

Origin of Alexander et al: Pattern Language for Unbounded Interaction **Ron Wakkary**

This paper explores the idea of Pattern Language as a method for interaction design in a social network environment. It is the belief of the author that Pattern Language can enable interaction design to address group interaction within an “unbounded” interaction event. The aim is to define a theoretical starting point for adapting Pattern Language that addresses criteria informed by the concept of social network analysis. The criteria are comprised of three properties: community definition, reciprocity and scale, and rich methodology.

Introduction

This paper explores the idea of Pattern Language as a method for interaction design in a social network environment. It is argued that Pattern Language can enable interaction design to address group interaction within an “unbounded” interaction event. The aim is to define a theoretical starting point for adapting Pattern Language that addresses criteria informed by the concept of social network analysis. The criteria are comprised of three properties: community definition, reciprocity and scale, and rich methodology.

Is Pattern Language The Way To Design For Social Networks?

Christopher Alexander’s pattern languages are abstract design tools that have been in use in architecture and urban design for the last thirty years. Pattern language is a network of patterns that model the interplay between design and social interaction in order to create a range of design solutions. But pattern languages are not intended as universal or generic toolkits; rather, they are meta-languages that generate situated design languages. (Erikson 1997)

Alexander and his colleagues began in the late sixties to analyze architecture and urban design as an interrelated set of design solutions. Recurring patterns were identified, refined and assessed for relevancy to particular problems. Patterns were integrated into a structured language of hierarchical patterns. The languages are extant and reliant on individual interaction for refinements, additions and subtractions. They are living languages, and like all other languages subject to the patterns of social use and context. An example of a pattern language is codified in the book *A Pattern Language*, (Alexander et al 1977). Described in a companion volume, *The Timeless Way of Building*, (Alexander et al 1979) is a discussion on the use of the patterns.

More recently, pattern language has been adopted by other technology related design disciplines. Pattern languages have extensively been used in object-oriented computer programming (Gamma et al 1999), interaction design (Erikson 1997), and more recently games design (Kreimeier 2002)

Alexander’s Pattern Language

In order to best illustrate the structure of a pattern and the structure of a pattern language, I will quote Alexander at length from *A Pattern Language* (see also Fig. 1):

The elements of this language are entities called patterns. Each pattern describes a problem which occurs over and over again in our environment, and then

describes the core of the solution to that problem, in such a way that you can use this solution a million times over, without ever doing the same thing twice.

For convenience and clarity, each pattern has the same format. First, there is a picture, which shows an archetypal example of the pattern. Second, after the picture each pattern has an introductory paragraph, which sets the context for the pattern, by explaining how it helps to complete certain larger patterns. Then there are three diamonds to mark the beginning of the problem. After the diamonds there is a headline, in bold type. This headline gives the essence of the problem in one or two sentences. After the headline comes the body of the problem. This is the longest section. It describes the empirical background of the pattern, the evidence for its validity, the range of different ways the pattern can be manifested in a building and so on. Then, again in bold type, like the headline, is the solution – the heart of the pattern – which describes the field of physical and social relationships which are required to solve the stated problem, in the stated context. This solution is always stated in the form of an instruction - so that you know exactly what you need to do, to build the pattern. Then, after the solution, there is a diagram, with labels to indicate its main components.

After the diagram, another three diamonds, to show that the main body of the pattern is finished. And finally, after the diamonds there is a paragraph which ties the pattern to all those smaller patterns in the language, which are needed to complete this pattern, to embellish it, to fill it out.

There are two essential purposes behind this format. First, to present each pattern connected to other patterns, so that you grasp the collection of all 253 patterns as a whole, as a language, within which you can create an infinite variety of combinations. Second, to present the problem and solution of each pattern in such a way that you can judge it for yourself, and modify it, without losing the essence that is central to it. (Alexander et al 1977)

Returning to the origins of Alexander et al, reminds us of the language of the patterns, and the ultimate goal of creating a social process for design that includes us all as enabled participants and practitioners. This is critical in regard to pattern language. Alexander is clear that individuals should not only be enabled to use patterns but each should be able to create their own patterns, and ultimately their own language. This level of participation is central to the idea of “piecemeal” building: a community is built over a long period of time, piece by piece. (Alexander et al 1977, 1979)

81 SMALL SERVICES
WITHOUT RED TAPE*



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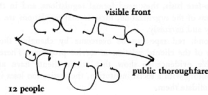
people that can sit down in a face-to-face discussion. It seems likely that a smaller staff size will work better still. Furthermore, each service should be relatively autonomous—subject only to a few simple, coordinative regulations from parent organizations—and that this should be emphasized by physical autonomy. In order to be physically autonomous, each service must have an area which is entirely under its own jurisdiction; with its own door on a public thoroughfare, and complete physical separation from other services.

This pattern applies equally to the departments of a city hall, a medical center, or to the local branches of a welfare agency. In most of these cases the pattern would require basic changes in administrative organization. However difficult they may be to implement, we believe these changes are required.

Therefore:

In any institution whose departments provide public service:

1. Make each service or department autonomous as far as possible.
2. Allow no one service more than 12 staff members total.
3. House each one in an identifiable piece of the building.
4. Give each one direct access to a public thoroughfare.



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... all offices which provide service to the public—WORK COMMENTARY (41), UNIVERSITY AS A MARKETPLACE (43), LOCAL TOWN HALL (44), HEALTH CENTER (47), TEENAGE SOCIETY (84) need subsidiary departments, where the members of the public go. And of course, piecemeal development of these small departments, one department at a time, can also help to generate these larger patterns gradually.

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Departments and public services don't work if they are too large. When they are large, their human qualities vanish; they become bureaucratic; red tape takes over.

There is a great deal of literature on the way red tape and bureaucracy work against human needs. See, for example, Gideon Sjoberg, Richard Bryner, and Buford Fazio, "Bureaucracy and the Lower Class," *Sociology and Social Research*, 50, April, 1966, pp. 325-77; and Alvin W. Gouldner, "Red Tape as a Social Problem," in Robert Merton, *Reader in Bureaucracy*, Free Press, 1952, pp. 110-18.

According to these authors, red tape can be overcome in two ways. First, it can be overcome by making each service program small and autonomous. A great deal of evidence shows that red tape occurs largely as a result of impersonal relationships in large institutions. When people can no longer communicate on a face-to-face basis, they need formal regulations, and in the lower echelons of the organization, these formal regulations are followed blindly and narrowly.

Second, red tape can be overcome by changing the passive nature of the clients' relation to service programs. There is considerable evidence to show that when clients have an active relationship with a social institution, the institution loses its power to intimidate them.

We have therefore concluded that no service should have more than 12 persons total (all staff, including clerks). We base this figure on the fact that 12 seems to be the largest number of

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81 SMALL SERVICES WITHOUT RED TAPE

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Arrange these departments in space, according to the prescription of OFFICE CONNECTIONS (82) and BUILDING COMPLEX (95); if the public thoroughfare is indoors, make it a BUILDING THOROUGHFARE (101), and make the fronts of the services visible as a FAMILY OF ENTRANCES (102); wherever the services are in any way connected to the political life of the community, mix them with ad hoc groups created by the citizens or users—NECKLACE OF COMMUNITY PROJECTS (45); arrange the inside space of the department according to WALKABLE OFFICE SPACE (116); and provide rooms where people can team up in two's and three's—SMALL WORK GROUPS (148). . . .

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Fig.1 "Small Services Without Red Tape" Pattern (Alexander et al 1977)

Pattern Language In A Social Network Context

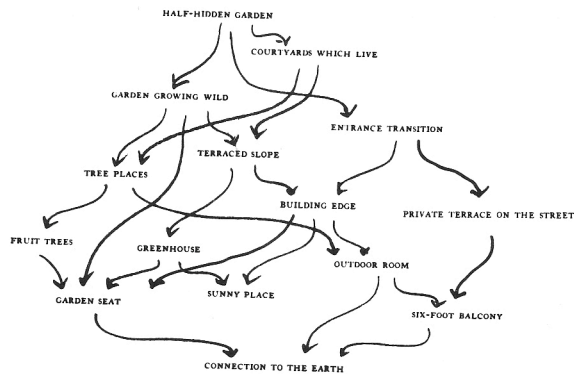


Fig. 2 “Pattern Language is a Network” (Alexander 1979)

Embedded in Alexander’s thinking is the idea that Pattern Language is deeply social. This paper aims to make more explicit the sociological aspect of design, generally, and pattern language, specifically. Toward that aim, social network analysis enables us to more fully analyze and understand the social context that pattern language is part of; and ultimately explain how it may be a method for creating interaction design solutions within a social network context.

These ideas and the idea of creating a social design process based on pattern language have been extended to create a conceptual framework. The framework identifies the following characteristics for a social design process:

- **Community Definition:** How does the design process describe its community or social context for interaction. Is there an understanding of community dynamic and is it situation-based? Does it allow for a temporal dimension of varying scale from the short-term (the immediate) to the long term (historical);
- **Reciprocity and Scale:** Can the design process establish at a meta-level the need for scale, whereby larger structures are connected to smaller actions and the opposite is true as well. Can the design facilitate reciprocity whereby actions within the event, however small, affect the overall design itself.
- **Rich Methodology:** Is the process and methods diverse and robust enough at both the design and meta-design level? Can it support “piecemeal” and collaborative development over a long period of time? Can the methods support qualitative and quantitative analysis, scalable participatory interaction, and be discursive.

What is the Relevance of Social Networks to Interaction Design?

Social Network analysis is the study of relationships and structures of relationships among social groups. “Social network analysts seek to describe networks of relationships as fully as possible, tease out the prominent patterns in such networks, trace the flow of information (and other resources) through them, and discover what effects these relations and networks have on people and organizations.” (Garton, Haythornwaite, Wellman 1999)

The sociologist Barry Wellman and other advocates of social network analysis argue that traditional approaches to community rely on a priori acceptance of community as a physically bound, tightly knit, and self-supporting entity. The neighborhood concept is in part based on a

pastoral fantasy, or nostalgic idea of the medieval village or pre-industrial rural town as being the archetypal neighborhood.

Let's examine closely the differences in social network analysis and traditional sociology in regard to community:

Consider the traditional approach saying that neighborhood equals community. This implies that successful neighborhood communities are tightly bound, densely knit groups of broadly based ties:

- Tightly bounded: Most community ties stay within the neighborhood.
- Densely knit: Most neighborhood residents interact with each other.
- Broadly based: Each tie among neighborhood community residents provides a wide range of social support and companionship.

Yet social network analysts have discovered the opposite.... They have shown that communities are usually loosely bound, sparsely knit networks of specialized ties:

- Loosely bounded: Most community ties do not stay within the neighborhood. Indeed, they do not stay within any social boundary such as a kinship group or community circle. Instead they ramify outward.
- Sparsely knit: Only a minority of personal community members interact with each other.
- Specialized: Most community ties provide a limited range of social support and companionship.

In short, communities are far-flung social networks and not local neighborhood solidarities. (Wellman 1999b)

Communities Are Networks Not Neighborhoods

Social network analysis assumes a community to have characteristics of a network and not a neighborhood. The social ties of network members are not predominantly the strong familial kind or marked by frequent interactions, rather the network members are bound loosely together. Like a network, the points of contact are not proximal, rather the contacts are specialized and often remote from each other. Communities are nebulous, sparsely knit, unbounded, and specialized.

The importance of the redefining of the term community as less a "spatial relationship", and more a "social relationship" cannot be overstated. "The traditional approach of looking at community as existing localities – urban neighborhoods and rural towns - made the mistake of looking for "community", a preeminently "social" phenomenon in "places", an inherently "spatial" phenomenon....The trick is to treat community as a social network rather than as a place." (Wellman 1999b)

The dynamics of interactions of flow and interplay are more at home in our more nebulous environment of mobility, spatial diversity, dispersed relationships, and multi-modality. (Wellman & Gulia, 1999)

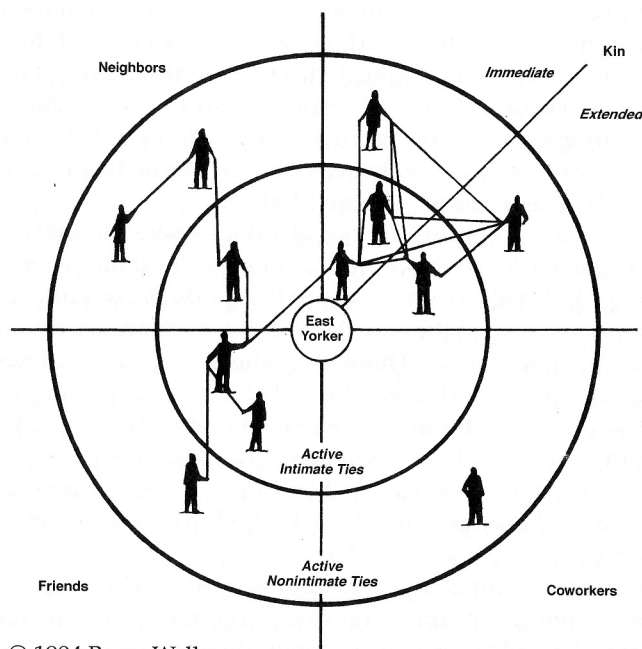
The inherent risk of the traditional "neighborhood" approach is that it is narrow in scope, overlooking community interaction, and mistakenly determining that community is disappearing. The same general analysis could be applied to interaction in virtual

environments. Current interaction design environments are predominantly bounded and spatial, risking an approach too narrow in scope and insufficient in addressing the more complex interaction environments that are unbounded and more structurally diverse.

Whole Networks And Personal Networks

Generally, network analysis defines two types of networks, “whole networks” and “personal networks”. “Whole networks”, or what Wellman calls the “Copernican” view is useful in studying bounded social groups, like organizations. (Wellman 1999a)

While “whole networks” are useful to analyze social groups with clearly defined boundaries, they have their practical drawbacks: “Yet whole network studies are not always feasible or analytically appropriate.” (Wellman 1999a). It is the latter approach, “personal networks”, or what Wellman calls the “Ptolemaic view” that is more flexible and able to study the less bounded or unbounded networks: “many community network analysts ... have concentrated on studying smaller *personal (or ego-centered) networks* defined from the standpoint of *focal persons*: a sample of individuals at the centers of their own networks. Rather than showing the universe as it is viewed by an outside observer, personal network studies provide Ptolemaic views of networks as they may be viewed by the individuals at their centers: the world we each see revolving around us.” (Wellman 1999a)



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Fig. 3 Typical Personal Network of an East Yorker (Wellman 1999a)

We Design In A Social Network Context

Definition of community is a primary advantage of social network analysis. Unlike other approaches its focus is on a wide set of social relationships. Reciprocity and scale is another advantage. By this we can begin to understand how relationships at all scales are interconnected, and equally important, linkages within the network affords the possibility to

change the entire network. Methodology is central to social network analysis. It offers a set of qualitative and quantitative techniques and innovations like “personal networks”.

Can Pattern Language Be Applied To Unbounded Interaction?

Similar to the influence of social network analysis on traditional sociology, pattern language has the potential to influence interaction design. Additionally, social network analysis provides two critical components for developing a theoretical framework for evolving pattern language: first, it provides the necessary sociological theory to better understand the potential; second, it describes the sociological environment that interaction design operates in.

How does pattern language fit the framework for a social network design process?

- **Community Definition:** The community that supports pattern language in Alexander’s *A Pattern Language* is at the core scalable, individuals can participate and create at varying levels of patterns influencing directly and contextually their environment. Action meets response at a personal and community level. The community is scalable temporally. The concept of “piecemeal” in Pattern Language, reveals the understanding of a community and an interaction event that is situation-based, and evolves in a temporal continuum from the short-term (the immediate) to the long term (historical);
- **Reciprocity and Scale:** Pattern language is a complex design process that operates in depth at both meta-design and design levels. This accounts for the inherent reciprocity of pattern language, from designers to interactors through the means of the language, both design and outcomes are directly affected. The definition of the community is embedded in pattern language. Scalability of patterns and hence of design solutions is second nature. The understanding that individuals can create and use patterns and language within a collective context is fundamental to the reciprocity and scalability of pattern language;
- **Rich Methodology:** The interconnections between the contextual pattern language and the ability to create and use pattern language individually is the equivalent of a Ptolemaic approach to interaction design. In addition, the methodology of the language and patterns are rich and inherently enable methodologies on a collaborative and collective level as well.

There is a need to develop an interaction design approach that proactively embeds ideas of social networks in the process. Pattern language has the potential to address that need. Pattern language designs less for the spatially or bounded events and more so for relational and unbounded events. Reciprocity emerges as the design process shifts to the structure of social relationships, or structure of interactions, rather than the spatial or definable structure of the interaction environment.

References

Alexander, Christopher. *The Timeless Way of Building*. New York: Oxford University Press, 1979.

Alexander, Christopher, Sara Ishikawa, Murray Silverstein. *A Pattern Language: Towns, Buildings, Construction*. New York: The Oxford University Press, 1977.

Erikson, Tom and John Thomas. "Putting It All Together: Toward a Pattern Language for Interaction Design Summary Report of the CHI '97 Workshop." Online Article, 1997.

Gamma, E., Helm, R., Johnson, R. & Vlissides, J. *Design Patterns: Elements of Reusable Object Oriented Software*. New York: Addison-Wesley, 1995.

Garton, L, C Haythornwaite, and B Wellman. "Studying Online Social Networks." *Doing Internet Research*, ed. S Jones. London: Sage Publications, 1999.

Kreimeier, Bernd. "The Case for Game Design Patterns." *Gamasutra.com*. 2002

Wellman, Barry. "The Network Community: An Introduction." In *Networks in the Global Village: Life in Contemporary Communities*, ed. Barry Wellman. Boulder, Colorado: Westview Press, 1999.

Wellman, Barry. "Preface." *Networks in the Global Village: Life in Contemporary Communities*, 377. Boulder, Colorado: Westview Press, 1999.

Wellman, Barry and Milena Gulia. "Net-Surfers Don't Ride Alone: Virtual Communities as Communities." In *Networks in The Global Villlage: Life in Contemporary Communities*, ed. Barry Wellman. Boulder, Colorado: Westview Press, 1999.

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