinary people' as well—continued to refer to it, though by this time they used the phrase "sacred spots". Hester reports that his interviews with residents revealed that knowledge of the town's sacred structure influenced the redesign of the Dutchess restaurant, the rebuilding of Fearing's Soda Shop (another sacred spot), and that "community members have consistently undertaken similar conscious actions to save and enhance what they now call 'Sacred Spots.'"

Alexandrian Interlude

To me, this is an amazing and inspiring result, perhaps the highest goal to which a designer can aspire. Hester's work in Manteo resulted not only in a plan for achieving economic renewal without sacrificing the town's character (the explicit goal he was asked to achieve), but it also resulted in a s*hared, self-sustaining system of beliefs and values* that enabled the plan to be realized over a much longer period of time. It seems to me that this shared system of beliefs and values — expressed in terms of concrete places and everyday activities — is really the heart of what pattern languages are all about, and hearkens back to Alexander's discussions of the role of pattern languages in pre-industrial societies. If a pattern language for a design project can be created and learned by the entire community, so that the community, and not just a few special interests, can participate in shaping the decisions to be made, I think the quality without a name will take care of itself.

WORKPLACE PATTERN LANGUAGES

In what has gone before, I've argued in favor of the use of pattern languages as *lingua franca*, and I've given an example which, though not derived from Alexander's methodology, illustrates the power and import of this approach. In this final section, I'll conclude by sketching a few patterns that might form part of a workplace pattern language. As analogy with the preceding example suggests, I imagine this language being used by the inhabitants of the workplace to understand and control the evolution of their environment, in the face of pressures to stimulate productivity by introducing new technologies and work practices.

A Small Beginning: Unpacking an Ethnography

I've generated the following patterns (see [4] for more detail) based on an ethnography of a design firm by Bellotti and Bly [3]; the patterns are intended for expository purposes only, and shouldn't be taken too seriously.

The design firm works with many clients at the same time, and provides a wide range of services. Its designers and engineers work on project-oriented teams (often more than one at a time), which form and reform as new projects begin and old ones end. The company culture encourages kibitzing and informal collaborations across team boundaries. The design firm is geographically distributed, and it is not unusual for the members of a project team to be located in different buildings, or even in different cities.

A Sketch of *Design Consultancy*

Let's look at some of the patterns that could describe the design firm. Because space is limited, I'll summarize the patterns; after describing a few patterns, and alluding to others, I'll discuss some of the ways in which a design firm pattern language might be used.

The largest scale pattern might be called *Design Consultancy*: its goal would be to characterize the design consulting business by describing the various forces which shape it. Thus the language would depict the firm's need to act quickly and flexibly to get, keep, and complete projects, balanced with its need to do this with a relatively fixed set of human resources, and limited amounts of time and materials. *Design Consultancy* would also describe the multiple clients, simultaneous projects, loose teams, and informal collaborations that occur in the firm. It would end with pointers to the smaller scale patterns which support *Design Consultancy.*

These patterns would include:

Maintaining Mutual Awareness. Bellotti and Bly observed that it was important for designers and engineers to keep up-to-date with what was going on, regardless of the projects with which they were involved. This practice helped the company bring a wide range of expertise to bear on problems, and was a good counterbalance to the potential inflexibility of project-oriented teams. *Maintaining Mutual Awareness* is supported by a number of smaller scale activity patterns, ranging from *Blanket Email* (the custom of addressing email messages with questions or answers to large groups) to *Kibitzing*, to what one engineer called *Doing a Walkabout* (i.e. wandering through the work areas just to see what others were up to). *Maintaining Mutual Awareness* was also supported by spatial patterns such as *Open Offices*, *Model Shop* and *Central Scanning Station*.

Locally Mobile Workers. This pattern (one of the central points made in the Bellotti and Bly paper [3]) captures the fact that many engineers and designers spend considerable time away from their desks, but are still in the general

vicinity. On the one hand, workers are pulled away from their desks by the need to get access to immobile shared resources such as *Model Shop* and *Central Scanning Station*, or to find local coworkers with whom they need to collaborate. On the other hand, they are pulled back to their desks by the need to use desk-based personal resources (PCs, telephones, voice mail) or to collaborate with remote colleagues. Thus, the engineers and designers spend considerable time moving about, a fact which — as Bellotti and Bly note — has considerable consequences for how they accomplish their work. Clearly, to the extent that locally mobile workers encounter others, this pattern supports *Maintaining Mutual Awareness*, at least for coworkers in the same locale.

Another pattern that goes hand in hand with *Locally Mobile Workers* is:

Receptionist as Hub. The mobility of many workers produces a need for coordination, a way for one person to locate another when the need arises. In this workplace Bellotti and Bly discovered that the receptionist played an important role in keeping track of people. This arose because her location and continuous presence at the entrance enabled her to observe the arrivals and departures of people. This was facilitated by her role as the conference room coordinator, which resulted in her being aware of the time, location and composition of meetings. Finally, some employees, recognizing her role as *de facto* coordinator, had adopted the practice of informing her of their anticipated whereabouts.

Many other patterns could be described — *Open Offices*, *Shared Resources*, *Kibitzing*, *Blanket Email*, and *Doing a Walkabout* — but this is enough to give a flavor of what the consulting firm pattern language would be like.

Uses of *Design Consultancy*

I imagine that the design firm would own and maintain its own pattern language. Perhaps, in the future, corporations will have staff ethnographers whose job is to maintain the corporate pattern language, and make sure that it doesn't get out of synch with the actual life of the organization, which presumably gradually evolves under the influences of a myriad of internal and external pressures. Such a pattern language would be a key part of the firm's intellectual property: it would be how the firm understood itself; it would provide a way for the firm to reflect upon its success and failures and understand its strengths and weaknesses; it would provide a way of gauging the impact of new technologies, processes and people on its functioning.

For example, suppose that the design firm is considering the purchase of an automatic scheduling system. While the first order effects of this might be to reduce the receptionist's workload and to provide employees with more immediate access to room scheduling, consideration of the pattern language — in particular, *Receptionist as Hub* and its supporting patterns — suggests that such a change might have less beneficial second order effects. For instance, reducing the receptionist's involvement in meeting scheduling might well reduce her effectiveness in keeping track of employees whereabouts. Or, to take a different example, switching from open offices to closed offices would could undermine *Maintaining Mutual Awareness* and *Kibitzing*.

The point here is not that these patterns and their relationships should be used to reject or approve changes, but rather that they can be used as a language for discussing changes and reflecting on their possible impacts, both in terms of the activities of the organization, and in terms of the qualities of work life which its members value. Just as Manteo was able to support economic redevelopment without sacrificing its quality of life, so might organizations of the future be able to evolve without sacrificing valued aspects of their corporate cultures.

CONCLUSION

I've sketched out my notion of design as an inherently communicative process, and suggested that pattern languages can have an important roles as *lingua franca*. I've offered the redevelopment of Manteo, North Carolina as an illustration of how providing a community with a common, concrete language can give ordinary people more control over how design impacts their lives. I've suggested that workplace pattern languages might function in a similar manner. Clearly, this is speculative, but it seems likely that in the future organizations will need to evolve quickly and flexibly, and that any method which can decrease the tension between necessary change and preservation of what is valued will be of immense importance.

ACKNOWLEDGMENTS

This paper draws very heavily on the work of Hester [5], and Bellotti and Bly [3]. However, the interpretations herein are my own, and might very well not meet with the approval of the authors.

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